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ANALYSIS OF VARIOUS TECHNIQUES USED FOR PERIODONTAL FLAP SURGERY - AN INSTITUTIONAL BASED RETROSPECTIVE STUDY

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Abstract

Periodontal therapy is directed at disease prevention, slowing or arresting disease progression, regenerating lost periodontium, and maintaining achieved therapeutic objectives. One of the most common surgical procedures done in the oral cavity is the periodontal flap surgery. Reconstructive periodontal procedures may improve tooth survival while minimising the progression of periodontitis and re-intervention needs provide long term outcome stability. The study aims at analysing the various flap techniques used in periodontal flap surgery among patients attending a private dental institution. We reviewed 42,110 patient records and it was found out that 722 patients matched the inclusion criteria. Chi square test was done for statistical analysis and the association between various flap techniques and periodontal diseases was found to be statistically significant with p value<0.05. Within the limit of our study, it can be concluded that the kirkland flap technique was most commonly followed by surgeons for periodontal flap surgery. Males had higher prevalence for undergoing periodontal flap surgery than females. Generalised chronic periodontitis patients aged less than 45 years old had mostly undergone periodontal flap surgery.

Keywords: *Flap techniques; Flap surgery; Kirkland flap, Periodontitis*

I. Introduction

Periodontitis can be defined as the chronic inflammatory disease affecting supporting tissues around the teeth which can lead to tooth loss if left untreated, it is associated with systemic diseases such as diabetes mellitus, chronic obstructive pulmonary diseases and many more [1]. Inflammation and tissue breakdown are caused due to inflammatory destructive mediators associated with initiation and progression of inflammatory diseases like periodontitis [2]. Periodontal reconstruction is a complex biological process that involves de novo formation of the lost tooth supporting structures including alveolar bone, periodontal ligament and cementum over a previously diseases root surface. Few proinflammatory cytokines such as IL-1, IL-6, IL-12, IL-17, IL-18, IL-21, TNFα [3][4] and IFN-γ have been reported to be involved in the pathogenesis of periodontitis. Since periodontitis is a multifactorial disease, gram negative anaerobes can be responsible for the progression of this disease [5]

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Various regenerative procedures were employed and still a gap was found in achieving the goal. Loss of periodontal tissues can be restored using new options such as platelet concentrates, which has plasma rich in growth factors (PRGF) [6]. As stem cells have the ability to self-renew and differentiate to produce specialized cells, there could be a possibility of using them for regenerative therapy [7]. Delivery of growth factors in the local environment holds a great deal in adjunct to bone grafts for complete periodontal regeneration[8]. Reconstructive periodontal treatment may improve survival rate of tooth and at the same time can minimise progression of periodontitis and re-intervention needs providing long term outcome and stability [9].

Periodontal flaps can be referred to as section or small parts of gingiva or mucosa which are separated surgically from the underlying tissues in order to provide both visibility as well as access to the bone and root surface. The main purposes of flap includes to eliminate periodontal pockets surgically, induce reattachment and bone regeneration in periodontal pockets and for mucogingival defects and deficiencies. There were various types of flap techniques that can be used in flap surgery which are kirkland flap, modified widman flap, distal wedge, undisplaced flap, papilla preservation flap and many more. The selection of each flap technique can be influenced by various factors such as case selection, severity of the periodontal problems, surgeons skills and many more. Previously our team had conducted various studies on treatment modalities for periodontal diseases and periodontal procedures [10][11], studies correlating various diseases and factors related to periodontal diseases [12] and in vitro diseases & radiological studies [13][14][15], and reviews [16][17][18] over the past 5 years. Now, we are focussing on retrospective studies. Therefore, the aim of this study is to analyse various flap techniques used in periodontal flap surgery among patients attending a private dental institution in chennai.

II. Materials And Methods

Study design :

The present study was a retrospective study done in a university setting at the Department of Periodontology in a private dental college. A total of 42,110 case records of patients were evaluated and it was found that 722 patients were selected and were included in the present study. The advantages for this study setting is it can provide easy accessibility to data and provide a population with similar ethnicity. The inclusion criteria would be all patients with history of undergoing periodontal flap surgery, the exclusion criteria would be all patients with history of nonsurgical periodontal treatment alone.

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:

Data selected was between the time period of June 2019 to March 2020. The age groups were split into three categories which were <45 years old, 46-60 years old and >60 years old. The convenient sampling method was used and photographic verification was done for cross verification of data. Sample data were cross verified by another examiner to avoid any missing data. Data regarding age, gender, periodontal diseases and flap techniques used in flap surgery were retrieved from patients records and tabulated in Microsoft Excel.

Statistical analysis:

Data was analysed using SPSS software (IBM SPSS Statistics, Version 24.0, Amonk, NY: IBM Corp). Descriptive statistics were used for data summarization. Chi square test was done to test the relationship between the variables. The level for a statistical significance was set at a p value<0.05. Association between the

various flap techniques and periodontal disease was analysed. The results were demonstrated in the form of bar graphs.

III. Results

In the present study, a total of 42,110 case records of patients were evaluated and it was found that among them 722 of them had a history of undergoing periodontal flap surgery. In the 722 patients with periodontal flap surgery 453(62.74%)of them were males and 269(37.26%) were females (Figure1). This finding indicates that male had a higher predilection for periodontitis in comparison to females.

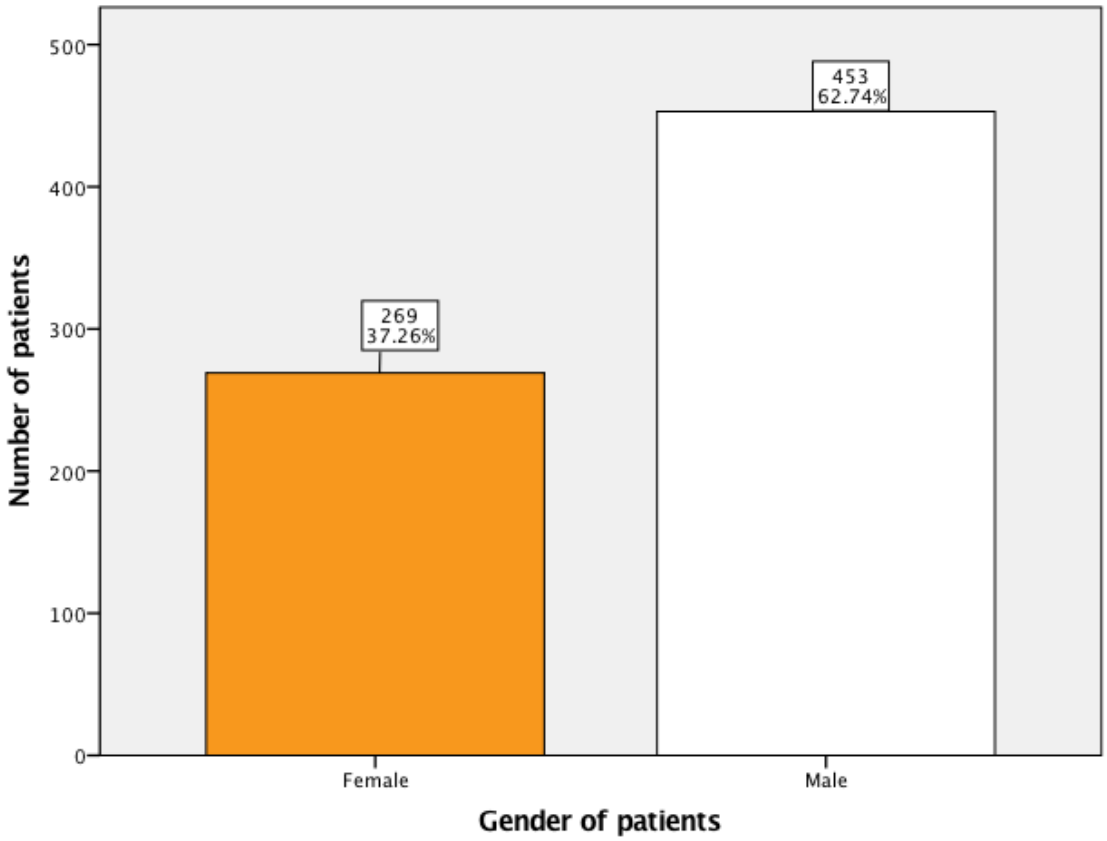

Figure 1 represents the gender distribution of patients who underwent periodontal flap surgery. X axis represents gender of patients and Y axis represents the number of patients who underwent periodontal flap surgery. More number of males (white) underwent periodontal flap surgery compared to females (orange).

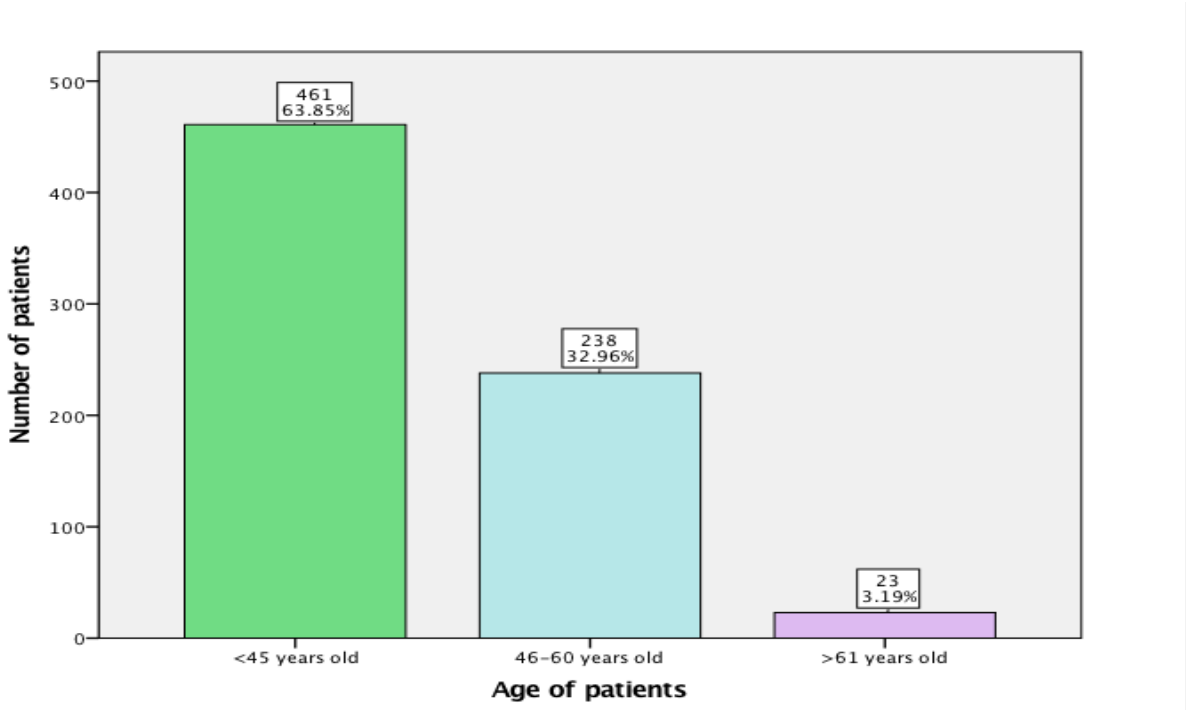

Figure 2 represents the age distribution of patients who underwent periodontal flap surgery. X axis represents age of patients and Y axis represents the number of patients who underwent periodontal flap surgery. It was noted that patients aged <45 years old (green) had mostly undergone periodontal flap surgery compared to other age groups.

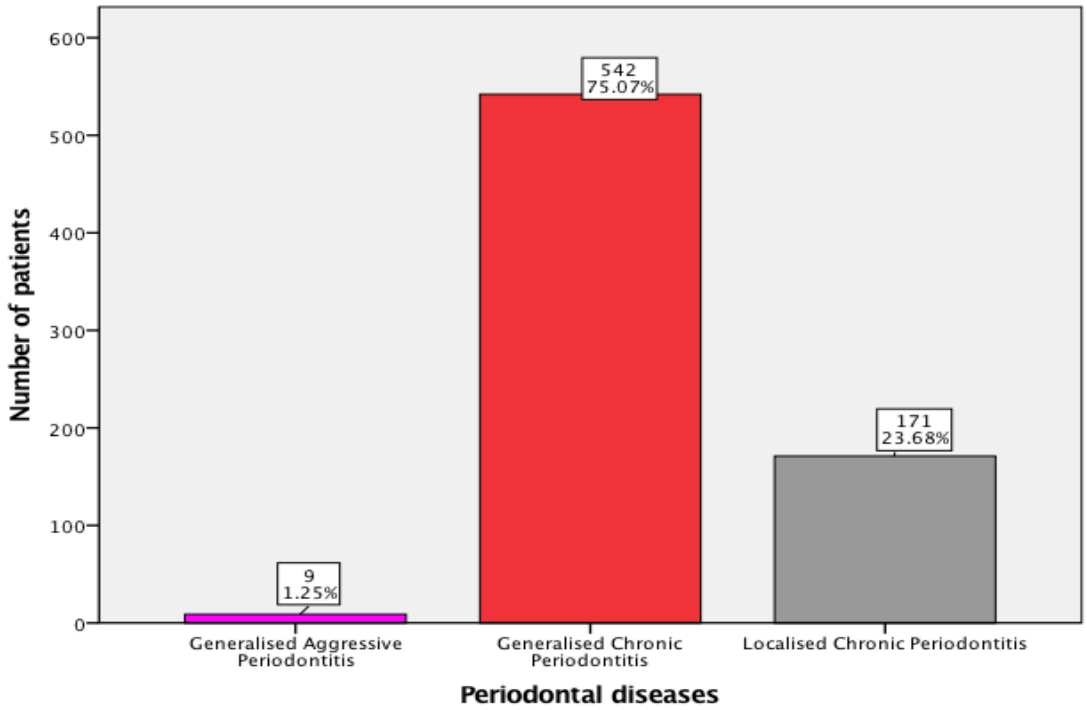

Figure 3 represents the distribution of various periodontal diseases. X axis represents periodontal diseases and Y axis represents the number of patients. It was found that patients with generalised chronic periodontitis (red) had higher prevalence for undergoing periodontal flap surgery compared to localised chronic periodontitis (grey) and generalised aggressive periodontitis(purple).

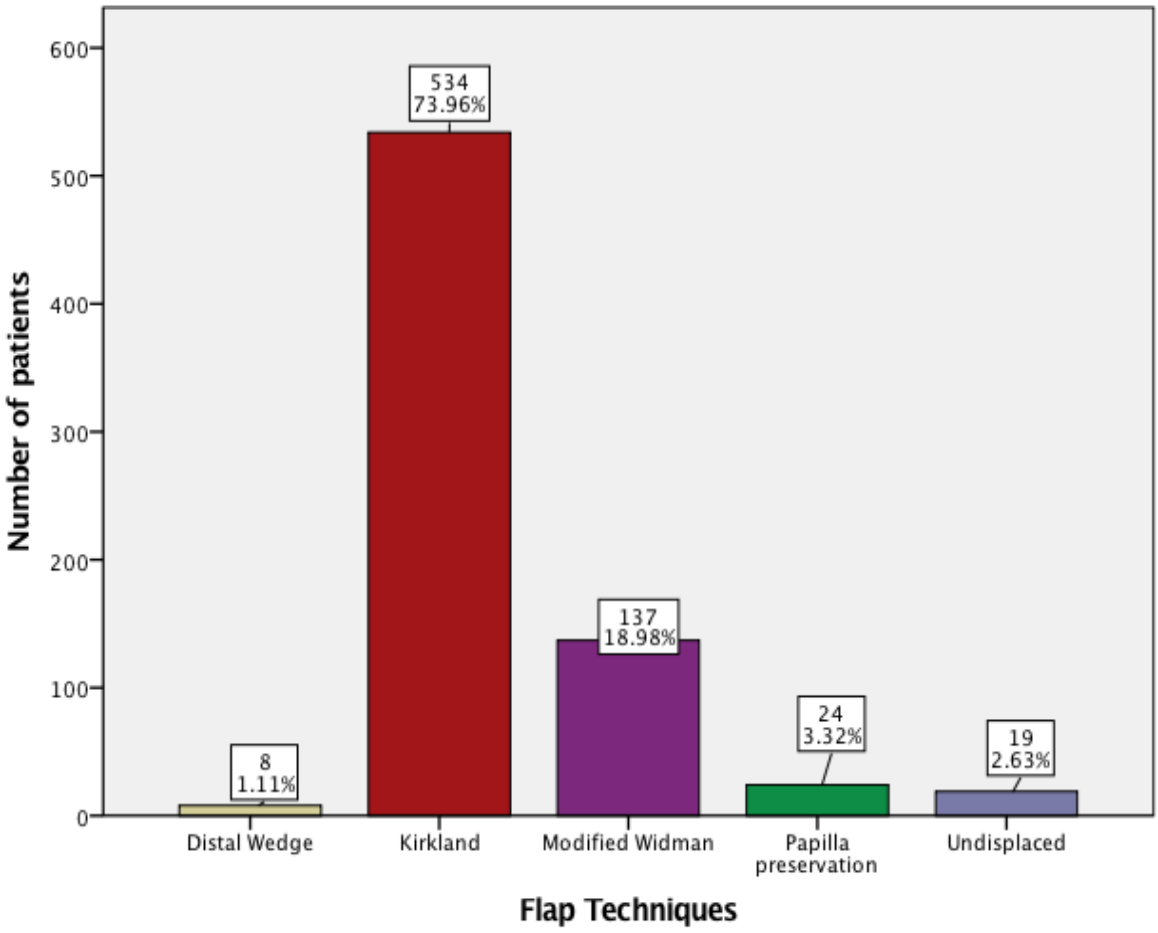

Figure 4 represents the distribution of various periodontal flap surgical techniques. X axis represents various flap techniques and Y axis represents the number of patients. It can be seen that the Kirkland flap technique(maroon) was mostly followed by the surgeon.

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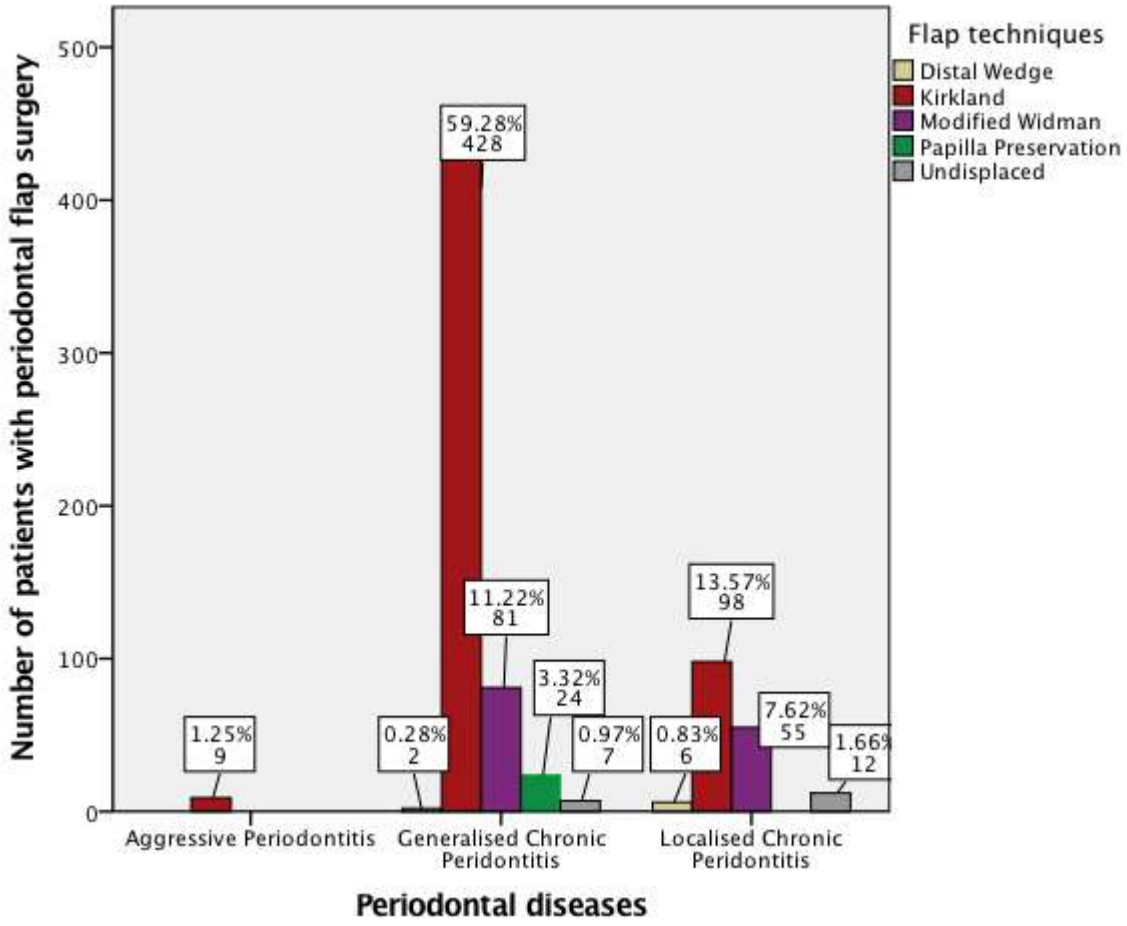

Figure 5 represents association between different flap techniques and periodontal diseases. X axis represents periodontal diseases and Y axis represents the number of patients who underwent periodontal flap surgery. It was found that the Kirkland flap technique (maroon) was the commonest technique used by surgeons for generalised chronic periodontitis patients. Chi square test was done and the association was found to be statistically significant with the p value=0.000(<0.05).

Based on the distribution of age of patients among periodontal flap surgery, it can be noted that patients aged <45 years(63.85%) had the highest prevalence for undergoing periodontal flap surgery followed by patients age 46-60 years old(32.96%) and the least was found to be in the age of 61 years old and above with percentage value of 3.19%(Figure 2).

In the present study, periodontal diseases were split into three categories which were generalised aggressive periodontitis, generalised chronic periodontitis and localised chronic periodontitis. According to the distribution of periodontal diseases based on periodontal flap surgery, it can be observed that generalised chronic periodontitis patients(75.07%) had the highest prevalence for undergoing periodontal flap surgery followed by localised chronic periodontitis patients(23.68%) and the least was found to be generalised aggressive periodontitis patients (1.25%) (Figure 3).

The various types of flap techniques were Distal wedge flap, Kirkland flap, Modified Widman flap, Papilla preservation flap and Undisplaced flap. Among these 5 types, the most commonest type being practically used by surgeons were Kirkland (73.96%), followed by Modified Widman flap (18.98%), papilla preservation flap (3.32%), undisplaced flap (2.63%), and finally the least common flap technique was distal wedge with percentage value of 1.11% (Figure 4).

Based on the association between periodontal diseases and different flap techniques, it can be seen that kirkland flap(1.25%) was the only technique used by surgeons in periodontal flap surgery among generalised aggressive periodontitis patients. Among generalised chronic periodontitis patients, it was found that kirkland flap(59.28%) was the commonest technique followed by modified widman flap(11.22%), papilla preservation(3.32%), undisplaced(0.97%) and finally distal wedge(0.28%). For localised chronic periodontitis patients, the most common flap technique was found to be kirkland flap (13.57%), modified widman flap (7.62%), undisplaced flap(1.66%) and the least done was distal wedge(0.83%) (Figure 5).

IV. Discussion

On assessing the distribution of flap surgery among gender, it can be noted that males had a higher predilection for flap surgery compared to females and this indicates that males were more commonly affected with periodontal disease than females. This finding is in accordance with studies reported by Doifode et al[19] and Agarwal et al[20] which stated that males were mostly affected with periodontal diseases than females. The higher prevalence in males in our current study and the other studies could be due to higher numbers examined on males compared to females. In addition, males were more likely to be exposed with deleterious oral habits such as tobacco chewing and smoking which were known to be one of the major risks for periodontal diseases.

According to the distribution of age based on periodontal flap, it can be concluded that patients age less than 45 years old had the highest prevalence for undergoing periodontal flap surgery compared to other age groups. The prevalence was 63.85%, 32.6% and 3.19% in the age groups <45 years old, 46-60 years old and 61 years old. The lower prevalence in older age could be due to early loss of teeth in elderly and also due to less patient interests to undergo treatment and poor compliance. Our finding in contrast with study from Shaju et al[21] which stated that the prevalence of periodontal disease increased with age. The difference in the prevalence for the sample populations in both studies could be due to variations in sample size.

Based on our study result, patients diagnosed with generalised chronic periodontitis had a highest prevalence for undergoing flap surgery followed by patients diagnosed with localised chronic periodontitis and generalised aggressive periodontitis. A study from Kundu et al [19] revealed the same findings with our current study in which the prevalence of generalised chronic periodontitis was significantly higher than aggressive periodontitis in their sample population with p value of 0.00 but the percentage value is almost two times higher than our studies. This difference in terms of percentage value could be attributed by size of sample populations, socioeconomic status and systemic health status.

Based on the frequency distribution of flap techniques, it could be observed that conventional flaps like the Kirkland and Modified Widman flap had been the most preferable techniques for flap surgery and the least popular would be distal wedge flap technique. In 1931, Kirkland introduced a modified flap operation which is basically an access flap for root surface debridement [22]. Ramfjord and Nissle in 1974 described the modified Widman flap technique that is also recognized as the open flap curettage technique. One apparent disadvantage of modified Widman flap procedure is the unfavourable interproximal architecture immediately following removal of the periodontal dressing[23]. Conventional flaps were most commonly used in flap surgery and could be attributed to the fact that it could provide maximum healing and reattachment of periodontal pockets with minimum loss of periodontal tissues during and after the surgery. This finding is similar to the study from Karthikeyan et al [24]. The limitation of this study is that due to small sample sizes that were included. Furthermore, it was only focusing on records from a single private dental institution. Further studies to be performed with large sample size. Moreover, this study should also be focused on multi centres and multi cities.

V. Conclusion

Within the limitations of our study, it can be concluded that the kirkland flap technique was most commonly followed by surgeons for periodontal flap surgery. Males had higher prevalence for undergoing periodontal flap surgery than females. Generalised chronic periodontitis patients aged less than 45 years had mostly undergone periodontal flap surgery.

Author Contributions

First author name Fahmida contributed towards the data collection, data analysis, and manuscript preparation. The second and third author Dr Balaji ganesh.S, Dr T.N.Uma Maheswari contributed towards the study design, key concepts, critical analysis, and review of the study.

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Conflict Of Interest

There were no conflicts of interest as declared by authors

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