

## Healing After Periodontal Flap Surgery after Using Bio- Adhesive Material And Silk Sutures: A Split-Mouth Comparative Clinical Study

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### ABSTRACT

**Background:** Now a days with increasing research and in the light of modern knowledge of the scientific procedures a number of techniques have been developed for the treatment of periodontal problems. Considering the procedure of flap surgery for periodontal reattachment, it demands a close postoperative adaptation for the mature and healthy gingival connective tissue onto the tooth surface so prepared before the surgery.

**Materials and Methods:** In the study conducted here in the department of periodontics of our dental institute, a set 50 patients were selected in the time period of one year. age group selected was between 20 to 60 years irrespective of the gender, showing acceptable oral hygiene before the study. A through medical and habit history was obtained from the patients.

**Results:** Studies conducted for plaque index in the mean value of Group A and Group B were almost same at the baseline initially. Though, the percentage improvement in plaque index for Group A and Group B over the period of 3 months with respect to baseline plaque index came out to be 54% for Group A and 56% for Group B keeping mean value of  $P = 0.486$ . It is noteworthy that absence of crater formation on the tip of the newly developed papillae and absence of any loss of sutures were observed in Group A and Group B.

**Conclusion:** The chances of secondary infection and pain are also less as compared to the silk sutures. No chances of food lodgement and ease of cleaning resulted in more favourable choice of suture material in periodontal surgery. Thus, The Isoamyl 2-cyanoacrylate has shown its promising and positive results in terms of comparison with other conventional suturing materials.

**Keywords:** Plaque, Periodontal, Reattachment.

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### INTRODUCTION

Now a days with increasing research and in the light of modern knowledge of the scientific procedures a number of techniques have been developed for the treatment of periodontal problems. Considering the procedure of flap surgery for periodontal reattachment, it demands a close postoperative adaptation for the mature and healthy gingival connective tissue onto the tooth surface so prepared before the surgery.<sup>1-3</sup> There are a variety of materials available for securing the tissue after the procedure of flap surgery. In this study an effort was made to analyse the comparison between the isoamyl 2-cyanoacrylate and silk sutures, both being used as the securing material post operatively for forming new attachment levels on the prepared tooth surface. As the conventional braided silk suture material has a tendency of "wicking" making it as site of potential secondary infection.<sup>4,5</sup> Also it has a considerable amount of inflammatory response in the tissue is observed, thus delaying the healing process. Both these

factors were enough to consider an alternative to the conventional silk sutures. Give rise to the development of a synthetically developed tissue adhesive by cover et al in the year 1959. The material so developed was isoamyl 2-cyanoacrylate. The present study was conducted to determine the healing efficacy after using traditional silk sutures and bio adhesive materials after periodontal flap surgery.

### MATERIALS AND METHODS

In the study conducted here in the department of periodontics of our dental institute, a set 50 patients were selected in the time period of one year. The study so conducted was in complete accord to the Helsinki declaration of 1975 later revised in the year 2013. The selection criteria for the patients was as: patient should have moderate to severe periodontitis, clinically probing depth should be more or up to 5mm and radiograph suggesting more

than or equal to 50% bone loss in three teeth consecutively in at least two quadrants of the mouth. The age group selected was between 20 to 60 years irrespective of the gender, showing acceptable oral hygiene before the study. A thorough medical and habit history was obtained from the patients. History of any drug use, drug allergy, systemic disease and any acquired disease was obtained as it might affect the healing process during the study. Patients with a history of smoking, use of tobacco in any form and alcohol consumption and also patients with history of pregnancy and lactating mothers were exclusively excluded from the study. Before any surgical intervention a written informed consent was obtained and secured from all the patients involved in the study voluntarily. The study was conducted in three phases. In the first phase of the study initial curettage, root planning procedures (ultrasonic and manual) and prophylaxis was carried out for every patient. Patients were advised chlorhexidine mouth during the four weeks' time for at least once daily. Complete mouth periodontal charting was done using Williams probe. These patients were then recalled after four weeks, and patients showing no inflammation at all were taken up for surgery. In the second phase of the study before the surgical flap were raised a through plaque index and bleeding index were obtained using the Turesky-Gilmore-Glickman index and Muhlemann and Sons index respectively. All the patients underwent flap surgery using modified widmann method. Chlorhexidine, povidine and normal saline were used as irrigating solutions. As anaesthesia 2% lignocaine with epinephrine 1:100,000 was used. All flaps were debrided and removed of any kind of irritants which might affect the healing adversely. From these 50 patients twenty five were given (3-0) silk sutures and 25 were given isoamyl 2-cyanoacrylate as tissue securing material after the surgery. Making two groups; as in GROUP A where 3-0 silk sutures were placed in interrupted manner with no periodontal pack and GROUP B where with isoamyl 2-cyanoacrylate was drop wise placed in order to keep flap margins in desired position. Again no periodontal pack was placed at the surgical site. Patients were given post-surgical instructions. After one week the sutures and the cyanoacrylate plug were removed from the patients. No examination was carried out in this sitting of the patients. Now in phase three, patients were recalled after 2<sup>nd</sup>, 6<sup>th</sup> and 12<sup>th</sup> weak for the follow-up. During this phase both objective and subjective aspects were taken in

consideration. Redness, plaque formation and presence of material-alba was objectively observed. Whereas, any pain, itching and alteration of aesthetics were recorded objectively. Results were analysed in a systematic manner considering each and every aspect of the surgery meticulously.

**Table 1: Gender distribution of the subjects**

Gender	Group A	Group B
Male	18	21
Female	7	4

**Table 2: Plaque levels amongst the groups**

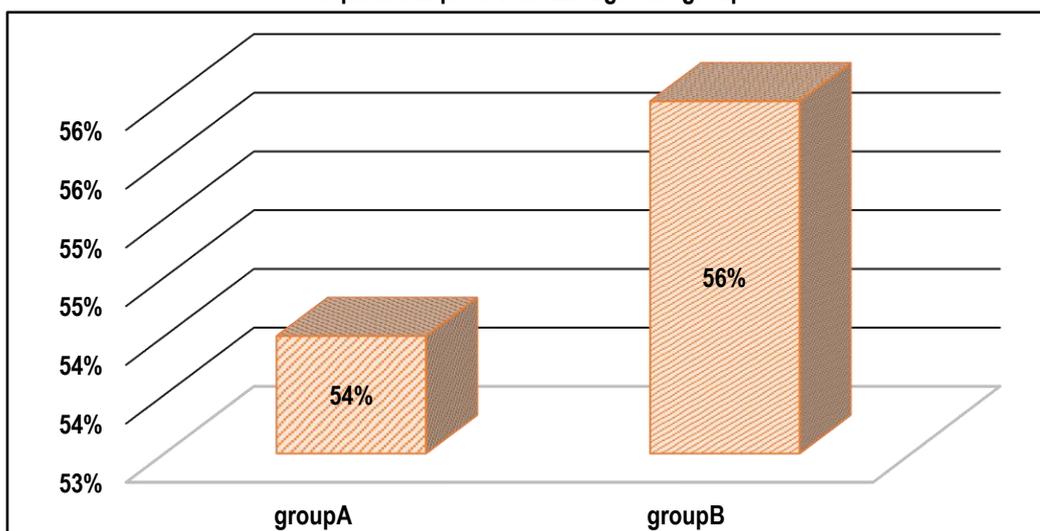
Group	% of Plaque
Group A	54%
Group B	56%

**RESULTS**

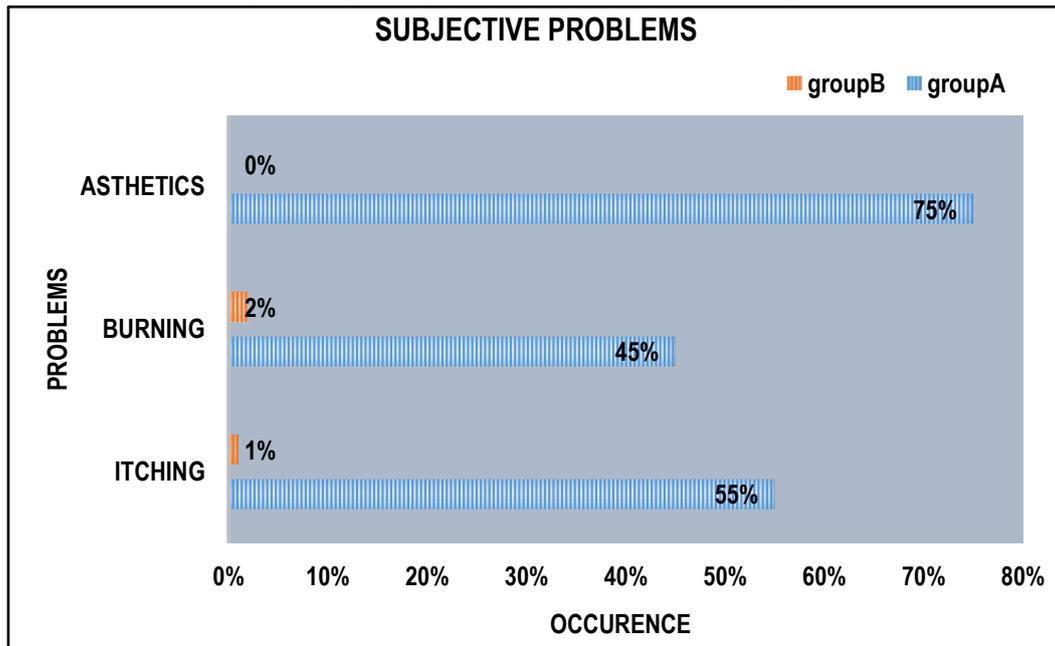
A total of 50 subjects with 25 subjects in each group were enrolled in the study. The mean age of the subjects was 36.54 +/-5.76 years. There were 29 males and 11 females in the study. Table 1 illustrates the gender distribution of the subjects. There were 18 males and 7 females in Group A and 21 males and 4 female sin Group B. Studies conducted for plaque index in the mean value of Group A and Group B were almost same at the baseline initially. Though, the percentage improvement in plaque index for Group A and Group B over the period of 3 months with respect to baseline plaque index came out to be 54% for Group A and 56% for Group B keeping mean value of  $P = 0.486$ . (Graph 1, Table 2)

A major improvement was not observed in Group B over Group A in terms of plaque index. Now considering the readings of the healing index and the mean value of early healing index at 2<sup>nd</sup> week were not majorly different among Groups A and B which came out to be  $P = 0.109$ . Same levels in early healing index are seen in both groups in the 2<sup>nd</sup> week. Again early healing index didn't suggested any difference among Group A and Group B until 2<sup>nd</sup> week. Again the mean value of bleeding index in Group A and Group B were same as the baseline. The overall progress in terms of percentage, Group A and Group B after 3 months when compared to baseline bleeding index was about 95% for Group A and 99% for Group B keeping  $P = 0.324$ .(graph 2)

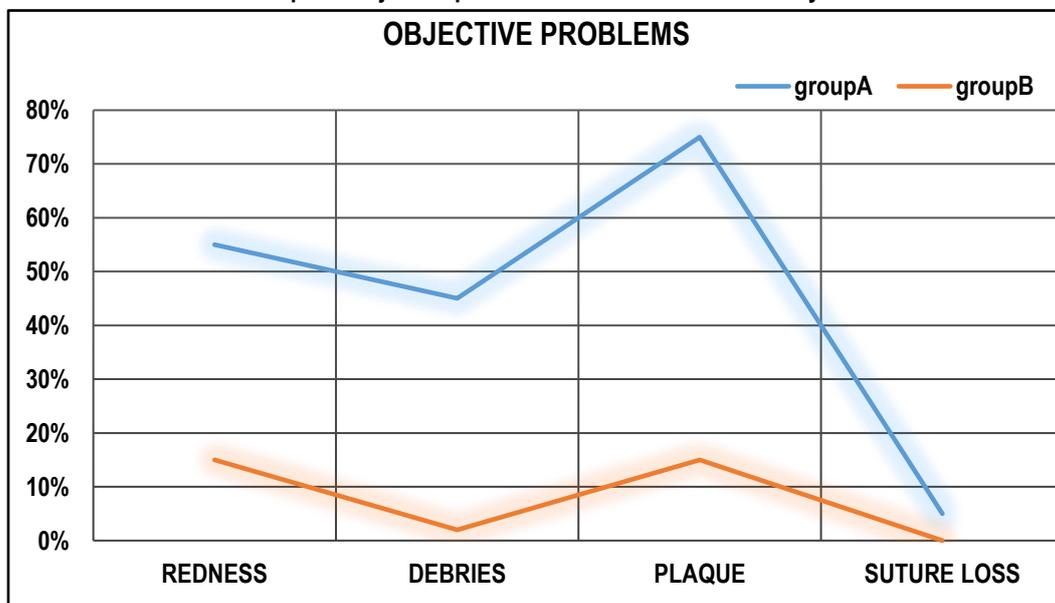
**Graph 1: Plaque levels amongst the groups**



Graph 2: Subjective problems encountered in both the groups



Graph 3: Objective problems encountered in the study



The minor improvement in terms of percentage, was reported in probing depth for Group A and Group B after 3 months was 70% for Group A and 72% for Group B keeping  $P = 0.240$ . Interestingly the occurrence of pain and discomfort is way up more in Group A as compared to Group B. The difference being statistically similar with  $P = 0.001$ . Also, none of the cases from Group A and Group B had burning or itching episodes. All cases of Group B showed better aesthetics when compared to Group A. The data was statistically significant with  $P = 0.001$ . The incidence of erythema (redness) didn't varied exponentially among Group A and Group B keeping  $P = 0.147$ . It is noteworthy that absence of crater formation on the tip of the newly developed papillae and absence of any loss of sutures were observed in Group A and Group B. All cases of Group A presented large amount of materia-alba and debris. On the other hand all study subjects in Group B complete absence of materia-alba and debris. (graph 3)

### DISCUSSION

It becomes a matter of discussion in this study, that remarkable decrease in the plaque index is observed in the individuals of Group B when compared to individuals of Group A when observed after 2<sup>nd</sup> and 6<sup>th</sup> week. But after three months' time no such difference was observed.<sup>6</sup> Data suggests an early reduction in the healing index which was observed in Group B when compared to Group A after 2 weeks. No major difference was observed in healing pattern even after 6<sup>th</sup> week while comparing both groups.<sup>7</sup> A dramatic reduction in sulcus bleeding index was observed for Group B when compared to Group A after 6<sup>th</sup> and 12<sup>th</sup> week. Quite major reduction in periodontal probing depth was observed in Group B as compared to Group A after 6<sup>th</sup> and 12<sup>th</sup> week. Data revealed considerable difference among the groups when observed in terms of pain and discomfort and also in terms of burning and itching. The aesthetics factor was also studied

between the sutured site and the site where isoamyl 2-cyanoacrylate was applied as securing material. The sites where isoamyl 2-cyanoacrylate was used, showed the absence of pain and discomfort and also absence of burning and itching sensations. It was also more aesthetically acceptable by all patient subjects.<sup>8</sup> Stats revealed a difference among the chance of redness, debris formation, losing of suture, and also accumulation of materia alba when evaluated after 2 weeks among the sutured site and the site where isoamyl 2-cyanoacrylate was used. The absence of redness, absence of debris formation at the tip of papilla and absence of materia-alba were observed at the site where isoamyl 2-cyanoacrylate was applied. The advantage during surgical procedures using cyanoacrylate is essential as it; Lessens trauma to the patient, less fatigue for the surgeon, reduces postoperative swelling and operating time considerably, ease of application, more comfortable and accepted to the patient. The added advantage for cyanoacrylate tissue adaptation is better, and healing is faster as compared to conventional silk sutures. Technically, tissue adaptation is better as it fixes flap to the whole tooth surface so prepared, as sutures provide only marginal fixation.<sup>9,10</sup>

In addition to this, cyanoacrylate also saves cost of preparing and sterilization, instruments at the time of suture removal. From patients point of view the removal of sutures is annoying and painful. In this study, the incidence of erythema (redness) didn't varied exponentially among Group A and Group B keeping  $P = 0.147$ . It is noteworthy that absence of crater formation on the tip of the newly developed papillae and absence of any loss of sutures were observed in Group A and Group B. All cases of Group A presented large amount of materia-alba and debris. On the other hand all study subjects in Group B complete absence of materia-alba and debris. So it is clear from the above data and study that isoamyl 2-cyanoacrylate is a better suture material in terms of plaque index was compared after 6 weeks and 3 months comparing both the groups.

The cyanoacrylates were discovered by Ardis in the year 1949<sup>11</sup> and its use as suture material in surgery was first advocated by Coover et al. in 1959<sup>12</sup> as an effort to revolutionized nonconventional suturing technique. The chances of secondary infection and pain are also less with cyanoacrylates as compared to the silk sutures. No chances of food lodgement and ease of cleaning resulted in more favourable choice of suture material in periodontal surgery. Plus the biologic sealant is well treated and accepted by the oral tissues, resulting in good acceptability with no side effects by all the subjects at all.

## CONCLUSION

The Isoamyl 2-cyanoacrylate has shown its promising and positive results in terms of comparison with other conventional suturing materials. The advantages are in the immediate haemostasis, ease of application as no technical experience is required. It is more accepted to patients in terms of aesthetics and lack of maintenance required. Therefore, considering all these aspects of

isoamyl 2-cyanoacrylate, it can be routinely, and conveniently used for flap sealing in periodontal flap surgery as a conventional material.

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