

## Semilunar Papilla Preservation Flap Technique in Combination with Chorion Membrane for Pocket Reduction and Gingival Recession Coverage

### Abstract

An unavoidable consequence of periodontal flap procedure is gingival recession (GR). Achieving both pocket depth reduction and GR coverage remains a challenge to periodontists. The present case report provides a new innovative technique that will enable all clinicians to achieve pocket depth reduction as well as recession coverage in esthetic zone. The clinical parameters that were assessed at baseline, 1 month, 3 months, and 6 months are probing depth (PD), clinical attachment level (CAL), height of GR (HGR), and gingival biotype. The patient reported with a faulty post and core with crown in relation to maxillary right central incisor with a PD of 8 mm and HGR of 2.5 mm. Following replacement of the crown with respect to the tooth, semilunar incision was made and flap was reflected to visualize the underlying bone. This technique does not involve the interdental papilla at the same time allows the coronal advancement of the flap. A chorion membrane was placed to accelerate the healing as well to provide stable clinical outcome. The patient was evaluated at 10 days, 1 month, 3 months, and 6 months. There was a considerable reduction in PD, GR, and thus gain in CAL. The results remained stable over a period of 6 months.

**Keywords:** Chorion membrane, papilla preservation technique, recession coverage, semilunar flap

### Introduction

Gingival recession (GR) following surgical periodontal therapy is a common occurrence. In order to overcome this drawback, Takei HH in 1985 gave the papilla preservation technique. In 1995, Cortellini *et al.* gave the modified papilla preservation for areas with interdental spacing >2 mm and, in 1999, simplified papilla preservation flap for interdental spacing <2 mm. Although papilla preservation flap procedures provide adequate access and retain the vasculature, slight amount of recession can still occur. In 1999, Cortellini *et al.* in their study concluded that, in spite of improved clinical outcomes in terms of probing depth (PD) and clinical attachment level (CAL), the simplified papilla preservation technique leads to a slight increase in GR.<sup>[1]</sup> Checchi *et al.* in 2009, over a follow-up period of 22 years, provided evidence that some buccal GRs occur following modified papilla preservation.<sup>[2]</sup>

In 2017, Aslan *et al.* provided the results of entire papilla preservation technique

over a period of 1 year. The results of the study suggested that preserving the entire papilla using tunnel-like “entire papilla preservation” technique reduces the risk of wound failure and prevents the possibility of exposure of the regenerative biomaterials, leading favorable clinical outcomes.<sup>[3]</sup> However, in case of esthetic regions, the efficiency of this technique in preventing GR is questionable.

The use of guided tissue regeneration (GTR) has been proven by to be an effective method to regenerate the lost periodontium. The potential advantage of GTR to a gingival flap procedure is the possibility of having a different healing pattern and ideally achieving periodontal regeneration rather than connective tissue repair of the exposed root surfaces with no additional donor site. The human placental allografts have gained a lot of popularity over the years due to their unique inherent properties. The human amnion and chorion membranes are said to possess nonimmunogenic, antibacterial, and anti-inflammatory properties, which make them the ideal allograft material for periodontal regeneration. Holtzclaw and

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Toscano in 2013 in a retrospective observational report documented the use of amnion-chorion membrane as GTR membrane for the treatment of periodontal intrabony defects with a minimum of a 12-month postsurgical observation. The results of the study suggested improved clinical outcomes in terms of gain in CAL as well as improved wound healing.<sup>[4]</sup>

In areas with PD as well as GR in esthetic regions, coronal advancement procedures to achieve pocket reduction as well as recession coverage have always been challenging. The present case report promotes the application of semilunar flap technique for preserving the entire papilla, to gain access to the underlying defect as well as to achieve coronal advancement for recession coverage.

### Case Report

A 38-year-old systemically healthy female patient reported to the department of periodontology with a chief complaint of blackish discoloration of the maxillary right central incisors for the past 1 year. The tooth was also associated with dull aching pain for the past 8 months which was intermittent in nature. There were no aggravating or relieving factors for the pain, and no associated sensitivity was reported by the patient. On examination, metal ceramic crown over a post and core buildup following root canal treatment was present in relation to tooth #11 (FDI system). The metal ceramic crown was only covering the middle third of the tooth, leaving the post and core as well as the luting cement exposed to the oral environment. The patient had a good oral hygiene status as assessed by Silness and Loe's plaque index. On further periodontal examination, a PD of 8 mm was present in relation to the distobuccal aspect of the tooth. The GR in the tooth was diagnosed as Miller's Class III GR with recession height of about 2.5 mm measured in the mid-buccal region and PD of 2 mm. Although the recession was not extending beyond the mucogingival junction, there was interdental soft-tissue and bone loss, thus making it a case of Miller's Class III GR. The loss of attachment was 4.5 mm and 9 mm in the mid-buccal region and distobuccal region, respectively. Furthermore, there was 2 mm of interdental spacing present between tooth #11 and tooth #12. Radiographic examination revealed horizontal bone loss extending up to the middle third of the tooth, with a ledge formation at the junction of the post and the root surface of the root canal treated tooth.

Before commencement of treatment, the patient was informed about the treatment plan and written informed consent was obtained. Supragingival and subgingival scaling was done for the patient during the initial visit. Prosthodontic consultation was made, and replacement of the existing crown followed by periodontal pocket reduction therapy was advised to the patient. A new metal ceramic crown was fabricated with supragingival margin. As there was Miller's Class III recession exposing 2 mm of the root surface and

the crown margin in relation to tooth #11, recession coverage was mandated in the case due to esthetic concerns. Root planing was performed using Gracey curettes #1–2 and #3–4 to achieve root surface smoothness as well as to remove any surface irregularities that might contribute to periodontal pocket formation. The crown margin was also contoured and polished to make it less plaque retentive. One month following this, the patient was re-evaluated and 6 mm of PD was still persistent in the distobuccal region [Figure 1]. The CAL at this time point was noted to be 7 mm in the distobuccal region and 4.5 mm in the mid-buccal region. The gingival biotype of the region was also measured using endodontic K-file with stopper and digital Vernier caliper and was noted to be 0.92 mm. Since 2 mm of interdental spacing was present between the tooth #11 and tooth #12, a novel technique of semilunar papilla preservation flap technique was tailored, in order to achieve pocket depth reduction as well as to coronally advance the flap.

The area to be operated was anesthetized with local anesthesia (2% LOX, Adrenaline [1:200,000], Neon, Tarapur, Thane India). PD was marked using Crane-Kaplan pocket marker. The outline of the incision was made using two-tone disclosing solution. Semilunar incision was made well above the interdental papilla using BP blade #15 from the mesial aspect of tooth #11 to mesial aspect of tooth #12. A microsurgical periosteal elevator was used to elevate a buccal full-thickness flap over the defect site, and a partial-thickness flap was raised away from the defect site. ×3 microsurgical loupe was used to visualize the region. Tunneling knife TKN #2 (TKN 2, Tunneling Knife, Hu-Friedy, IL) was used to create a tunnel beneath the papilla, extending up to the palatal aspect of tooth #11. By this, the access to the defect is obtained without involving the interdental papilla. After the granulation tissue within the defect was debrided using a mini-curette, shallow and narrow vertical bone loss of depth 4 mm was noted.

Chorion membrane (Tissue Bank, Tata Memorial Hospital, Mumbai, India) was chosen as the suitable GTR membrane



Figure 1: Preoperative probing depth of 6 mm noted in the distobuccal region of #11

to aid in regeneration as well as recession coverage for this case. The membrane was trimmed according to the defect and placed beneath the flap covering the defect region [Figure 2]. The semilunar flap was then coronally advanced, and a passive figure-of-eight suture was placed with 4-0 vicryl resorbable suture material (4-0, Solus 910, Lotus™, India), along the distal aspect of the flap overlying the defect. Noneugenol periodontal dressing was given.

The patient was instructed not to brush over the treated tooth until removal of the periodontal dressing and the suture. A prescription of chlorhexidine gluconate mouthrinse (0.2%) twice daily for 1 min, analgesics (ibuprofen 400 mg twice a day), and antibiotics (amoxicillin 500 mg three times daily) for 5 days was given to the patient. She was advised to report after 10 days for re-evaluation and suture removal.

Ten days postoperatively, suture removal was done. Slight inflammation was noted in the treated site with no associated pain or edema. The surgical site was evaluated on a weekly basis for the 1<sup>st</sup> month. The patient was recalled at 3 months and 6 months. The clinical parameters such as PD, CAL, height of GR, and gingival biotype were noted.

## Results

The inflammation noted at the treated site reduced over a period of 1 month. At 3-month follow-up, the PD had reduced to 3 mm from 6 mm. There was a gain in CAL up to 2 mm in the mid-buccal region and 3 mm in the distobuccal region. 100% recession coverage was achieved through this technique. There was a 0.8-mm increase in the gingival biotype. At 6-month follow-up, the results remained stable in terms of percentage of root coverage, PD, and CAL [Figure 3].

## Discussion

GR is an inexorable shortcoming of surgical periodontal therapy. Kaldahl *et al.* in 1996 conducted a study comparing

the results of coronal scaling, root planing, modified Widman flap technique, and flap with osseous resection therapy for the treatment of periodontally involved sites. All four treatment modalities showed some amount of GR depending on the depth of the defect. Greater the defect depth, greater was the GR postoperatively.<sup>[5]</sup>

In order to overcome such demerit, papilla preservation techniques gained importance over the past two decades. Graziani *et al.* in 2012 strongly recommended the use of papilla preservation flap as the standard surgical approach. The results of this systematic review and meta-analysis suggested that papilla preservation techniques gave the most stable results in terms of CAL, PD, and minimal GR over a period of 24 months.<sup>[6]</sup>

Rodríguez and Caffesse in 2018<sup>[7]</sup> developed a novel papilla preservation technique that provides access to the deep defect at the same time preserving the entire papilla. Here, only one a mesiodistal incision was placed on the buccal mucosa that is far from the interdental papilla. The flap was then reflected apicocoronally to gain access to the underlying intrabony defect without involving the papilla.

Unfortunately, there is no adequate information regarding the flap techniques that can achieve both papilla preservation and recession coverage, especially in anterior regions where esthetics in a prime concern.

The semilunar modification of the coronally positioned flap was originated by Tarnow in 1986.<sup>[8]</sup> It is designed primarily for attaining esthetic root coverage where only 2–3 mm of coverage is required. The advantage of this technique is that there is no tension on the flap after coronal repositioning. Santos *et al.* in 2017<sup>[9]</sup> conducted a study to compare the clinical outcomes of the semilunar coronally repositioned flap (SLCRF) and coronally advanced flap (CAF) procedure in the treatment of maxillary Miller's Class I GR defects. The results of the study concluded that



Figure 2: Flap advanced coronally and chorion membrane placed beneath the flap



Figure 3: Six-month postoperative results showing reduced probing depth and gain in clinical attachment level

both the procedures provided stable clinical outcome in terms of recession coverage.

In the field of medicine and dentistry, there are various materials that aid in soft-tissue healing. The placental derivatives are better alternatives because they are easily available and enable in achieving remarkable clinical outcomes due to their nonimmunogenicity, anti-inflammatory, and antibacterial properties. Moreover, they are rich in various growth factors such as platelet-derived growth factor, keratinocyte growth factor, vascular endothelial growth factor and contains various collagen molecules such as collagen type I, III and IV that hasten wound healing in humans.<sup>[10]</sup> The nonimmunogenicity can be attributed to lack of human leukocyte antigen antigens,<sup>[11]</sup> and the antibacterial activity is because they possess innate bactericidal effect.<sup>[12]</sup>

Dandekar *et al.* in 2019 conducted a randomized controlled trial (RCT) to compare the efficacy of platelet-rich fibrin (PRF) and chorion membrane in the treatment of GR.<sup>[13]</sup> The study suggested that, though both the techniques achieved good recession coverage, chorion membrane provided a better and more stable clinical outcome.

Temraz *et al.* in 2019 in a RCT suggested that fetal membranes along with Open flap debridement (OFD) had clinical and radiographic outcomes similar to demineralized bone matrix with OFD, showing statistically significant improvement in terms of PD, CAL, and radiographic assessment of bone defect area.<sup>[14]</sup>

Rehan *et al.* in 2018 compared the clinical efficacy of CAF in combination with PRF and CAF with amnion membrane (AM). The results of the study promoted the usage of AM as it showed superior results to that of the group that was treated with CAF with PRF, in terms of percentage of root coverage and gingival biotype.<sup>[15]</sup>

The margins of the prosthetic restoration were placed supragingivally because, in the periodontal point of view, both supragingival and equigingival margins are well tolerated with minimal retention of plaque.<sup>[16]</sup>

Thus, in the present case, we adapted a new method of papilla preservation by combining the SLCRF along with papilla preservation technique to achieve the desired clinical outcome and to overcome the postoperative recession following flap surgery for pocket reduction. Furthermore, chorion membrane was placed within the defect for achieving stable clinical outcome in terms of wound healing and recession coverage.

The result of this novel approach is in accordance with the abovementioned studies in term of gain CAL, PD reduction, and GR coverage.

## Conclusion

The present case report provides evidence that this novel semilunar papilla preservation technique in combination

with human placental chorionic membrane will provide access to the underlying defect at the same time enable in coronally repositioning the flap. The results of this technique remained stable for over a period of 6 months. In order to validate the results of this novel approach, long-term randomized clinical trials are required.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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