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Case Study

GINGIVAL RECESSION TREATMENT BY TUNNELING, PLATELET-RICH FIBRIN MEMBRANE, DOUBLE CROSS SUTURE WITH BELT-SUSPENDERS TECHNIQUE

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ABSTRACT

Objective: Gingival recession by treating tunneling technique can minimize flap opening so that obtain more adequate blood supply. The addition of a platelet-rich fibrin (PRF) membrane enhances the healing process due to the presence of growth factors. Apart from that, the double cross suture combined with the belt and suspenders technique can also help the success of the treatment.

Methods: A 30 y old female came in complaining her teeth had felt sore for the last 1 y. Complaints increased when brushing teeth and drinking cold drinks, especially on the upper right teeth. The etiology was due to an error in brushing teeth, resulting in gingival recession on teeth 13 of 1 mm and 15 of 2 mm (class 1 Miller). Alveolar bone did not decrease on radiographs. The initial treatment was done by scaling and polishing, followed by the application of desensitizing agents to reduce pain, the patient was instructed to replace her toothbrush type and trained with the modified Stillman method. The surgery used tunneling with PRF membrane, sutured by a double cross combined with the belts-suspenders technique. The controls were done after days 7, 14, 30, 90 and 120.

Results: The results showed that gingival recession on teeth 13 and 15 was corrected 100% from 1 mm and 2 mm to 0 mm. After day 120, there were no complaints of pain or aches, and the patient was satisfied.

Conclusion: The combination tunneling, PRF membrane, sutured by double cross combined with belts and suspenders technique could be an alternative treatment in cases of Miller class 1 gingival recession stable up to 120 d.

Keywords: Double Cross Suture; Gingival Recession; Platelet Rich-fibrin Membrane; Tunneling

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INTRODUCTION

Gingival recession can be defined as the displacement of the gingival margin towards the cementoenamel junction (CEJ), varying in extent and severity [1]. This condition can lead to both periodontal health issues and aesthetic concerns. Typically, patients may experience sensitivity, especially to cold foods and beverages, due to dentin hypersensitivity. Factors contributing to gingival recession include crowded tooth anatomy, prominent root shapes from orthodontic treatment, thin gingival tissue, frenulum attachment extending to coronal, plaque, and calculus, and improper brushing techniques [2, 3].

Management of gingival recession should be based on clinical examination, considering causal factors and the recession's severity. The primary goal is to eliminate etiological factors to prevent relapse. Surgical treatment of gingival recession should be performed based on indications and aesthetic considerations. One technique that can improve gingival recession is the tunneling technique [4].

Tunneling technique treatment combines aspects of partial and full-thickness flaps to create a tunnel-like structure. Flap tension should be minimized to prevent relapse and ensure the stability of the membrane that fills the tunnel [5]. This technique typically yields superior aesthetic results by avoiding vertical incisions and preserving the interdental papilla. Connective tissue graft (CTG), a gold standard for increasing keratinized gum tissue, Aroca *et al.* (2018) reported that CTG yielded substantial clinical attachment gain and a mean root coverage of over 80% at one year, indicating its effectiveness even in complex recession cases. But requires a donor site and may cause postsurgical complications [6, 7]. However, one major limitation is the need for a secondary surgical site to obtain the graft, which can lead to increased risks of bleeding, discomfort, and swelling—prompting consideration of alternative root coverage techniques [6]. Another type of graft is platelet-rich fibrin (PRF) membranes, it helps maintain adequate blood supply, facilitating the effective adaptation of platelet-rich fibrin (PRF) membranes [8].

Platelet-rich fibrin (PRF) is a second-generation autologous platelet concentrate that does not use anticoagulants and contains a high concentration of leukocytes as part of the body's defense system [9]. PRF offers several advantages as a natural biomaterial due to its compatibility with the human body. Its centrifugation process results in the release of growth factors such as Fibroblast Growth Factor (FGF-2), Insulin-like Growth Factor (IGF-1), Vascular Endothelial Growth Factor (VEGF), and Platelet-derived Growth Factor (PDGF), which facilitate cell growth, migration, proliferation, and differentiation during the healing process [10, 11].

To ensure optimal healing, maintaining adequate blood supply and providing stability with appropriate suturing techniques are crucial. Aroca *et al.* and Zuhr *et al.* recommend using a composite stop placed at contact points to prevent soft tissue dehiscence. The double cross suturing technique combined with additional belt and suspenders involves double-crossing sutures fixed with composite. This technique effectively provides fixation and stability during tunneling procedures by adding a PRF membrane [12].

CASE REPORT

Based on the examination findings, the diagnosis for this 30 y old female patient is Miller Class 1 recession on teeth 13 and 15. The treatment plan includes initial phase therapy consisting of scaling and root planing along with oral hygiene instructions. Subsequent visits will involve surgical treatment using the tunneling technique for recession coverage, with the addition of PRF membrane. The suturing technique will employ a double cross pattern supplemented with belts and suspenders for enhanced stability. This comprehensive approach aims to address the patient's chief complaint of tooth sensitivity and ensure long-term maintenance of periodontal health and aesthetics. Regular follow-up visits will be essential to monitor healing and treatment outcomes.

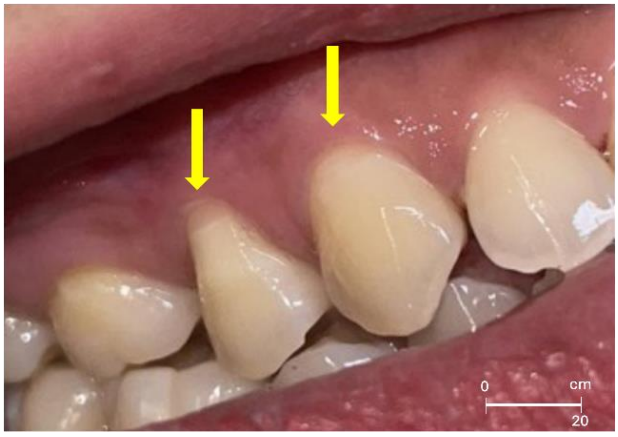


Fig. 1: Examination of 13 and 15

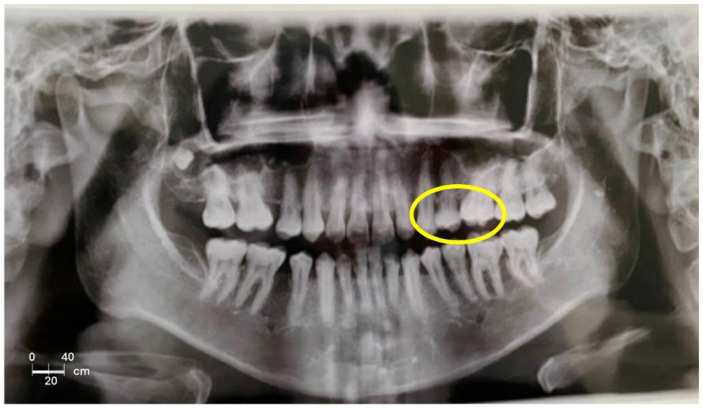
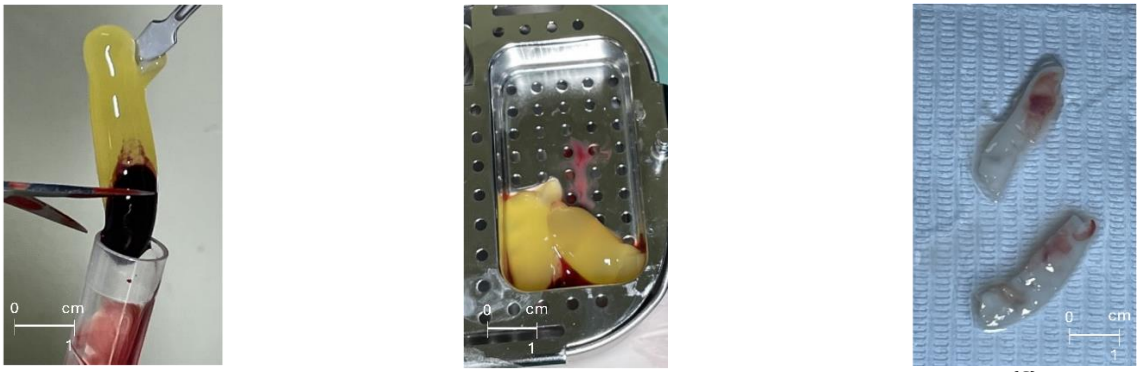


Fig. 2: Examination of panoramic radiograph



(A) **(B)** **(C)**

Fig. 3: Preparation of PRF membrane. (A) Collection of PRF. (B) Compression off PRF. (C) Cutting the PRF membrane to fit the size of the tunnel

Case management

On the first visit, scaling and root planing, as well as Dental Health Education, were performed. The patient was instructed on the correct method, timing, frequency, and duration of tooth brushing. The patient was educated about their condition and the stages of the follow-up treatment plan, to which the patient agreed. No medication was prescribed. During the next visit, recession surgery was performed.

Before the procedure began, the patient was asked to prepare for blood collection. Subsequently, 20 ml of venous blood was drawn from the patient's right median cubital vein and centrifuged with 2700 rpm during 12 min. The platelet-rich fibrin was compressed (fig. 3). The procedure then commenced with asepsis of the operative area using povidone-iodine. Infiltration anesthesia was administered at the mucobuccal fold of teeth 13 and 15. Once anesthetized, the tunneling procedure was performed with a sulcular incision at the gingival margin of teeth 13, 15, and 16 to obtain adequate access to the recession area. A periosteal elevator was inserted between the periosteum and bone through the sulcular incision access. Subperiosteal tunnel extension was carried out to the interproximal area beneath each interdental papilla without cutting the papilla. Next, a flap elevation was done using a tunneling kit and extended to the mucogingival junction. The tunnel was elevated to detach it from its attachments, followed by coronal flap

mobilization. Curettage and Ethylenediaminetetraacetic acid (EDTA) application were performed to remove the smear layer. The prepared PRF membrane was then inserted into the tunnel of teeth 13, 15 and 16 and the thickness of membrane around 0,1-0,5 mm. Adaptation and suturing (Vicryl 6-0) were continued using a combination technique of double cross with additional belts and suspenders. The sutures were secured with composite on the interdental sides of the teeth. The area was irrigated with saline solution and then pressed with saline-moistened sterile gauze. The surgical area was covered with a periodontal pack. The patient was prescribed antibiotics three times daily for 5 d and Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) three times daily if pain, along with chlorhexidine mouthwash twice daily for 5 d, and instructed to avoid eating/drinking hot substances and not to chew food in the postoperative area. The patient was asked to return for a follow-up to monitor the healing process (fig. 4).

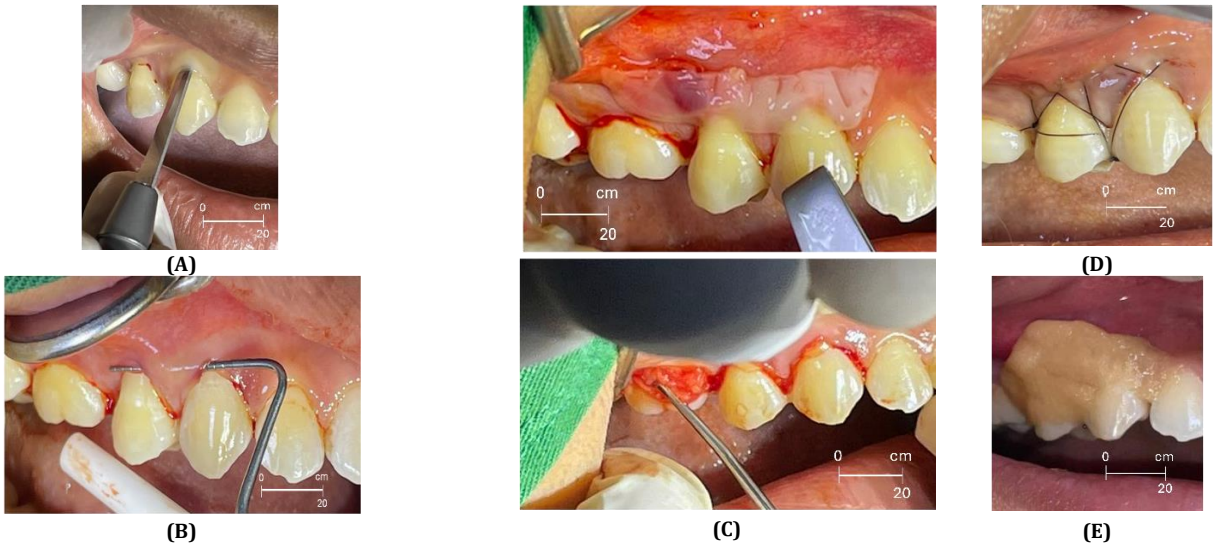


Fig. 4: Procedure steps. (A) Sulcular incision with a microblade. (B) Tunnel elevation with a probe. (C) Placement of the PRF membrane in the tunnel. (D) Combination suturing technique of double cross with additional belt and suspenders, accompanied by interdental composite stops. (E) Application of a periodontal pack

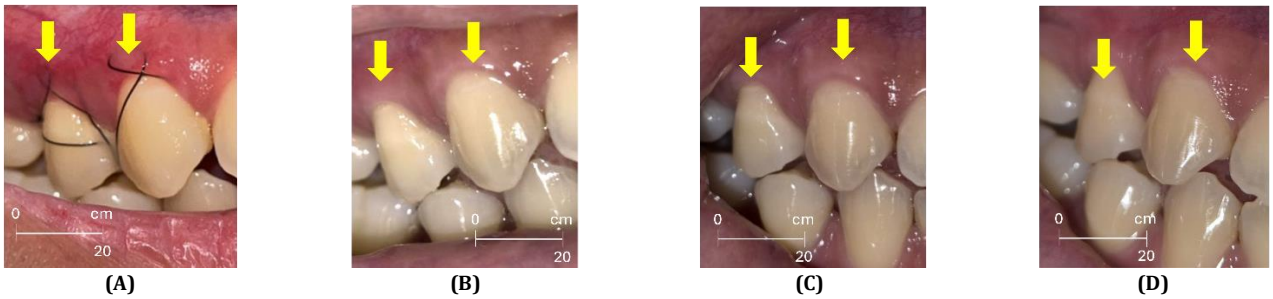


Fig. 5: Post-treatment follow-Up. (A) 2 w follow-up. (B) 1 mo follow-up. (C) 3 mo follow-up. (D) 6 mo follow-up

Third visit: evaluation was performed one week after the tunneling procedure. The gingiva appeared still red but only slightly painful. Fourth Visit: Two weeks post-procedure, sutures were removed, and saline irrigation was done. Fifth Visit: One-month post-procedure, the gingiva appeared coral pink with no relapse. Sixth Visit: Evaluation was carried out three months post-procedure. The patient reported no sensitivity issues and was satisfied with the results, the score of Visual Analog Scale (VAS) 9/10.

Seventh Visit: Evaluation was carried out six months post-procedure. No sensitivity issues and no relaps (fig. 5). Postoperative care included chlorhexidine mouth rinses, avoidance of mechanical trauma to the site, and regular follow-up visits at 1, 3, and 6 mo to monitor tissue stability and detect any signs of relapse.

DISCUSSION

Gingival recession is not caused by age but can result from pathological changes such as destructive periodontal disease, tooth malposition, alveolar bone dehiscence, orthodontic appliance traction, frenulum pull, and occlusal trauma [1, 2]. Other factors contributing to gingival recession include improper tooth brushing techniques. Common incorrect brushing techniques include horizontal and vertical brushing. Aggressive use of these techniques over time can lead to gingival recession [13].

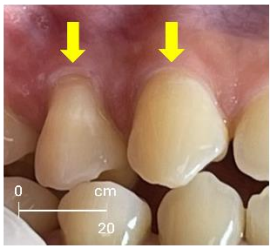
Tunneling is a recession surgery technique developed as a modification of the envelope technique. Various literature confirms that it provides good recession coverage without reducing keratinized gingiva. This technique can be used when the recession is less than 3 mm, offering high aesthetic success and adequate blood supply [14]. In this case, tooth 15 had a 2 mm recession, and tooth 13 had a 1 mm recession, making tunneling the chosen technique. The keratinized tissue gain observed was 2 mm.

Platelet-rich fibrin can be an alternative to using Connective Tissue Graft (CTG), which is the gold standard. Platelet-rich fibrin membrane can be used in cases with contraindications to CTG collection from the palate where the patient and physician want to reduce morbidity and are willing to accept less-than-optimal results [15]. The addition of PRF membranes can aid in the tissue healing regeneration process. It has been reported that PRF releases growth factors more gradually due to the use of a fibrin scaffold that can trap growth factors and release them slowly, such as leukocytes, which are responsible for the

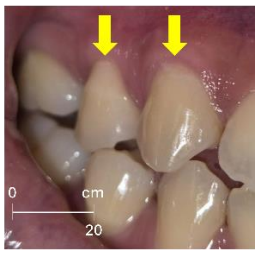
release of additional growth factors [9]. The growth factors produced include the transforming growth factor (TGF), which can stimulate osteoblast proliferation. Additionally, platelet-derived growth factor (PDGF) and insulin-like growth factor (IGF) can regulate the migration, proliferation, and differentiation of mesenchymal cells. In the early stages of healing, PRF also acts as a hemostatic agent and stabilizes the blood clot in the defect area [16].

In addition to surgical techniques and supplementary materials to support the success of recession surgery, the adaptation of sutures after the procedure is also crucial. The sling suture technique with composite stops is commonly used, but often experiences rupture [17]. To prevent rupture, the combination suturing technique of double cross with additional belts and suspenders, along with composite stops at the interdental areas, can be successfully applied. In cases of deep, wide, and asymmetric recession, current suturing techniques often fail to stabilize the tissue along the cementoenamel junction, especially in the mid-tooth region during gingival retraction. This led to the development of the belt (horizontal suture) and suspenders (vertical suture) technique, which combines horizontal and vertical mattress sutures anchored between the interdental teeth with the aid of composite material. Apart from preventing relapse, this technique promotes good healing processes, thus maintaining gingival aesthetics [18].

This case was evaluated over a six-month period. Attached are the pre-and post-operative photographs (fig. 6). Acknowledge that a 6-month follow-up is insufficient to fully assess long-term stability and relapse risk, and recommend collecting 12 mo data in future case series. The absence of microbial/histological analyses and emphasize the need for larger cohort studies to confirm the reproducibility of this combined technique.



(A) pre-operative



(B) post-operative

Fig. 6: Attached are the pre-and post-operative photographs

CONCLUSSION

Treatment of the recession in this case was successfully performed using the tunneling technique combined with PRF membrane. Strong adaptation was achieved with the combination suturing technique of double cross with additional belts and suspenders anchored between the interdental teeth using composite material. This case will continue to be evaluated for up to one-year post-procedure.

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Nil

AUTHORS CONTRIBUTIONS

MAP: Conceptualization, patient management, literature review, manuscript writing; KM: critical revision of the manuscript, supervision

CONFLICT OF INTERESTS

Declare that there is no conflict of interest regarding the publications of this paper.

REFERENCES

1. Baker P. Gingival recession causes and management. Prim Dent J. 2020;8(4):40-7. doi: 10.1308/205016820828463843, PMID 32127093.
2. Hadyan FZ, Kurnia S. Multiple gingival recession coverage treated with modified tunneling technique using acellular dermal matrix (ADM) combined with platelet-rich fibrin (PRF): a case report. In: Proceedings of the 4th Periodontic Seminar (Perios 4). Surabaya: Program Pendidikan Dokter Gigi Spesialis Periodonsia, FKG Universitas Airlangga; 2019. p. 69-73.
3. Etriyani N, Thahir H. Periodontal estetik: perawatan resesi gingiva (tin-jauan pustaka) [Aesthetic periodontal: treatment of gingival recession (literature review)]. B-Dent: Jurnal Kedokteran Gigi Universitas Baiturrahmah. 2021;8(2):131-7. doi: 10.33854/jbd.v8i2.866.
4. Metta P, Miranda A, Rusminah N, Puspitadewi H. Tunneling connective tissue graft as a treatment procedure for miller class I gum recession. Padjajaran J Dent. 2020;32(1):9-16. doi: 10.24198/jkg.v32i1.18042.
5. Khursheed DA, Zardawi FM. Minimally invasive intrasulcular tunneling technique for treatment of gingival recessions: a case series. Clin Case Rep. 2022;10(4):e05699. doi: 10.1002/ccr3.5699, PMID 35414908.
6. Mayta Tovalino F, Barboza JJ, Pasupuleti V, Hernandez AV. Efficacy of tunnel technique (TUN) versus coronally advanced flap (CAF) in the management of multiple gingival recession defects: a meta-analysis. Int J Dent. 2023;2023:8671484. doi: 10.1155/2023/8671484, PMID 37063452.
7. Aroca S, Barbieri A, Clementini M, Renouard F, De Sanctis M. Treatment of class III multiple gingival recessions: prognostic factors for achieving a complete root coverage. J Clin Periodontol. 2018;45(7):861-8. doi: 10.1111/jcpe.12923, PMID 29757468.
8. Pratiwi R, Ratnawati ID, Krismariono A. Root coverage using modified tunneling technique with acellular dermal matrix for treatment of gingival recession associated with orthodontic treatment: a case report. Odonto: Dental Journal. 2023;10(1):47-53. doi: 10.30659/odj.10.0.47-53.
9. Wang X, Zhang Y, Choukroun J, Ghanaati S, Miron RJ. Effects of an injectable platelet-rich fibrin on osteoblast behavior and bone tissue formation in comparison to platelet-rich plasma. Platelets. 2017;29(1):48-55. doi: 10.1080/09537104.2017.1293807, PMID 28351189.
10. De Lima Barbosa R, Stellet Lourenco E, De Azevedo Dos Santos JV, Rodrigues Santiago Rocha N, Mourao CF, Alves GG. The effects of platelet-rich fibrin in the behavior of mineralizing cells related to bone tissue regeneration-a scoping review of *in vitro* evidence. J Funct Biomater. 2023;14(10):503. doi: 10.3390/jfb14100503, PMID 37888168.
11. Utomo DN, Hernugrahanto KD. The role of platelet-rich fibrin facilitates the healing of gastrocnemius muscle defect: a preliminary study on an animal model. Joints. 2019;7(1):31. doi: 10.20473/joints.v7i1.2018.31-41.
12. Chacon Ramirez GJ, Tavelli L, Barootchi S, Wang HL. 'V-reverse' suturing technique for tunnel soft tissue graft and flap

stabilization: technique illustration. Clin Adv Periodontics. 2021;11(3):129-33. doi: 10.1002/cap.10134, PMID 33216466.
13. Rizkika L, Mintjelungan CN, Zuliari K, Khoman J. Hubungan teknik menyikat gigi dengan keparahan resesi gingiva pada masyarakat pesisir pantai di kawasan Megamas Kota Manado. e-GiGi(eG). 2019;7(2):65-70. doi: 10.35790/eg.7.2.2019.23929.
14. Silva BG, Dias MA, Vilela Junior RA. Surgical technique of tunneling for gingival recession recovery: clinical case report. Res Soc Dev. 2021;10(12):e107101220183. doi: 10.33448/rsd-v10i12.20183.
15. Sandra P, Cahyani Adiati E, Khairiyah N, Sulijaya B, Soeroso Y. Effectiveness of tunnelling modification technique using platelet-rich fibrin and connective tissue graft in gingival recession: a systematic review. F1000Res. 2024;13:842. doi: 10.12688/f1000research.152557.1, PMID 41127303.
16. Louisa M, Putranto RA. Scoping review: peran platelet-rich fibrin (PRF) dalam terapi regeneratif peri-implantitis. JIKS. 2023;5(2):172-6. doi: 10.29313/jiks.v5i2.11947.
17. Tambe LV, Tandale MM, Chhibber R, Wu DT. Treatment of multiple gingival recessions using modified tunnel technique with V-reverse sutures: a report of three cases. J Contemp Dent Pract. 2022;23(2):232-6. doi: 10.5005/jp-journals-10024-3301, PMID 35748455.
18. Ronco V. Tunneling: a comprehensive concept in periodontal plastic surgery. 1st ed. Batavia, IL: Quintessence Publishing Co; 2022.