

## Fibrin Glue Application in Conjunction with Laterally Repositioned Flap in the Treatment of Mandibular Gingival Recession: A Case Report

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**Abstract:** This report presents a case of use of a Fibrin Fibronectin Sealing System (FFSS) in the treatment mandibular recession defect. FFSS is a topical biological tissue adhesive. A 20 year old male reported with a class 1 recession defect in mandibular incisor region. Lateral pedicle graft along with FFSS was used to cover the defect. One month post-operative results showed complete root coverage thus showing that addition of FFSS improved the amount of root coverage, especially in relatively shallow defects.

**Keywords:** Fibrin Fibronectin Sealing System (FFSS), G ingival recession, Lateral pedicle graft (LPG)

### INTRODUCTION

In the changing era of periodontal surgeries, cosmetic procedures have become an integral part of periodontal treatment to meet the increasing desire for improved aesthetics. Gingival recessions are both an esthetic as well as functional problem.

Gingival recession is the apical migration of the junctional epithelium with exposure of root surfaces [1]. The etiology is multifactorial. It may include plaque induced inflammation, restorative iatrogenic factors, calculus, trauma from improper oral hygiene practices, high frenum attachment, tooth malposition and uncontrolled orthodontic movements [2]. A variety of periodontal plastic surgeries have been suggested for root coverage. Surgical procedures can be classified as pedicle soft tissue grafts, free soft tissue grafts or a combination of these two [3]. Among the soft tissue grafts, the connective tissue graft, are the most commonly used technique. However, in the above procedure a second surgical site is required for procurement of graft, therefore increasing patient morbidity. The pedicle graft was proposed in 1956 for root coverage [4]. They are based on the simple concept of moving donor tissue laterally to cover an adjacent defect. It provides sufficient esthetic result, but is less versatile than the connective tissue graft. Initially it was described as the "lateral sliding flap", then modified as laterally positioned flap. The modifications in incision design include "oblique rotational flap", the "rotation flap", and the "transpositioned flap". The flap is called a double papilla flap, when the lateral movement is both mesial and distal to the defect [5]. All these procedures

have a common requirement of adequate width of attached gingiva prior to root coverage procedures [6].

FFSS is a topical biological adhesive consisting of a solution of concentrated human fibrinogen, which is activated by the addition of bovine thrombin and calcium chloride. The resultant clot supports haemostasis and tissue sealing, and is completely absorbed during wound healing without foreign body reaction or extensive fibrosis. Fibronectin, a family of related proteins found in blood plasma, may serve to anchor a blood clot to surrounding collagen owing to its property of being covalently linked to fibrin and collagen by factor XIII a.

Conventional sutures provide only a marginal fixation, while the fibrin sealing system makes the tissues adhere on its whole surface. It saves time and makes it easier to fix tissues. [7] In the field of medicine, fibrin sealant is indicated as an adjunct to haemostasis in surgeries involving cardiopulmonary bypass, treatment of splenic injuries and also closure of colostomies. Sutures cause inflammation around themselves, while fibrin glue enhances early wound healing. In periodontal plastic surgeries of aesthetically important areas, it gives better results than sutures [7]. It has osteoconductive potential and significantly produces more new bone and new connective tissue when used with bone graft material like  $\beta$ -tricalcium phosphate [8].

This case report presents the treatment of localized gingival recession by lateral pedicle graft with FFSS.

### CASE REPORT

A 20 year old male patient reported to the Department of Periodontology, Subharti Dental College, Meerut with the chief complaint of receding gums in lower front teeth region. On examination, there was presence of Miller's class 1 recession defect on mandibular right central incisor (Fig. 1). Defect was narrow and shallow, 3mm in height and 2mm in width. Also, sufficient interdental bone height was present (Fig. 2).



Fig. 1: Miller's class 1 recession



Fig. 2: recession defect 3mm in height and 2mm in width

The patient was informed and written consent was obtained before the surgical procedures.

### Protocol

#### Fibrin Fibronectin Sealing System

Each TISSEEL™ Kit contains 5 vials with the active ingredients:

It is a biological two-component sealant. The two components (TISSEEL Solution and Thrombin Solution) were mixed during or immediately before application. A viscous TISSEEL-Thrombin Solution was formed that quickly sets to form a white, elastic mass (fibrin sealant), which firmly adhered to tissue.

The process simulates the key features of the physiological coagulation process and was used to achieve haemostasis, to seal or glue tissue, and to support wound healing. The solution was kept at 37°C until used.

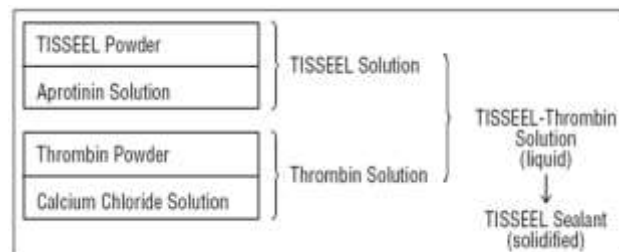


Fig. 3: The flowchart of the process

### Surgical procedure

Surgical intervention was done after completion of phase I therapy. The recession site was thoroughly scaled and root planed. A partial thickness flap was raised by giving sulcular and vertical incision with respect to distal line angle of right central incisor (Fig. 4). About 1ml of FFSS was applied over the reflected flap, bone and root surface (Fig. 5). The flap was then displaced and held in new position for 2 minutes with moist gauze (Fig. 6). 5-0 silk sutures were placed for proper adaption of flap (Fig. 7). Periodontal dressing was placed.



Fig. 4: Incisions given



Fig. 5: FFSS applied over reflected flap, bone and root surface



Figure 6: Flap displaced to donor site



Fig. 7: Sling Suture for Flap Adaptation

The patient was placed on analgesic (b.d. for 5 days) and 0.2% chlorhexidine mouth rinse twice daily for 3 weeks. Patient was advised to take soft diet and not to brush at the surgical site for atleast 2 weeks after the day of surgery.

Results showed complete root coverage after 1 month with minimum post-operative discomfort (Fig. 8).



Fig. 8: Post -operative 1 month

## DISCUSSION

Gingival recessions may occur without any symptoms but may give rise to the patient concern about poor aesthetics, dentine hypersensitivity, inability to perform oral hygiene procedures, and loss of the tooth. There are currently different techniques for root

coverage, but it is often difficult to anticipate the success rate of root coverage procedures since it depends on several factors, including the classification and location of the recession and the technique used. The selection of the surgical technique also depends on several factors, including the anatomy of the defect site, size of the recession defect, the presence or absence of keratinized tissue adjacent to the defect, the width and height of the interdental soft tissue, and the depth of the vestibule or the presence of frenum [8]. In this case report a lateral pedicle flap technique was used for successful root coverage along with FFSS. Indication of this technique is to repair an isolated area of gingival recession when there is sufficient width, length, and thickness of keratinized tissue adjacent to the area of gingival recession [10]. It is well stated that a better root coverage outcomes were only achieved in cases with adequate height and width of keratinized tissue [11]. It is recommended in class I and II shallow recessions according to *Miller*. [9]. Contraindications include if the donor site lacks sufficient attached gingiva or if the donor site has a fenestration or dehiscence of its supporting bone. In this, the flap remains attached at their base so that they retain their own blood supply during their transfer to a new location. Blood supply after this procedure is maintained from the areas bordering the recession defect and from the pedicle. To preserve the integrity of marginal gingiva at the donor site, submarginal incision was performed. Stability and dimension of the laterally positioned flap (the wider the pedicle, the greater the blood supply to the marginal portion of the flap) are critical for accomplishing root coverage. The tissue thickness of the flap is an important aspect on the root coverage predictability and an improvement in esthetic outcome [12]. Precise determination of the location of the CEJ and mucogingival junction prior to surgery and precise placement of incisions are necessary in order to achieve optimum esthetics [13]. Studies have shown that with a rigid case selection the laterally positioned flap is an effective method in treating isolated gingival recession [14]. The advantages of pedicle graft are that predictable correction of gingival recession is possible as the graft has an uninterrupted blood supply, and that postoperative discomfort is usually minor with good colour matching. The disadvantages of this method are possible bone loss and gingival recession at the donor site [15].

Fibrin sealant simulates key features of the physiological blood clotting mechanism. Factor XIII, activated by thrombin, catalyses the formation of cross links within the fibrin clot and a stable clot is formed at the site of application.

The observation in this case was that the application of a tissue adhesive overcame mechanical and anatomical limitations of flap adaptation and



stabilization. As reported by Catonet *et al.* [16], the assumption being that collagen fibrils exposed during tetracycline HCL conditioning may effectively bind the fibrin-fibronectin sealing system and this in turn, secures the gingival flap to the root.

It has been previously observed by Ripamonti *et al.* [17] that the amount of flap contraction during wound healing was minimized by the adjunctive application of a fibrin-fibronectin adhesive system to demineralized root surfaces in experimentally induced osseous defects in non-human primates.

FFSS contains factors such as thrombin, fibrin, fibronectin and platelet-derived growth factor, which are known to retain their biologic activities on cell proliferation and differentiation. These factors may potentially enhance regeneration of hard and soft tissue components of the attachment apparatus of the tooth. However, reviewing the results of the preclinical studies evaluating this biochemical approach to periodontal regeneration, support of the hypothesis is not conclusive. Judged from other experiments, however, when extracellular matrix proteins or blood clot elements including fibronectin have been added to the root surface to enhance periodontal regeneration, the effect of such biochemical conditioning appears to be ambiguous [18].

## CONCLUSION

The surgical approach presented here may suggest that fibrin adhesive represents a viable tissue adhesive. The use of lateral pedicle graft followed by the application of FFSS is an effective procedure for root coverage in anterior teeth, especially in relatively shallow defects. Nevertheless, well-controlled clinical studies should be conducted to evaluate the clinical advantages and disadvantages of the material.

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