

## Influence Of Suturing Techniques On Wound Healing Following Periodontal Flap Surgery

Research Article

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### Abstract

**Background:** Proper suturing technique is essential for obtaining wound healing and avoiding infection. Techniques that must be mastered include good version, maintaining uniform tensile strength and precise approximation along tissue edges. The primary objective of suturing is to position and secure surgical flaps to promote optimal healing.

**Aim:** The aim of the study was to evaluate the influence of two different suturing techniques on wound healing following periodontal flap surgery.

**Materials And Methods:** The single centered cross-sectional study was conducted among 100 patients who had undergone periodontal flap surgery in the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. The patients were categorized based on the suturing technique as follows: Group 1: Mattress (50 patients), Group 2: Direct loop (50 patients). After one week of periodontal flap surgery, all the patients were recalled for suture removal. After suture removal, the healing index score was recorded for both the groups and compared. The data was analyzed using Statistical Package for Social Sciences (SPSS Software, Version 23.0). Frequency, percentage and Chi-square test were calculated.

**Results:** Majority of the patients with mattress suturing technique (28%) had better wound healing when compared to the patients with direct loop suturing technique (21%). The association between type of suturing technique and wound healing index was done by Chi square test and was found to be significant with the p value of 0.05

**Conclusion:** The present study suggests that better wound healing was observed among patients with mattress suturing technique when compared to direct loop suturing technique following periodontal flap surgery.

**Keywords:** Direct Loop Suture; Mattress Suture; Suturing Technique; Innovative Technique; Wound Healing.

### Introduction

Periodontitis is a chronic inflammatory disease which affects the supporting structures of the tooth. The main etiology of the disease is dental plaque, however the disease gets aggravated by various risk factors including age, gender, smoking, stress, socio-economic status, genetic factors, systemic diseases and hormonal changes [1-9]. If the condition is left untreated it leads to increase in pocket depth, gingival recession, clinical attachment loss, bone loss, furcation involvement, pathological migration and tooth mobility eventually leads to tooth loss [10-15].

The management of periodontitis involves scaling and root planing followed by flap surgery. In periodontal surgery, the most common method of wound closure is by sutures [16]. Proper suturing technique is essential for obtaining wound healing and avoiding infection. Techniques that must be mastered include good version, maintaining uniform tensile strength and precise approximation along tissue edges [17]. The primary objective of suturing is to position and secure surgical flaps to promote optimal healing. The ideal suture is strong, handles easily, and forms secure knots [18]. Periodontal surgery incorporates many issues and is complicated in many cases as it deals with the periodontal disease process affecting both soft and hard tissues [19]. Flap sta-

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bility and durability is the major concern during the postoperative period [20]. The mouth is a moist, movable and contaminated environment where healing has to take place following a periodontal surgery [21]. At the same time basic functions such as eating and speaking should be accomplished. Many patients may also be involved in destructive behaviours such as smoking or poor oral hygiene or poor oral hygiene, which has an impact on surgical efforts [22].

Suturing is often the most tedious part of any surgical procedure. However, applying the basic principles and techniques of suturing can help make suturing more efficient and can also improve the wound healing of surgery [23]. Wound healing after periodontal flap surgery also depends on the technique employed. Various suturing methods are being practised in the field of periodontal surgery. Commonly used suturing techniques are simple interrupted suturing techniques, continuous suturing techniques and vertical or horizontal mattress suturing techniques for adequate approximation of the elevated flap [24]. Mattress suturing techniques are employed in the areas where tension free closure cannot be accomplished. It is used to resist muscle pull, evert the wound edges which keeps the epithelium away from underlying structures and to adapt the tissue flap tightly to the underlying structures in case of flap surgery, bone graft, tissue graft, alveolar ridge corrections, regenerative membrane or dental implant. Mattress suturing techniques are helpful in close approximation of the flap under tension and in the cases of suturing done in different planes [25]. The direct loop or the interrupted suture are most commonly used suture in periodontal surgery and is frequently used to affix tension-free and mobile surgical flap [17].

Our team has extensive knowledge and research experience that has translated into high quality publications [26-45]. Through extensive literature search, it was revealed that there is a lack of adequate studies assessing the influence of suturing techniques on wound healing following periodontal flap surgery. Hence, the rationale of this study was to evaluate the influence of two different suturing techniques on wound healing following periodontal flap surgery.

## Materials and Methods

The single centered cross-sectional study was conducted among

100 patients who had undergone periodontal flap surgery in the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. The ethical clearance was obtained from the Institutional Ethical Committee and a written informed consent was obtained from all the study participants.

The patients were categorized based on the suturing technique as follows: Group 1: Mattress (50 patients), Group 2: Direct loop (50 patients). After one week of periodontal flap surgery, all the patients were recalled for suture removal. After suture removal, healing index score based on Huang et al., 2005 Wound Healing Index [46] was given for all the patients.

## Statistical Analysis:

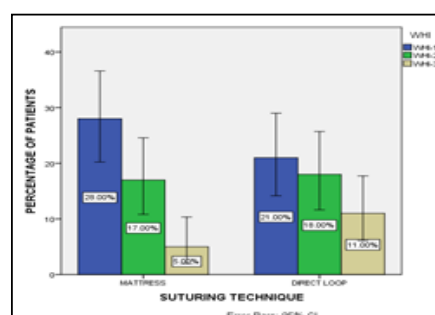
The data was analyzed using Statistical Package for Social Sciences (SPSS Software, Version 23.0). Descriptive and inferential statistics were done for data summarization and presentation. Frequency, percentage and Chi-square test were calculated.

## Results

A total of 100 patients were enrolled. Of which 50 patients had undergone periodontal flap surgery with mattress suturing technique and another 50 patients had undergone periodontal flap surgery with direct loop suturing technique. Wound healing index (WHI) scores were recorded and compared between both the groups.

Among 50 patients with mattress suturing technique, 28 patients showed wound healing index score of 1, 17 patients showed wound healing index score of 2 and 5 patients showed wound healing index score of 3. Among 50 patients with direct loop suturing technique, 21 patients showed WHI score of 1, 18 patients showed WHI score of 2 and 11 patients showed WHI score of 3. Majority of the patients with mattress suturing technique had better wound healing when compared with the patients with direct loop suture technique. The association between type of suturing technique and wound healing index was done by Chi square test and was found to be significant with the p value of 0.05 (Figure 1).

**Figure 1.** The bar chart represents the association between suturing technique and wound healing index (WHI). X axis represents different suturing techniques and Y axis represents the percentage of patients who underwent periodontal flap surgery. Blue colour denotes wound healing index score of 1(WHI-1) and green colour denotes wound healing index score of 2 (WHI-2) and yellow colour denotes wound healing index score of 3 (WHI-3). Majority of the patients with mattress suturing technique (28%) had better wound healing when compared to the patients with direct loop suturing technique (21%). The association between type of suturing technique and wound healing index was done by Chi square test and was found to be significant with the p value of 0.05.



## Discussion

The present study was done to evaluate the influence of two different suturing techniques on wound healing following periodontal flap surgery.

From the present study, it was noted that mattress suturing had better wound healing than the direct loop suturing among the patients who had undergone periodontal flap surgery. Kumar et al conducted a study to compare the mattress suture and simple loop interrupted suture following modified Widman flap surgery and found out that flap closure by modified vertical internal mattress suturing technique resulted in better improvement than the simple loop interrupted sutures [47].

Gopu *et al.*, in 2012 conducted a study to assess the efficacy of modified vertical mattress suturing technique for flap approximation after periodontal flap surgery. In this study the modified vertical mattress suturing technique was found to be reliable and an effective method of suturing for flap approximation [48]. Another study was conducted to evaluate whether horizontal mattress suturing is more effective than simple interrupted suturing on postoperative complication and primary wound healing after impacted mandibular third molar surgery. There was significantly less wound dehiscence in the horizontal mattress suturing than in the simple interrupted suturing technique. According to the results of this study, the horizontal mattress suturing technique is more effective than the simple interrupted suturing technique on wound healing [49].

Similarly, another study was done to assess the influence of suturing technique on marginal flap stability following coronally advanced flap. In this study simple interrupted, single sling or sling and tag suture techniques were investigated through a specific tool involving a load cell- based recording device. Suturing technique highly affects the marginal flap stability following coronally advanced flap and the technique was shown to be a positive predictor for flap stability [50].

According to Christopher et al, the mattress suture technique is the most commonly used effective suturing technique and it prevents early wound dehiscence [57]. Our results are in accordance with the previous study. This might be because of the advantage of mattress suturing technique, as it reduces dead space between the flap and the bone as compared to other suturing techniques promoting better improvement.

The limitation of the study was that only two different suturing techniques were included in the study. However this study would shed light for future studies assessing the influence of other types of suturing techniques, different suturing materials, surgical procedure and patient related factors on wound healing.

## Conclusion

The present study suggests that better wound healing was observed among patients with mattress suturing technique when compared to direct loop suturing technique following periodontal flap surgery.

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