

Analysis of Localized Periodontal Flap Surgical Techniques: An Institutional Based Retrospective Study

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Abstract

A myriad of periodontal flap surgical procedures have been used throughout the years in an attempt to reestablish the attachment of periodontal tissues to root surfaces in regions affected by periodontitis. Flap surgery is quite a common procedure done for the patients with deep periodontal pockets. The aim of this study is to analyze the localized periodontal flap surgical techniques done in a private dental hospital. Among a sample of 746 patients who had undergone periodontal flap surgery in private dental hospital, a total of 172 patients who had undergone localized periodontal flap surgery were selected for the study. All patients' data was collected and categorized based on their age, gender, tooth site and localized periodontal flap surgical techniques. Excel tabulation and SPSS Version 22 was used to analyze the data. Kirkland flap technique was most followed in relation to lower molars (23.26%). Association between localized periodontal flap surgical techniques and tooth site was done and it was found to be statistically significant (p -value=0.014). Within the limitations of our study, it can be concluded that the kirkland flap technique was most commonly followed by surgeons for localized periodontal flap surgery and it was most commonly done in relation to lower molars. Males had higher prevalence for undergoing periodontal flap surgery than females. Localized chronic periodontitis patients aged 31 to 50 years had mostly undergone periodontal flap surgery.

Keywords:

Flap surgery; Kirkland flap; Modified widman flap; Undisplaced flap; Palatal flap

Introduction

Periodontitis can be defined as an inflammatory disease of the periodontium or supporting tissues of the teeth.

It is caused by a group of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone and eventually form periodontal pocket, causing gingival recession or possibly both. [1]

Periodontal disease is a complex infectious disease that can be attributed to many factors that include bacterial infection and host response to bacterial challenge. This irreversible disease can be modified by environmental, acquired risk factors and genetic susceptibility. [2]

The surgical phase of periodontal therapy had the following objectives. [3] The first and foremost is the improvement of tooth prognosis.

[4] It allows the prognosis of the tooth to be periodontally compromised to be corrected in terms of surgical intervention, while providing form and function. [5] The second, but not the least, is aesthetics. Dentition provides facial aesthetics, and is undeniably a fact. [6] Without healthy teeth and gum levels that are aligned, a smile would look displeasing. Periodontal therapy largely consists of oral prophylaxis, curettage and frenectomy, gingivectomy, and flap surgery. It consists of techniques for pocket therapy and for the correction of osseous and mucogingival defects. [7,8]

Flap surgery is quite a common procedure done for the patients with deep periodontal pockets. Periodontal flap is defined as a section of the gingiva and/or mucosa that is surgically

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separated from the underlying tissue to provide visibility of access to the bone and the root surface. The purpose of advising a flap surgery is to provide access to the diseased root surfaces and to eliminate the periodontal pockets. [9]

Moreover, flap surgery helps to eradicate the infected and necrotic alveolar bone, maintain the complexity of the mucogingival junction and possibly regenerate periodontal tissues. The classification of periodontal flap includes the following, based on the purpose of surgery which can be sub classified into pocket elimination, reattachment of flap and mucogingival repair. [10]

Based on bone exposure after flap regeneration that splits into full thickness mucoperiosteal flap and partial thickness flap. Based on flap placement after surgery which is displaced and undisplaced.

Displaced flaps can be further divided into coronally displaced flaps, apically displaced flaps, and laterally displaced flaps. [11]

The indications of flap surgery include bone regeneration in intrabony defects, pockets on teeth in which a complete removal of tooth irritants is not possible by nonsurgical therapy, furcation involvement and persistent inflammation in moderate to deep pockets. [12] The contradictions include acute oral infections, systemic conditions, and medically compromised patients. [13]

The various flap designs include the modified flap operation also known as kirkland flap, the widman flap, the modified widman flap, undisplaced flap, palatal flap, papillary preservation flap, distal wedge procedure and modified distal wedge procedure. [13]

The advantages of flap surgery includes improved visualization of the root surface, improved periodontal pocket reduction and improved regeneration of lost periodontal tissues.

The disadvantages include the possibilities of postoperative hypersensitivity, exposure of roots and furcations that may result in root caries and flap surgery in shallow pockets may lead to attachment loss. [14,15]

Previously various had conducted clinical studies, [16-18] systematic reviews, [19-24] randomized controlled trials, [25-27] case studies [28,29] have been done in managing the various periodontal problems.

Previously our team has a rich experience in working on various research projects across multiple disciplines. [30-44]

This study provides statistics about which teeth are more susceptible to deep pockets and about various pocket reduction surgery done for localized periodontitis cases.

The aim of this study is to analyze the localized periodontal flap surgical techniques done in a private dental hospital.

Methodology

Study design

A retrospective study was conducted to analyze the localized periodontal flap surgical techniques done in Saveetha Dental College, Chennai.

This study is based on a university setting. Inclusion criteria are both male and female patients with chronic periodontitis under the age group of 18 to 65 years, patients who had undergone localized periodontal flap surgery. Whereas, exclusion criteria includes patients who had undergone full mouth flap periodontal flap surgery.

Ethicals

Before scheduling of the retrospective study, the official permission was obtained from the Institutional ethical committee (ethical approval number-SDC/SIHEC/2020/DIASDATA/0619-0320).

Data collection

Among a sample of 746 patients who had undergone periodontal flap surgery in Saveetha Dental College, a total of 172 patients who had undergone localized periodontal flap surgery were selected for the study.

All patient's data was collected and categorized based on their age, gender, tooth site and localized periodontal flap surgical techniques. These data were retrieved from dental records from June 2019 to March 2020.

Patient records that were incomplete were removed from this study. Repetitive entries were also excluded. Cross-verification was done by radiographic and photographic evaluation.

Statistical analysis

Excel tabulation consisting of all the variables were done. SPSS version 22 was used to statistically analyze the data. The statistical test used was the chi-square test.

The type of analysis was descriptive analysis (percentage, mean and standard deviation) and inferential test (Chi square test) and results were expressed as bar graphs. The association between localized periodontal flap surgical techniques used and tooth site was analyzed. P value less than 0.05 was considered to be statistically significant.

Results and Observations

The following are the results obtained from the analysis. Figure 1 shows the frequency of gender of the total number of patients analyzed. Out of the 172 patients, 58.1% of them were males and 41.86% of them were females. Male participants were higher than female participants.

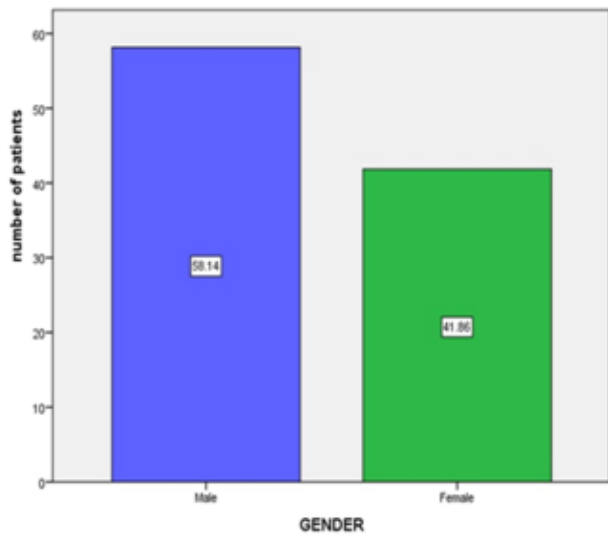


Figure 1: The graph represents the gender distribution of patients who underwent localized periodontal flap surgery. X-axis represents gender and Y-axis represents the number of patients. More number of males (blue) underwent localised periodontal flap surgery compared to females (green).

In Figure 2, the frequency of the types of flap surgical techniques followed were analyzed. Kirkland flap method was the most commonly followed (60.47%), then it was modified widman flap (29.65%), undisplaced flap (6.39%) and distal wedge which was the lowest (3.48%).

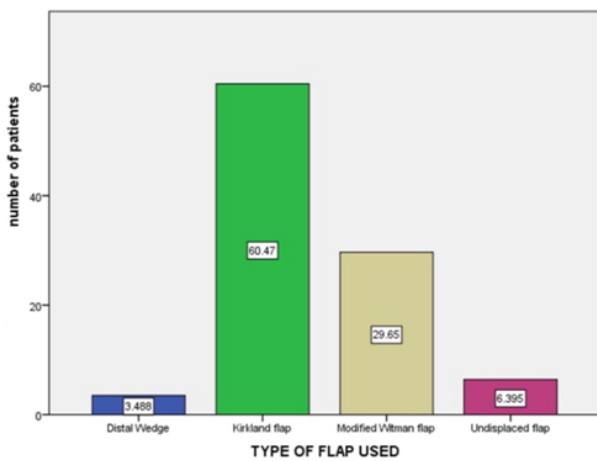


Figure 2: The graph represents the distribution of various types of localized periodontal flap surgical techniques. X-axis represents types of flap surgical techniques used and Y-axis represents the number of patients. Kirkland flap technique (green) was mostly followed by the surgeon.

Figure 3 shows the frequency of age groups among the patients. Ages 31-50 was the highest (44.19%), followed by 18-30 (37.79%), and the least which was 51-65 (18.02%).

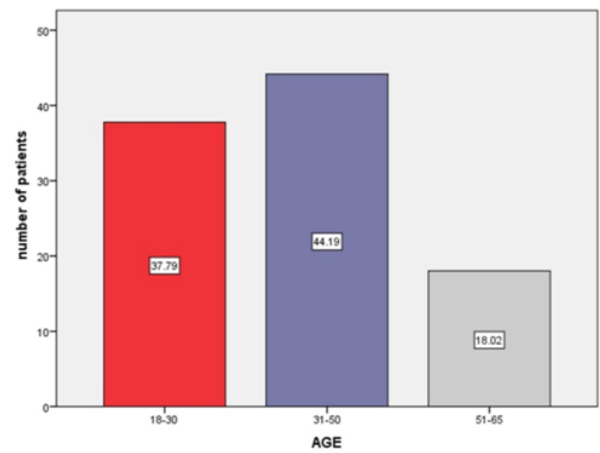


Figure 3: The graph represents the age distribution of patients who underwent localized periodontal flap surgery. X-axis represents age and Y-axis represents the number of patients. It was noted that patients aged 31 to 50 years (indigo) had mostly undergone localized periodontal flap surgery as compared to other age groups.

Figure 4 shows the association between flap surgical techniques used and tooth site. Modified widman technique was most commonly used in relation to Upper anterior (4.65%) and upper premolars (9.30%). Kirkland flap was most commonly used in relation to lower molars (23.26%), upper molars (22.67%) and lower anteriors (2.91%). The lower premolars had both Kirkland flap (0.58%) and modified widman flap (1.74%) commonly used. Thus, Kirkland flap technique is most commonly done in relation to lower molars (23.26%). Chi-square test done, P-value=0.014 (<0.05), hence statistically significant.

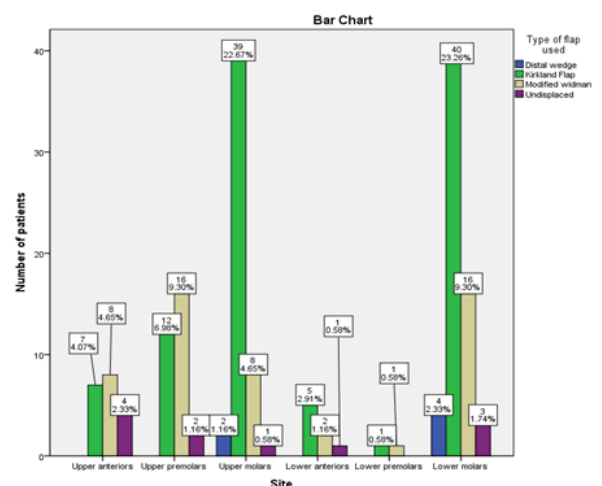


Figure 4: This graph represents the association between localized periodontal flap surgical techniques used and tooth site. X-axis represents the tooth site and Y-axis represents the number of patients. Hence proving that kirkland flap technique is widely used in relation to lower molars (23.26%). Chi-

square test done, P-value=0.014 (<0.05), hence statistically significant.

Discussion

A myriad of periodontal flap surgical procedures have been used throughout the years in an attempt to reestablish the attachment of periodontal tissues to root surfaces in regions affected by periodontitis. [45] While most of the patients with periodontitis can be effectively managed by non-surgical procedures, others require surgical techniques to restore their periodontal health. The purpose of surgical pocket therapy is to eliminate the pathological changes in the pocket walls, to create a stable, easily maintainable state and if possible, to promote periodontal regeneration. To fulfill these objectives, surgical techniques increase accessibility to the root surface, reduce or eliminate pocket depth, reshape soft and hard tissue. Regardless of the therapy selected, methods of dealing with the periodontal pocket have always been a subject of discussion and controversy. Several surgical procedures have been proposed to treat the soft tissue lesion of periodontitis as well as to gain access to the tooth root and supporting bone. [46]

Olin Kirkland, a prominent dentist in Alabama presented in 1932, a technique that he called a modified flap operation. [47] It was used for isolated deep periodontal lesions. The procedure consisted of splitting mesiodistally the papilla of the involved space and retracting the gingiva using separators to keep the area open, followed by scaling and removal of granulation tissue on the soft tissue flap and closure of the wound with suture. Ramfjord *et al.* [48] modified the technique initially described by Widman, in 1916, turning it into a conservative procedure. The changes were: Primary incision which was an inverse beveled, partial-thickness, thinning incision held parallel to the long axis of the tooth and directed toward the crest of alveolar bone, and intra-sulcular (secondary) incision was performed. After raising the flaps, the loosened collar of tissue was removed at the alveolar crest.

In the present study, the frequency of male participants was higher than female participants to undergo flap surgery. According to Stanescu *et al.* [49] there is a higher gender predilection for the male population compared to females due to many factors. They include lifestyle and genetic variation. [50] The frequency of Kirkland flap was the highest compared to the others. According to Kumar [51] kirkland flap is becoming even more common in terms of periodontal flap surgery as it does not disrupt the esthetics of the surgical site.

The frequency of patients between ages 31-50 was the highest among the patients undergoing flap surgery. The influence of age of patients undergoing flap surgery depends on many factors, such as patient's willingness, patient compliance and systemic diseases history. Another study contradictory to the results of this study stated that patients of ages 50 and above are more prone to flap surgeries as age is a risk factor for periodontitis. [52-59]

Based on a similar study done by Graziani *et al.* the kirkland flap was the most widely used technique of choice for periodontal surgery. [60] According to Kim *et al.* [61]

undisplaced flap surgery was minimally practiced in the areas of esthetic concern and in cases with less width of attached gingiva and in cases of severe hypersensitivity. The limitations of this study are a small sample size and it is self-centered. In the future, a larger study population should be encouraged to compare the pre and post-surgical parameters among various periodontal flap techniques.

Conclusion

Within the limitations of our study, it can be concluded that the kirkland flap technique was most commonly followed by surgeons for localized periodontal flap surgery and it was most commonly done in relation to lower molars. Males had higher prevalence for undergoing periodontal flap surgery than females. Localized chronic periodontitis patients aged 31 to 50 years had mostly undergone periodontal flap surgery.

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