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## RESEARCH ARTICLE

## Can Use of fibrin glue in Periodontal Flap Surgery be an alternative to suturing? - A Review

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### Abstract

Traditionally, for a longtime suturing has been the only means of periodontal flap closure. With the advent of fibrin glue, a new chapter has opened in the field of flap closure. Fibrin glue is easy to handle and also tissue friendly. It does not retard wound healing and also causes less trauma to the patient. Suturing will always remain a gold standard for periodontal flap closure. Fibrin glue is proving to be a good alternative to suturing. In this review article, we critically try to review the pros and cons of fibrin glue in periodontal surgery.

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## INTRODUCTION

Fibrin glue is "Fibrin Fibronectin Sealing System (FFSS)". It is available as two component system: first component contains highly concentrated fibrinogen, factor XIII, fibronectin, and traces of other plasma proteins. The second component contains thrombin, calcium chloride, and anti fibrinolytic agents such as aprotinin.

Mixing of two components promotes clotting with the formation and cross-linking of fibrin.

Fibrin glue is commercially available as Tisseel VH (Baxter, U.S.A.) and Tissucol (Termotratato, Wien.)<sup>1</sup>

### Applications of fibrin glue in dentistry

1. Fibrin-sealing system is effective as a means of fixing tissues after periodontal surgery, as fibrin glue is easier and quicker to use than sutures. Sutures cause inflammation around themselves, while fibrin glue enhances early wound healing. In periodontal plastic surgeries of esthetically important areas it gives better results than sutures.<sup>1</sup>

2. The split mouth clinical trials done to see effect of treating deep wide buccal gingival recession with guided tissues regeneration procedure after root conditioning with tetracycline HCl and FFSS give good results.<sup>1</sup>

3. Recent animal studies showed that FFSS has osteoconductive potential and significantly produced more new bone and new connective tissue when used with bone graft material like  $\beta$ -tricalcium phosphate. Establishing a non-tension primary wound closure of various soft-tissue flaps is essential for optimal postsurgical wound healing.<sup>1</sup>

Suturing is a common procedure done for this but it is time consuming, may get infected, with scarring, requires technical skill and understanding and an additional patient visit for its removal.<sup>2</sup> In search of a solution of these problems, concept of tissue adhesive came forward. Fibrin sealant is a synthetic substance used to create fibrin clot.<sup>3</sup> It is composed of fibrinogen and thrombin where thrombin acts as an enzyme and converts the fibrinogen to fibrin

which can act as a tissue adhesive.<sup>3</sup> Fibrin sealant in addition to adhesive property also has an anti-enzymatic effect which promotes fibroblast aggregation, their growth and adhesion.<sup>4</sup>

### **Limitations**

1. Fibrin sealant cannot be used in individuals who are known to be hypersensitive to bovine protein.
2. Fibrin sealant cannot be indicated for the treatment of massive and brisk arterial or venous bleeding.
3. To avoid risk of allergic anaphylactic reaction and/or thromboembolic events, which maybe life threatening.

### **Studies.**

Aparajitha Sunkavalli and K. Raja V. Murthy<sup>5</sup> conducted a study on population consisted of 14 patients with a total of 28 gingival recession defects. The selected gingival recession sites were randomly assigned as either experimental site A (BioMend Regular®) or experimental site B (BioMend Regular® + Tisseel®). The clinical parameters including plaque index, gingival index, recession depth, recession width, width of keratinized gingiva, probing depth and clinical attachment level were recorded at baseline and at six months and twelve months post-operatively. Twelve months follow-up results showed significant improvements in all clinical parameters for both the treatment groups. The recession width and depth were reduced in both the groups - BioMend Regular® and BioMend Regular® + Tisseel®, with mean root coverage of 31.79% and 35.64%, respectively. Furthermore, the width of keratinized gingiva was increased by 2.71 mm and 3.14 mm for experimental site A and experimental site B respectively when baseline values were compared with twelve month post-operative data. On intergroup comparison, the mean difference in different clinical parameters was statistically not significant.<sup>5</sup>

In another trial conducted by Shaju Jacob Pulikkotil and Sonia Nath wound healing clinically, histologically and morphometrically after the use of fibrin sealant and sutures was compared for periodontal flap closure. Ten patients were selected for this split-mouth randomized controlled clinical trial. On the test site fibrin sealant (F) was applied for flap closure after periodontal flap surgery (n = 10) and on the control site sutures (S) were used (n = 10). Clinically wound healing was observed at 7, 14 and 21 days and biopsy was taken on the 8th day. At seventh day better healing was observed in fibrin sealant site. Histologically mature epithelium and connective tissue formation was seen in fibrin sealant site with increased density of fibroblasts and mature collagen fibers. The suture site had more number of inflammatory cells and more number of blood. Fibrin sealant can form a better alternative to sutures for periodontal flap surgery.<sup>6</sup>

### **Precautions to be taken while using fibrin glue**

1. Fibrin sealant should not be applied intravascularly or into the tissues.
2. The fibrin sealing system provides better early hemostasis and complete adhesion of the whole surface of the tissues to the underlying layer.
3. Sutures cause inflammation themselves; fibrin glue enhances early wound healing.
4. The fibrin sealing system is effective as a means of fixing tissues after periodontal surgery. Fibrin sealant is easier and quicker to use than sutures.

### **Comparison of healing between sutures and fibrin glue**

It is worth noting that the overall convenience in using fibrin sealing system should be evaluated on the basis of its cost and benefits.

To evaluate fibrin sealing system in the clinical trial, Ethicon Mersilk 3-0 sutures were used as a control since the latter is the usual means of fixing tissues in periodontal surgery.<sup>1</sup> Synthetic adhesives (cyanoacrylates) have been discarded because of toxicity, stiffness, and lack of acceptance by clinicians.

Resorbable sutures use sometimes known to cause strong inflammatory responses. It appeared that the essential precursor for connective tissue attachment was occurrence of fibrin linkage with the root surface, and this attachment became replaced by collagen to establish new connective tissue attachment to a denuded root surface.

However from biologic stand point, the fibrin glue seemed both innocuous and effective, also bringing about early wound healing.<sup>1</sup>

Fibronectin, a family of related proteins found in blood plasma and on fibroblast surfaces is a chemoattractant for fibroblasts and enhances the interaction and adherence of fibroblast to surfaces. Fibronectin 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. Both hemostatic and

adhering effects can be modulated using thrombin in different concentrations: 4NIH thrombin allows 20–30 seconds to adjust flaps or grafts before clotting, 500NIH solution reduces operative and clotting times, especially useful for small flaps since positioning of tissues must be accomplished less than 5–10 seconds.<sup>1</sup>

Conventional sutures provides only a marginal fixation, while the fibrin sealing system makes the tissues adhere on its whole surface.

### Conclusion.

Fibrin sealant enhances early wound healing and stimulate repair proved by morphometric and histological analysis. The fibrin sealant provides tissue fixation without any injury, this property is very useful for fixing flaps, even in microsurgical procedures. Fibrin sealant can thus form a better alternative and an effective means for fixing tissues after periodontal Surgery.<sup>6</sup>

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