Coronally Repositioned Flap Combined with Platelet-rich Fibrin and Frenotomy to obtain Root Coverage over the Maxillary Central Incisors

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ABSTRACT

Introduction: Platelet-rich fibrin (PRF) is a second-generation platelet concentrate and has the potential to accelerate soft and hard tissue regeneration. This case report describes a method for coronally repositioning gingiva combined with PRF for root coverage (RC) over the maxillary central incisors while simultaneously performing frenotomy.

Materials and methods: The patient was a healthy 28-year-old male. His chief complaint pertained to the unesthetic appearance of the gingival recession involving both maxillary central incisors. Intraoral examination revealed a thick biotype with an adequate band of keratinized gingiva and Miller’s class I recession defects. Coronally advanced flap (CAF) procedure combined with PRF and frenotomy was planned.

Results: Complete RC was achieved over the maxillary central incisors that initially presented with Miller’s class I gingival recession.

Conclusion: This case report shows the possibility of successfully applying combined CAF with PRF and frenotomy to treat Miller’s class I gingival recession. Further controlled investigations are needed to define the efficacy of this surgical technique.

Keywords: Coronally advanced flap, Frenotomy, Gingival recession, Platelet-rich fibrin.

INTRODUCTION

Gingival recession is defined as the displacement of the marginal tissue apical to the cementoenamel junction (CEJ). Various factors have been implicated in gingival recession, such as oral hygiene habits, high muscle attachments and frenal pull, tooth malpositioning, bone dehiscences, and iatrogenic factors related to various restorative and periodontal procedures. Trauma from tooth brushing is the main causative factor for gingival recession. The migration of gingival tissue in an apical direction is a progressive condition that occurs gradually over the years and creates undue concerns, such as dentinal hypersensitivity, root caries, improper oral hygiene, and esthetic issues.

A frenum is a mucous membrane fold, which contains muscle and connective tissue fibers that attach the lip and the cheek to the alveolar mucosa, gingiva and the underlying periosteum. A review of the literature suggests that a low frenum attachment can contribute to the progression of recession by generating tension on the marginal tissues. Various techniques exist for eliminating or repositioning a labial frenum. These techniques all expand on the concepts of a frenotomy and a frenectomy. A frenotomy involves making an incision into and separating the frenum, whereas a frenectomy involves the complete excision of the frenum.

Successful coverage of exposed roots for esthetic and functional reasons has been the objective of various mucogingival procedures. Gingival recession can be successfully treated by several surgical approaches. The main goal of these periodontal plastic surgical procedures is to improve periodontal health through the reconstruction of lost periodontal tissues or by preventing its further loss and also enhancing the esthetic appearance. Since 1956, numerous surgical techniques, such as laterally positioned flaps, free gingival grafts, coronally advanced flaps (CAFs), connective tissue grafts, barrier membranes, cellular dermal matrices, and other regenerative procedures have been introduced for root coverage (RC).

Recent reviews have demonstrated that connective tissue grafting with CAF is an effective means of RC and considered a gold standard; however, it has some disadvantages, such as second surgical area, increasing postoperative discomfort, and provides a limited amount...
of available donor tissue, resulting in increased patient resistance for this surgical procedure.

The CAF is a RC surgery that does not involve a palatal donor site, and it was demonstrated to be a safe and predictable approach. Data indicate that the CAF used alone is a less-than-optimal technique to achieve RC despite having the advantage of generating low morbidity. A surgical technique that can be combined with the CAF in order to overcome its limitations is desirable for the management of gingival recession.

Several clinical and histological studies reveal that a specific platelet concentrated therapeutic concept could be an encouraging medium for the improvement of soft tissue healing and regeneration in periodontology and implantology. Platelet-rich fibrin (PRF) was first developed in France by Choukroun et al for specific use (bone regeneration) in oral and maxillofacial surgery. The PRF is a second-generation, autologous platelet concentrate gel with growth factors and cicatricial properties for RC procedures.

CASE REPORT

A 28-year-old male patient presented to the Department of Periodontology and Implantology, Institute of Dental Sciences, Bareilly, Uttar Pradesh, India, in October 2015. His chief complaint pertained to the unesthetic appearance of the gingival recession involving both maxillary central incisors. The adequacy of the patient’s oral hygiene was noted during the intraoral examination. The patient was in good general health with noncontributory medical history. The biotype was visually determined to be thick, and the areas of recession involving the maxillary central incisors were diagnosed as Miller’s class I gingival recession defects. Miller’s class I gingival recession defect is defined as marginal tissue recession that does not extend to the mucogingival junction (MGJ) with no loss of bone or soft tissue in the interdental area. There was an adequate band of keratinized gingiva based on a visual assessment of the amount of keratinized tissue that was needed to obtain complete RC. The depth of the maxillary buccal vestibule was adequate. Recession defect was measured by calculating the distance between the CEJ and the most apical portion of the gingival margin and was recorded as 3 and 2 mm on 11 and 21 respectively (Fig. 1). The surgical procedure was explained to the patient and written informed consent was obtained.

All clinical parameters were measured before and after surgery. The following measurements were taken at baseline, one month, 3 months and 6 months after surgery using a UNC 15 probe recession depth (RD), recession width, clinical attachment level (CAL), width of keratinized gingiva (WKG), and probing pocket depth. The CAL was measured from the CEJ to the bottom of the gingival sulcus.

The patient underwent thorough scaling and root planning by ultrasonic and hand instruments. Detailed oral hygiene instructions regarding self-performed plaque control measures were given. Two weeks after phase I therapy, the patient was subjected to surgical procedure after recording all the baseline measurements. Routine radiographic and blood investigations were done.

Preparation of Platelet-rich Fibrin Membrane

The PRF was prepared following the protocol developed by Choukroun et al. Before surgery, 10 mL of intravenous blood sample without anticoagulant was taken into test tubes, which were immediately centrifuged at 3,000 resolutions/min for 10 minutes. At the end of centrifugation, following three layers were seen: The topmost layer of supernatant serum, the fibrin clot at the middle layer, and the bottom layer containing the red blood cells (RBCs). The fibrin clot was separated from the RBC base using scissors and placed in a sterile dappen dish. The PRF was obtained in the form of a membrane by squeezing out the fluids in the fibrin clot.

Surgical Procedure

The facial skin all around the oral cavity and the intraoral surgical site were painted with 5% povidone-iodine solution. After obtaining an adequate anesthesia with a solution of 2% lignocaine with 1:80,000 adrenaline, an intrasulcular incision was made on the buccal aspect of the involved teeth. The horizontal right-angle incision was bevelled into the adjacent interdental papillae at the level of CEJ of the tooth with an exposed root surface. Then, two bevelled oblique, slightly divergent incisions...
starting at the end of the horizontal incisions were made that extended beyond the MGJ. A trapezoidal flap was raised full thickness up to the MGJ. This was done to include the periosteum and the maximum soft tissue thickness in the central portion of the flap covering the avascular root exposure. Apical to bone exposure flap elevation continued with split thickness by giving horizontal releasing incision in the periosteum, and finished when it was possible to move the flap passively in the coronal direction. Coronal mobilization of the flap was considered “adequate” when the marginal portion of the flap was able to passively reach a level coronal to the CEJ of the tooth with the recession defect. The root surfaces were debrided with the use of curettes (Graceycuretts, Hu-Friedy). The facial soft tissue of the anatomic interdental papillae coronal to the horizontal incisions was de-epithelialized to create connective tissue beds to which the CAF was sutured. At the recipient site, the prepared PRF membrane was placed over the denuded root surfaces. Before advancing the flap in a coronal direction, frenotomy was performed using no. 15 blade to eliminate positive frenal pull. Then, the flap was coronally advanced to cover the membrane as well as the defect and sutured in place using a sling-suture technique with a nonresorbable 4–0 silk suture. The releasing incisions were closed with interrupted sutures after which the operated site was covered with noneugenol periodontal dressing for protection (Figs 2 to 7).

**Postsurgical Instructions and Infection Control**

Patient was given a cold compress extra orally to minimize swelling and bleeding during the postoperative period. Patient was prescribed with antibiotics (500 mg amoxicillin, three times daily for 5 days) and analgesics (400 mg ibuprofen, three times daily for 3 days). Patient was instructed not to brush his teeth in the treated area, but to rinse with chlorhexidine gluconate solution (0.2%) twice a day for 1 minute. Patient was recalled after 14 days for suture removal. Plaque control in the surgically treated area was maintained by chlorhexidine rinsing for an additional 2 weeks. After this period, the patient was again instructed in mechanical tooth cleaning.
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The patient was evaluated at 1, 3, and 6 months postoperatively, and there was no postoperative complication and the healing was found to be satisfactory (Fig. 8).

**DISCUSSION**

Increasing awareness and high esthetic demands of the patient are primary reason for the RC surgical procedures. Predictable RC of exposed roots is the important aspect of various mucogingival treatment approaches. Several surgical techniques have been described to achieve a predictable RC of exposed root surfaces. There is variability in efficacy of the following surgical procedures that may depend on various factors, such as the type of defect, location of defect, the mean initial depth, and operator skills.

The simultaneous performance of a frenotomy with the CAF technique between maxillary central incisors is clinically advantageous compared to two-stage techniques. The described one-stage combination technique for RC is less time consuming and cost-efficient for the clinician. The results of CAF alone can be compromised by the existence of frenal pull in the apical direction. The predictability of the results can be improved by removing this potential etiological factor prior to coronally repositioning the tissue using frenotomy or frenectomy. Combining frenotomy with the CAF yields a pedicle graft with no clinically discernible tension when it is coronally repositioned. Furthermore, the depth of the maxillary buccal vestibule is not reduced.

The PRF is a second-generation platelet concentrate and has been claimed to enhance soft tissue healing, promote initial stabilization, and revascularization of flaps and grafts in RC procedures. The preparation process conceives a gel-like matrix that contains a high concentration of platelets enmeshed in a fibrin matrix, which releases a high concentration of growth factors over a long time. The addition of PRF as a membrane to CAF showed an increase in WKG, gain in CAL, and reduction in RD after 6 months. The clinical implications and advantages of PRF membrane use as graft material are related to donor site surgical procedure, advanced tissue healing during postsurgery, and a decrease in patient discomfort during the early wound healing period.

In this case report, the CAF combined with a frenotomy avoided an additional surgical phase, second donor site, reduction in vestibular depth, and also provided tension-free flap to adapt. The technique also eliminated the impingement of the frenum into the esthetic zone and its potential to pull on the surgically treated area. In addition, the technique is advantageous because it can be performed quickly and avoids multiple surgical stages.

**CONCLUSION**

The results of this case report show the possibility of applying a combined CAF with PRF membrane and
frenotomy to successfully treat Miller’s class I gingival recession defects. Further controlled investigations are needed to define the efficacy of this surgical technique.

REFERENCES