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# Comparative Evaluation of Simplified Autologous Fibrin Glue and Silk Suture in Healing of Surgical Periodontal Wound Closure and Stability of Periodontal Flap.

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**ABSTRACT: Background:** Periodontal surgical procedures are routinely employed for disease induced changes in periodontal tissues. Proper closure and stabilization of approximated tissues in their desired position are critical events in the success of these procedures. Suturing is the conventional method used to achieve proper closure of periodontal wound. But these procedures have a spectrum of drawbacks, such as tissue trauma due to needle penetration, scar formation, second visit for suture removal are some of the shortcomings of the conventional suture material. In addition, wicking of silk suture makes the surgical site prone to secondary infection. Hence, need for alternative procedure to suture is required. Autologous fibrin glue is one such sutureless flap closure technique, which is a biological tissue adhesive, mimicking the final stages of coagulation. It is useful for closing tissue during periodontal surgery, since it is simpler to use and is faster than the sutures.

**Aim:** To compare the healing of surgical periodontal wound closure and stability of periodontal flap using simplified autologous fibrin glue with that of silk suture.

**Methodology:** Twenty-two Chronic Generalized Periodontitis Patients who requires periodontal flap surgery, in age group of 20-50 years reporting in the Department of Periodontics and Oral Implantology, Azeezia College of Dental Sciences and Research, Meyannoor, Kollam were enrolled in the study. The patients were divided into two groups. Group I: Periodontal flap closure using silk suture and Group II: Periodontal flap closure using simplified autologous fibrin glue. Periodontal dressings were given. Antibiotics and analgesics were prescribed. Periodontal parameters including Roll test, Plaque index, Wound healing index, modified gingival index were measured at Baseline, 1st week, 3rd week and 12th week along with Numeric pain rating scale.

**Results:** The results showed significant reduction ($P<0.05$) in all the clinical parameters i.e. Roll test, Plaque index, Wound healing index, Modified gingival index along with Numeric pain rating scale for both the Group I & II. On inter-group analysis, autologous fibrin glue showed significantly more reduction for Roll test, Plaque index, Wound healing index, Modified gingival index and Numeric pain rating scale in comparison to silk suture.

**Conclusion:** Autologous fibrin glue can be used as an alternative to silk sutures for flap closures after periodontal surgeries.

**Keywords:** Autologous fibrin glue, Surgical silk suture, Fibrin glue, Periodontal wound healing.

## I. INTRODUCTION:

Periodontium is specialized tissues that both surround and support the teeth. Periodontitis is an infectious disease affecting the supporting structures of the teeth(1). Periodontitis is a chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by

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progressive destruction of the tooth-supporting apparatus. Its primary features include the loss of periodontal tissue support, manifested through clinical attachment loss (CAL) and radiographically assessed alveolar bone loss, presence of periodontal pocketing and gingival bleeding(2).

Periodontitis is a major public health problem due to its high prevalence and it may lead to tooth loss and disability which negatively affect chewing function and aesthetics and be a source of social inequality and impair quality of life(2).

Periodontal treatment is aimed at improving and preserving overall health and lifespan(3). The ultimate goal of periodontal therapy is to stop and reverse the loss of periodontal attachment resulting from disease and regenerate periodontal tissue and promote early wound healing(1). Therapy has evolved to include an initial non-surgical treatment which includes scaling and root planing. In some cases, non-surgical therapy alone cannot eliminate the etiologic factors. Even though non-surgical therapy is considered gold standard, it is technically demanding, and complete calculus removal is difficult to achieve and less effective especially at mobile teeth and in deep sites and at posterior teeth (particularly in molars with furcation involvements)(4).

Periodontal flap surgery is a routinely employed procedure in the management of moderate to deep periodontal pocket. Intimate adaptation of the flap to the prepared root surface is essential for the reestablishment of the dentogingival unit(5). Traditionally, flaps after periodontal flap surgery are approximated usually by sutures. A surgical suture approximates adjacent surfaces and compresses blood vessels to initiate hemostasis, which leads to primary wound healing(6). Materials like silk, nylon, catgut and polyglycolic polylactic acid derivatives are routine used suture material, with silk being the most commonly used material(5).

Sutures have many drawbacks such as plaque management issues, increased postoperative pain, increased tissue reactivity, and a higher infection risk(7). Tissue trauma due to needle penetration, scar formation, secondary infection, second visit for suture removal are some of the shortcomings of the conventional suture material. In addition, “wicking” of silk suture makes the surgical site prone to secondary infection. Staphylococcus aures is the organism commonly associated with wound infection, some of the other organisms impliated are Pseudomonas aeruginosa, Enterobacteriaceae, Enterococcus spp. and opportunistic fungi like candida(5).

Suture granulomas, fistulas, and railroad track scars are another disadvantage of sutures. During suturing, it also pricks normal parenchymal and inflammatory tissues. There is a higher risk of infection or reinfection due to the capillary action of suture materials. The suturing approach lengthens the surgical procedure. An unexpected needle prick increases the risk of disease transmission during suturing, such as acquired immunodeficiency syndrome and hepatitis(6). To overcome these disadvantages, the possibility of sutures alternatives for flap approximation has been explored(3).

Fibrin glue is one such sutureless flap closure technique, which is a biological tissue adhesive, mimicking the final stages of coagulation(8). Fibrin glue is useful for closing tissue during periodontal surgery, since it is simpler to use and is faster than the sutures(3).

Fibrin sealant is a better alternative to tissue fixation as compared with sutures. The stabilization of the flaps was more consistent compared to the sutures, since fibrin sealant can provide better fixation by sealing the entire surface of the flap than just the potential marginal fixation with sutures and promote early wound healing(3). The application of fibrin sealant requires less skill while providing firm adhesion leading to reduction of pocket depth and provide smooth adaptation of flaps to the tooth surface resulting in lesser accumulation of plaque(1).

Fibrin sealant has been used in medical and dentistry disciplines for a variety of treatments, such as approximating flaps following implant surgery, particularly in the aesthetic area and mucogingival procedures(6).

Fibrin sealant can be prepared from the patient’s own blood (autologous) or derived from donated blood(1). The drawback of commercial fibrin glue is increased cost, multiple components (fibrinogen, thrombin, afibrinolytics, fibronectin, and calcium chloride) involved in preparation, limited shelf life, not always available on demand, chances of allergic reaction to bovine protein and transmission of viral infection limits their usage(8).

Dave et al (2020) introduced a simplified autologous fibrin glue with minimal components in a normal chairside setting. This autologous fibrin glue preparation is not only easy and simple to prepare but also provides good postoperative healing and stability in flap closure. It is also atraumatic, faster during chairside use, and requires lesser skills for its application(8).

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The present study aims to assess the healing of surgical periodontal wound closure and stability of periodontal flap using simplified autologous fibrin glue with that of silk suture.

## II. MATERIALS AND METHODS:

Twenty-two subjects with chronic generalized periodontitis as per AAP international workshop for classification of periodontal diseases who requires periodontal flap surgery, in age group of 20-50 years reporting in the Department of Periodontics and Oral Implantology Azeezia College of Dental Sciences and Research, Meeyannoor, Kollam. The patients were given written information both in English and Malayalam regarding the procedures and the study was started after getting ethical clearance from the Ethical Committee of the Institute, AEC/REV/2022/16.

**PATIENT SELECTION:**

INCLUSION CRITERIA:

1. Consenting adult patients with chronic generalized periodontitis aged 20-50 years.
2. Patients indicated for periodontal flap surgery involving at least four adjacent teeth.

EXCLUSION CRITERIA:

1. Patients with systemic diseases
2. Smoking
3. Tobacco chewing
4. Pregnant or lactating

**SUBJECT GROUPING:**

Twenty-two subjects with chronic generalized periodontitis as per AAP international workshop for classification of periodontal diseases who requires periodontal flap surgery, in age group of 20-50 years were included in the study.

Grouped into two:

Group I (11): Periodontal flap closure using silk suture.

Group II (11): Periodontal flap closure using simplified autologous fibrin glue.

**CLINICAL PARAMETERS:**

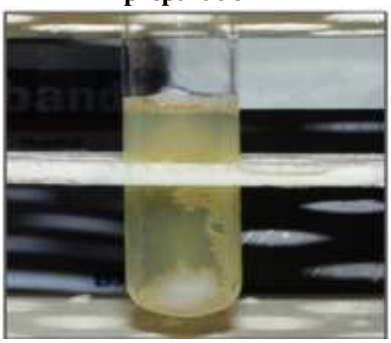
The following clinical measurements were recorded for all patients in the study:

1. Roll's test (Dave et al)
2. Plaque index (Silness P and Loe H)
3. Wound healing index (Huang et al)
4. Modified gingival index (Lobene et al)
5. Numeric pain rating scale

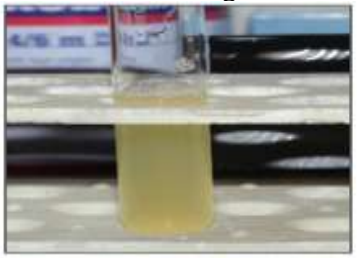
**PREPARATION OF AUTOLOGOUS FIBRIN GLUE:**

For autologous fibrin glue preparation, 10ml of patient blood was collected in sterile 0.9% sodium citrate containing vacutainers and centrifuged at 3000 rpm for 10 minutes. This vacutainer now had a layer of platelet-poor plasma on top, a layer of platelet-rich plasma in the center, and a layer of red blood cells at the bottom (RBCs). The platelet-poor and platelet-rich plasma is drawn into a sterile syringe and kept in separate test tube without anticoagulant. To precipitate the most amount of fibrinogen, protamine sulphate (10mg/ml) was applied to platelet-rich and platelet-poor plasma. This test tube was centrifuged for 5 minutes at 1000 rpm. A top layer of serum with thrombin(autologous) and a bottom layer of fibrinogen precipitate were present in the centrifuged tube. The top serum was removed, but 0.5ml of it was retained in the test tube to dilute the fibrinogen precipitate and aspirated into one syringe. A second syringe is taken and was filled with calcium chloride (0.025 mmol/l) and solutions from both the syringe were applied in similar amounts under the flaps, which were held under digital pressure for 2-3 minutes.

**Armamentarium for the autologous fibrin glue preparation**



**Fibrinogen precipitate sediment after secondcentrifugation**



**Platelet - rich plasma + platelet poor plasma separated after first centrifugation**

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**Fibrinogen precipitate and calcium chloride**

**STUDY METHOD:**

After proper case recordings, patients underwent initial therapy which included thorough scaling and root planing. Evaluation of phase I done and candidates for phase II (Surgical phase) were selected.

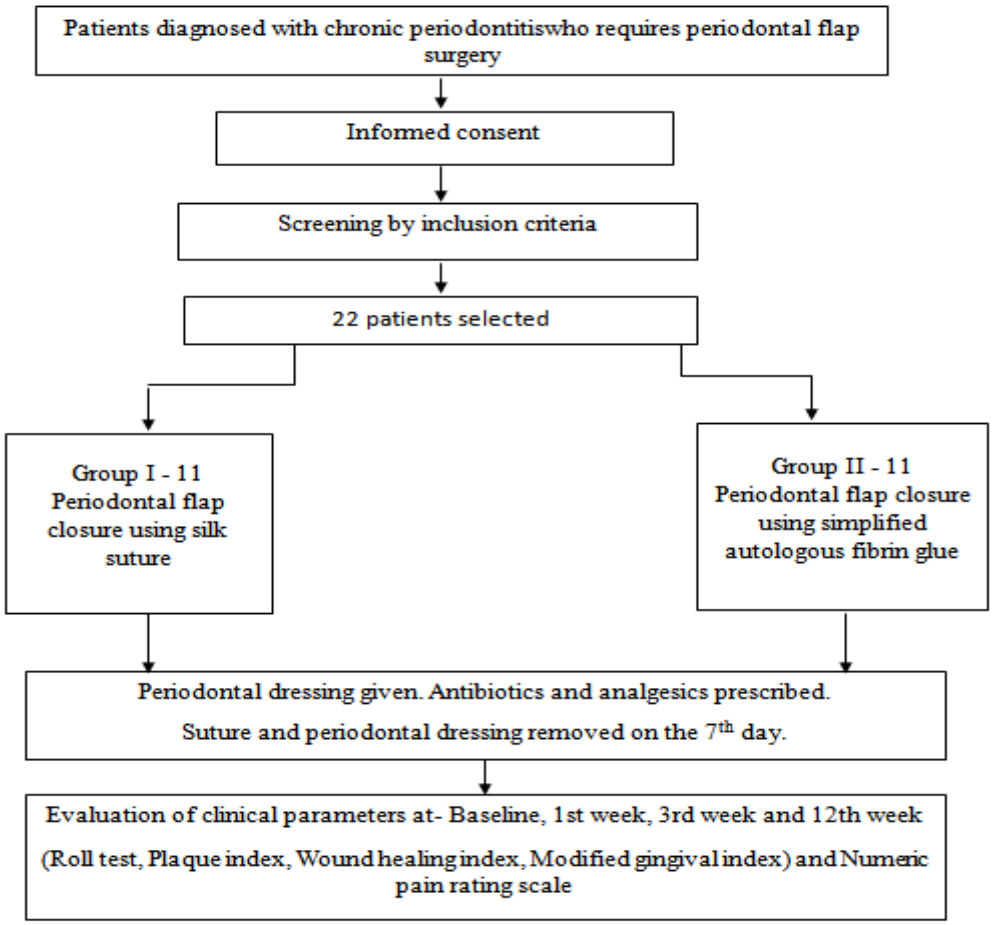
In phase II therapy, periodontal access flap surgery was done in the respective sites under profound anesthesia. After appropriate surgical procedure and after achieving adequate hemostasis, periodontal flaps were approximated for closure.

In Group I: Periodontal flap closure is done using surgical silk suture

In Group II: Periodontal flap closure is done using Autologous fibrin glue which is applied under the flap and held under digital pressure for 2-3 minutes.

Standard post- operative instructions were given to patients in the both groups. Antibiotics and analgesics were prescribed. Periodontal dressings were given. Patients were given a printed proforma to enter the severity of pain experienced following 5 days after surgery. The intensity of pain was measured using a Visual analogue scale with values from 0-10. Sutures at the sutured sites and periodontal dressings removed on the 7th day. All the subjects were recalled and clinical periodontal parameters assessed at baseline, 1st week, 3rd week and 12th week.

**FLOWCHART SHOWING STUDY PARTICIPANTS:**



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**GROUP I: PERIODONTAL FLAP CLOSURE USING SILK SUTURE**

**Periodontal flap closure using silk suture**

**Review at 1st week**

**Review at 3rd week**

**Review at 12th week**

**GROUP II: PERIODONTAL FLAP CLOSURE USINGSIMPLIFIED AUTOLOGOUS FIBRIN GLUE**

**Application of autologous fibrin glue**

**After application of autologous fibrin glue**

**Review at 1st week**

**Review at 3rd week**

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**Review at 12th week**

## III. RESULTS:

Table I - Comparison of Roll test between the two groups at baseline, 1st week, 3rd week and 12th week.

| Time period | Groups | N | Mean | Std. Deviation | T value | P-value |
|---|---|---|---|---|---|---|
| Baseline | Group I (suture) | 11 | 2.11 | 0.186 | 1.81 | 0.08 |
| | Group II (Autologous fibrin glue) | 11 | 1.98 | 0.145 | | |
| 1st week | Group I (Suture) | 11 | 1.86 | 0.088 | 6.45 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 1.48 | 0.173 | | |
| 3rd week | Group I (Suture) | 11 | 1.59 | 0.145 | 5.84 | **0.001*** |
| | Group II(Autologous fibrin glue) | 11 | 1.24 | 0.136 | | |
| 12th week | Group I (Suture) | 11 | 1.48 | 0.085 | 10.91 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 1.10 | 0.075 | | |

Table II - Comparison of Plaque index between the two groupsat baseline, 1st week, 3rd week and 12th week.

| Time period | Groups | N | Mean | Std. Deviation | T value | P-value |
|---|---|---|---|---|---|---|
| Baseline | Group I (Suture) | 11 | 2.56 | 0.54 | 2.25 | **0.03*** |
| | Group II (Autologous fibrin glue) | 11 | 2.06 | 0.49 | | |
| 1st week | Group I (Suture) | 11 | 1.23 | 0.35 | 4.61 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 0.66 | 0.19 | | |
| 3rd week | Group I (Suture) | 11 | 1.008 | 0.23 | 4.48 | **0.001*** |
| | Group II(Autologous fibrin glue) | 11 | 0.60 | 0.18 | | |
| 12th week | Group I (Suture) | 11 | 0.99 | 0.20 | 6.94 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 0.52 | 0.070 | | |

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Table III - Comparison of Wound healing index between the two groupsat baseline, 1st week, 3rd week and 12th week.

| Time period | Groups | N | Mean | Std. Deviation | T value | P-value |
|---|---|---|---|---|---|---|
| 1st week | Group I (Suture) | 11 | 1.94 | 0.123 | -0.97 | 0.34 |
| | Group II (Autologous fibrin glue) | 11 | 1.99 | 0.117 | | |
| 3rd week | Group I (Suture) | 11 | 1.76 | 0.108 | 10.05 | **0.001*** |
| | Group II(Autologous fibrin glue) | 11 | 1.24 | 0.130 | | |
| 12th week | Group I (Suture) | 11 | 1.30 | 0.141 | 4.51 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 1.09 | 0.061 | | |

Table IV - Comparison of Modified gingival index between the two groupsat baseline, 1st week, 3rd week and 12th week.

| Time period | Groups | N | Mean | Std. Deviation | T value | P-value |
|---|---|---|---|---|---|---|
| Baseline | Group I (Suture) | 11 | 2.58 | 0.573 | -0.14 | 0.89 |
| | Group II (Autologous fibrin glue) | 11 | 2.61 | 0.413 | | |
| 1st week | Group I (Suture) | 11 | 2.23 | 0.38 | 2.91 | **0.009*** |
| | Group II (Autologous fibrin glue) | 11 | 1.73 | 0.41 | | |
| 3rd week | Group I (Suture) | 11 | 1.29 | 0.17 | 2.17 | **0.04*** |
| | Group II(Autologous fibrin glue) | 11 | 1.02 | 0.37 | | |
| 12th week | Group I (Suture) | 11 | 0.77 | 0.170 | 8.21 | **0.001*** |
| | Group II (Autologous fibrin glue) | 11 | 0.21 | 0.147 | | |

Table V - Comparison of Numeric pain rating scale between the two groupsat baseline, 1st week, 3rd week and 12th week.

| Time period | Groups | N | Mean | Std. Deviation | T value | P-value |
|---|---|---|---|---|---|---|
| Day 1 | Group I (Suture) | 11 | 4.40 | 0.71 | 0.94 | 0.35 |
| | Group II (Autologous fibrin glue) | 11 | 4.10 | 0.79 | | |
| Day 2 | Group I (Suture) | 11 | 4.11 | 0.702 | 1.02 | 0.32 |
| | Group II (Autologous fibrin glue) | 11 | 3.73 | 1.015 | | |
| Day 3 | Group I (Suture) | 11 | 3.35 | 0.896 | -0.302 | 0.765 |
| | Group II(Autologous fibrin glue) | 11 | 3.46 | 0.762 | | |
| Day 4 | Group I (Suture) | 11 | 3.38 | 1.30 | 0.73 | 0.46 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | Group II (Autologous fibrin glue) | 11 | 2.93 | 1.54 | | |
| Day 5 | Group I (Suture) | 11 | 2.59 | 0.779 | 2.79 | **0.01*** |
| | Group II (Autologous fibrin glue) | 11 | 1.51 | 1.01 | | |

## IV. DISCUSSION:

Wound closure is a part of any surgical procedure. The objective of laceration repair or incision closure is to approximate the edges of a wound so that natural healing process may occur. To promote healing, one should achieve precise wound approximation, reduction of patient discomfort, easy handling of the working properties of wound closure materials, and low infection rates(9).

The aim of all wound closure techniques is to approximate the edges of the wound so that natural process of uneventful healing takes place. In wound closure the primary focus should be on relieving tension on the wound and bringing the tissue edges together. Precise approximation of the incised/lacerated margins is critical to favorable cosmetic and functional results(10).

The most commonly used method for wound closure is suturing(10). Sutures being a classic method of wound closure has many advantages such as achievement of careful closure, low dehiscence rate, and resilient tensile strength. However, sutures do have certain disadvantages namely prolonged duration of surgery and anesthesia, tissue reactivity, risk of needle stick, undesirable trauma to the intact tissue on either side of the wound, permanent suture tracts, early removal which results in dehiscence, anxiety, and pain during removal and inadequate esthetic(11).

Another disadvantage of suture is the phenomenon of 'wicking,' which makes it a site for retention and ingress of bacteria into the tissues and thus a reservoir of secondary infection. It has been found that silk has maximum amount of inflammatory tissue response. So, in order to overcome these difficulties, a need for an alternative to sutures is always felt(12).

Over the past 3 decades new biomaterials have been discovered as an alternative to conventional suture material. These include staples, adhesive tapes, and tissue adhesives(9).

Bergel began the use of fibrin glue in 1909(3). Later on, Bösch P et al, Bartolucci et al (1982) and Prato GP et al found that fibrin glue is useful in periodontal surgery(13–17).

Human fibrinogen, when activated by thrombin, initiates the final leg of coagulation(15). This forms the basis for the biologic tissue adhesive, fibrin sealant. The soluble fibrinogen polymerizes into fibrin leading to the formation of a stable clot(15,16). Fibrin sealant, also known as fibrin glue has found applications in surgery as a sealant as well as for hemostasis(18).

It has been used to secure gingival grafts and mucoperiosteal flaps(14,17). In addition to binding tissues, fibrin sealant acts as a natural wound bed. This bed functions as a scaffold facilitating the proliferation and differentiation of mesenchymal and endothelial cells(19). Fibronectin as one of its main constituents has the potential for regeneration of periodontal supporting structures. A temporary shield is created for the safe population of potential periodontal ligament cells capable of regeneration of functional periodontium(20). Fibrin sealant has been investigated as a targeted local cell and drug delivery system(21).

Autologous fibrin glue when compared to commercial fibrins are easy to use, have a better tolerance, and the probability of viral transmission or prion infection may be decreased. Since, the recipient is his/her own blood donor, probable risk of infection or of foreign body reaction might be reduced by using autologous fibrin glue(22).

The aim of the present study was to compare the healing of surgical periodontal wound closure and stability of periodontal flap using simplified autologous fibrin glue with that of silk suture.

The plaque index revealed the score of (2.56±0.54) and (2.06±0.49) in the baseline in group I and group II respectively. The patients then had undergone the initial therapy and oral hygiene instructions are given. Before the start of the surgery, the patients had demonstrated acceptable oral hygiene standards and gingival health in both group I and group II respectively. At the 12th week follow up, the plaque scores were reduced to 0.99±0.20 in group I and 0.52±0.070 in group II. On intergroup comparison, this difference was statistically significant (p-value=0.001).The intragroup comparison revealed a statistically significant difference at 1st week, 3rd week and 12$^{th}$week follow up respectively from baseline in both groups (p-value=0.001). However, the results were highly significant in group II compared to

group I. The increased score in group I could be attributed to the fact that the patient was refrained from mechanical oral hygiene procedures and that sutures provide a suitable place for the formation of bacterial biofilm(23). Also, it may be due to the difficulty in maintaining oral hygiene after surgery. The reduction in group II, could be due to the fact that fibrin glue provides a smooth adaptation of flaps to the tooth surface resulting in lesser accumulation of plaque(14). And the adhesive property effectively seals tissue and eliminate potential spaces(24).

The wound healing index comparisons were made between the groups, there was a reduction in the scores at group II (1.99±0.117 to 1.09±0.061) and the group I (1.94±0.123 to 1.30±0.141) from the baseline to the end of 12th week. The intragroup comparison revealed a statistically significant difference at 3rd week and 12th week follow up respectively from 1st week in both groups (p-value=0.001). Wound closure for primary intention healing appears to be an absolute prerequisite for periodontal wound healing/regeneration, avoiding exposure of newly formed and maturing tissues to the oral environment. Wound closure of periodontal defects is challenging because of the position, rigidity and mineralized avascular nature of the root surface, as well as the confined spaces between teeth and tensile forces acting on the wound margins challenging flap adaption, frequently leading to suture-line exposures and compromised outcomes(25). However, the results were highly significant in group II compared to group I. This may be attributed to the fact that fibrin sealants stimulate early wound healing and connective tissue growth by accelerating revascularization and facilitating the migration of fibroblasts(26). It is able to induce angiogenesis, highly stable epithelium-connective tissue interface and connective tissue more resistant to proteolytic enzymes. There is more mature epithelium, connective tissue, increased density of fibroblasts, mature collagen following multi week of fibrin sealant recuperating, while inflammatory cells have expanded in sutured site(27,28).

The modified gingival index revealed the score of (2.58±0.573) and (2.61±0.413) in the baseline in group I and group II respectively. The patientsthen had undergone the initial therapy and before the start of the surgery, the patients had demonstrated acceptable oral hygiene standards and gingival health in both group I and group II respectively. On intergroup comparison, this difference was statistically non-significant (p-value=0.89). At the 12th week follow up, the gingival scores were reduced to 0.77±0.170 in group I and 0.21±0.147. This difference was statistically significant (p-value=0.001).The intragroup comparison revealed a statistically significant difference at 1st week, 3rd week and 12th week follow up respectively from baseline in both groups (p-value=0.001). The gingival index can give us an idea regarding the inflammatory processes and tissue response towards both the materials. The higher gingival score in group I can be attributed to the plaque retention of the suture material which would trigger an inflammatory response(29). The silk material itself is a foreign body and hence it is capable of causing foreign body reaction by the immune system which can cause inflammation of the gingiva(30). As the patient was refrained from mechanical oral hygiene procedures, the plaque accumulations were more in the group I.

The numeric pain rating scale revealed the score of 4.40±0.71 in group I and 4.10±0.79 in group II on the first day which reduced to 2.59±0.779 in group I and 1.51±1.01 in group I in the fifth post-operative day respectively. The intragroup comparison revealed a statistically significant difference at 2nd, 3rd, 4th and 5th day from 1st week in both groups (p-value=0.001). The results of the study with regard to the parameter pain showed no statistically significant difference in the post operative pain experienced by the patients after surgery in group I and group II in the first four days but on the fifth day, there is a statistically significant difference (p-value=0.01). This could be attributed to the profound local anesthesia given to the patients and sympathetic psychological management and also both groups were given post operative analgesics and antibiotics. Even though the pain experienced were similar, discomfort and irritation were stated by the patients in presence of suture material.

In study by Nachimuthu et al in 2023(6), compared VAS score in the commercial fibrin glue with that of suture on the 2nd and 7th day after periodontal flap surgery. The participants reported that the site approximated with available fibrin glue was less painful than the site approximated with suture on the second day. Suturing causessecondary tissue trauma, which can exacerbate pain at the site, resulting in an increase in pain on the side where sutures were used.

The roll test revealed the score of (2.11±0.186) and (1.98±0.145) in group I and group II respectively. On intergroup comparison, this difference was statistically non-significant (p-value=0.08). At 12th week follow up, roll scores were reduced to 1.48±0.085 in group I and

1.10±0.075 in group II. This difference was statistically significant (p-value=0.001).The intragroup comparison revealed a statistically significant difference at 1st week, 3rd week and 12th week follow up respectively from baseline in both groups (p-value=0.001). However, the results were highly significant in group II compared to group I. The reduction of roll score in group II could be attributed to use of autologous fibrin glue. In comparison to sutures, fibrin glue proves to be a good alternative for tissue fixation. Since, the fibrin glue can seal the entire undersurface rather than only the marginal fixation possible with sutures(31).

In a study by Subasree et al (2021)(7), compared roll test in autologous fibrin glue with that of suture in periodontal flap surgery. In the inter group comparisons of roll test score at 1 week follow up, there was no significant difference between two groups. In the intra group comparisons, significant difference was seen in roll test score between baseline and 1 week follow up in both the groups. The results were similar with the study conducted by Dave et al in 2020(8).

Thus, considering advantages of Autologous fibrin glue over sutures, it can be easily, routinely and conveniently used for closure after periodontal surgery. The simplified fibrin glue preparation that not only had all of the benefits of previous fibrin glue preparations, but also had the added benefits of a lower cost and a simpler procedure for preparation under normal chairside/laboratory conditions, without the use of complicated techniques or sophisticated procedures. Thus, autologous fibrin seems to be promising and it could be used as an alternative to suturing, thereby marking the beginning of a sutureless era(7).

The material used in this present study, Autologous fibrin glue in particular was found to be better to sutures as the preparation is not only quick and easy to prepare, but it also offers excellent postoperative healing and flap closure stability that is comparableto or better than silk sutures. It is also less traumatic, quicker at the chairside, and needs less skills to use than silk sutures.There are certain limitations to this study which include obtaining the materials required for the preparation, several components are involved (fibrinogen, calcium chloride, thrombin, and afibrinolytics), temperature sensitive preparation procedure, complex, and time-consuming chairside methodology(7).

## V. CONCLUSION:

The present study concluded that Autologous fibrin glue can be used as an alternative to surgical silk sutures for periodontal surgical procedures. It is a multi-purpose surgical glue that can be used as a hemostat, sealant, or adhesive to improve the overall clinical outcome of surgical procedures and reduces patient discomfort. The Autologous fibrin glue group showed better wound healing and stability of flap than the suture group with an added advantage of avoiding future visit for suture removal. The Autologous fibrin glue appears to be promising and should improve the usage in the future giving it a more common place for flap closure and marking the beginning of a sutureless era.

## REFERENCES:

[1]. Pulikkotil S, Nath S. Fibrin Sealant: A Review of Its Applications in Periodontal Surgery. International Journal of Experimental Dental Science. 2015 Jun;4(1):40–6.

[2]. Papapanou PN, Sanz M, Buduneli N, Dietrich T, Feres M, Fine DH, et al. Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. J Periodontol. 2018 Jun 1;89: S173–82.

[3]. Fenol A, Shereef M, Bhaskar A, Prabhu KN. Autologous Fibrin Glue: Milestone in Periodontal Flap Surgery. International Journal of Dental Science and Innovative Research [Internet]. 2020; Available from: www.ijdsir.com

[4]. Citterio F, Gualini G, Chang M, Piccoli GM, Giraudi M, Manavella V, et al. Pocket closure and residual pockets after non-surgical periodontal therapy: A systematic review and meta-analysis. J Clin Periodontol. 2022 Jan;49(1):2–14.

[5]. Dipika, Sankari M, Nambi G. A comparative study on the effectiveness of iso–amyl cyanoacrylate tissue adhesive to silk sutures in the closure of periodontal flap: A split-mouth study. Res J Pharm Technol. 2020 Aug 12;13(8):3671–4.

[6]. Nachimuthu KP, Balakrishnan B, Vyloppillil R, Peter MR, Suresh R, Srinivasan S, et al. Comparison of Postoperative Healing Using Commercially Available Fibrin (Reliseal®) and Vicryl Suture Following Periodontal Flap Surgery: A Split-mouth Study. World Journal of Dentistry. 2023 Jan 1;14(1):62–6.

[7]. Soundarajan S, Rajasekar A. Citation: Subasree Soundarajan, Arvina Rajasekar. Comparison Of Simplified Autologous Fibrin Glue Versus Suturing For Periodontal Flap Closure-A Randomized Controlled Trial. Int J Dentistry Oral Sci [Internet]. 2021;8(8):3810–5. Available from: https://scidoc.org/IJDOS.php

[8]. Dave BP, Sathyanarayana S. Periodontal flap closure using a simplified autologous fibrin glue preparation: A report of two successful cases. J Indian Soc Periodontol. 2020 Nov 1;24(6):579–82.

[9]. Sagar P, Prasad K, Lalitha RM, Ranganath K. Cyanoacrylate for Intraoral Wound Closure: A Possibility? Int J Biomater. 2015; 2015:1–6.

[10]. Gassner R. Wound closure materials. Oral Maxillofac Surg Clin North Am. 2002 Feb;14(1):95–104.

[11]. M Gadhavi DrJ, Chande DrM. Comparison of n butyl 2 cyanoacrylate and silk sutures for the minor surgical procedure: a clinical study. Surgical Update: International Journal of Surgery and Orthopedics. 2020 Jun 30;6(3):204–7.

[12]. Kulkarni S, Dodwad V, Chava V. Healing of periodontal flaps when closed with silk sutures and N-butyl cyanoacrylate: A clinical and histological study. Indian Journal of Dental Research. 2007;18(2):72.

[13]. Bergmann Verlag JF, Bbsch' P, Lintner F, Arbes H, Brand G. Archives of Orthopaedic and Traumatic Surgery Experimental Investigations of the Effect of the Fibrin Adhesive on the Kiel Heterologous Bone Graft. Vol. 96, Arch Orthop Traumat Surg. 1980.

[14]. Bartolucci EG, Pratof GP. Preliminary Observations on the Use of a Biologic Sealing System (Tissucol®) in Periodontal Surgery.

[15]. Praia GPDS, De Paali SDS, Clouser C, Enrico DS^, Sc' M. On the Use of a Biologic Sealing System (Tissucol®) * in Periodontal Surgery.

[16]. Pini GP, De Faoli FS, Corlellini' " P, Zerosi'" C, Clouser C. On the Use of a Biologic Sealing System (Tissucol*) in PeriodontaT Therapy 11. Histologie Evaluation. Vol. 3, The International Journal of Periodontics and Restorative Dentistry. 1985.

[17]. Paolo G, Prato P, Cortellini P, Agudio G, Clauser C. Human Fibrin Glue Versus Sutures in Periodontal Surgery*.

[18]. Young JZ, Medawar PB. FIBRIN SUTURE OF PERIPHERAL NERVES. The Lancet. 1940 Aug;236(6101):126–8.

[19]. Soffer E, Ouhayoun JP, Anagnostou F. Fibrin sealants and platelet preparations in bone and periodontal healing. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2003 May;95(5):521–8.

[20]. Cortellini P, DeSanctis M, Pini Prato G, Baldi C, Clauser C. Guided tissue regeneration procedure using a fibrin-fibronectin system in surgically induced recession in dogs. Int J Periodontics Restorative Dent. 1991;11(2):150–63.

[21]. Yang KC, Wang CH, Chang HH, Chan WP, Chi CH, Kuo TF. Fibrin glue mixed with platelet-rich fibrin as a scaffold seeded with dental bud cells for tooth regeneration. J Tissue Eng Regen Med. 2012 Nov;6(10):777–85.

[22]. Khodakaram-Tafti A, Mehrabani D, Shaterzadeh-Yazdi H. An overview on autologous fibrin glue in bone tissue engineering of maxillofacial surgery. Dent Res J (Isfahan). 2017;14(2):79.

[23]. S Sadatmansouri, SH Moradi, B Iranpour. Effect of Cyanoacrylate Adhesive on Tissue Healing After Periodontal Surgery [Internet]. 2020. Available from: http://www.jrdms.dentaliau.ac.ir

[24]. Spotnitz WD, Falstrom JK, Rodeheaver GT. THE ROLE OF SUTURES AND FIBRIN SEALANT IN WOUND HEALING. Vol. 77. 1997.

[25]. Susin C, Fiorini T, Lee J, De Stefano JA, Dickinson DP, Wikesjö UME. Wound healing following surgical and regenerative periodontal therapy. Periodontol 2000. 2015 Jun 13;68(1):83–98.

[26]. Romanos GE, Strub JR. Effect of Tissucol on connective tissue matrix during wound healing: An immunohistochemical study in rat skin. Vol. 39, J Biomed Mater Res. 1998.

[27]. Pulikkotil SJ, Nath S. Fibrin Sealant as an alternative for Sutures in Periodontal Surgery [Internet]. Article in Journal of College of Physicians and Surgeons Pakistan. 2013. Available from: https://www.researchgate.net/publication/235394800

[28]. Manimegalai A. A comparative study on the efficacy of a commercial fibrin adhesive (Tisseel ®) vis-à-vis silk suture on wound closure following periodontal surgical procedures. J Indian Soc Periodontol. 2010;14(4):231.
[29]. Kulkarni SS, Chava VK. Comparison of cyanoacrylate and silk sutures on healing of oral wounds--an animal model study. Indian J Dent Res. 2003;14(4):254–8.
[30]. Macht SD, Krizek TJ. Sutures and suturing--current concepts. J Oral Surg. 1978 Sep;36(9):710–2.
[31]. Le Guéhennec L, Layrolle P, Daculsi G, Redl H, Pandit A, Czernuszka J. A review of bioceramics and fibrin sealant. Vol. 8, European Cells and Materials. AO Research Institute Davos; 2004. p. 1–11.