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PREVALENCE OF AGE AND GENDER WITH DIFFERENT FLAP TECHNIQUES USED IN POSTERIOR ARCH IN PERIODONTAL SURGERY IN CHENNAI

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Running Title: Flap techniques used in posterior arch

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Abstract:
INTRODUCTION: Mucosal flaps are reflected in the majority of dentoalveolar procedures. Exposure or removal of impacted teeth, implant bed preparation, alveolar bone exposure for augmentation, periodontal surgeries, and repair of mucosal soft tissue defects all require this phase. Because of the rich vascularity of the oral mucosa, flap design has a lot of flexibility, but this also leads to carelessness and a lack of thoughtful preparation, which can lead to unsatisfactory results or complications. This study is aimed to determine the prevalence of age and gender with different flap techniques used in posterior arch in periodontal surgery in a sample of patients in chennai city population.

MATERIALS AND METHODS: This retrospective study involved 1290 patients out of which 766 were male and 521 were female. Types of Flap technique data was recorded among patients who reported to Saveetha Dental College, Chennai from June 2020- March 2021. Parameters such as age, gender and types of flap technique procedure done were evaluated and assessed by a single examiner and reviewed by 2 independent investigators.

RESULTS: In this study, we observed that out of 1290 patients, the majority of male patients about 59.52% had Kirkland flap technique among others in which age group of 36-50 years were more common. The distribution of study subjects based on different types of flap techniques revealed that 67.52% undergone kirkland flap, 20.51% undergone modified widman flap, 5.21% had papilla preservation flap, 2.25% had undisplaced flap, 1.55% had apically displaced flap and very less undergone distal wedge procedure which depicts that most commonly used flap technique was kirkland flap among other techniques.

CONCLUSION: Within the limits of this study, there is significant male predilection with an incidence of 59.52% in relation to flap surgery, most widely used technique was kirkland technique of 67.52% among other types of flap techniques.An advanced intervention will help in better patient management and decision making as to perform specific types of flap technique and assess duration for wounds to heal.

KEYWORDS: Flap technique, Periodontal flap, Kirkland flap, innovative, Modified widman flap, Dentoalveolar procedure.

INTRODUCTION:

Oral surgical flap by definition is the procedure in which a fragment of the mucoperiosteal tissue is surgically elevated from the underlying bone for improving accessibility and infrastructure. (Yolcu and Acar, 2015). However, regardless of the application, the concepts of the common flap apply to all types of flaps: they should provide broad visibility, clear vision, good access, and ensure rich vascularity and a good final aesthetic result. (Kokich, 2004). Various flaps have been suggested for surgeries like third molar surgery, canine exposure, various periodontal surgery, dental implant preparation, endodontic procedures, and repair of oroantral communications (Trombelli and Farina, 2011). Mucosal flaps are reflected in the majority of dentoalveolar procedures. Exposure or removal of impacted teeth, implant bed preparation, alveolar bone exposure for augmentation, periodontal surgeries, and repair of mucosal soft tissue defects all require this phase(Prasanth, 2009) Because of the rich vascularity of the oral mucosa, flap design has a lot of flexibility, but this also leads to carelessness and a lack of thoughtful preparation, which can lead to unsatisfactory results or complications(Grandi and Pacifici, 2009). The type of flap used has no impact on the effects of inflammation, discomfort, or improved mouth opening after extraction; the lack of increase in depth is the product of a technical conservative approach.(Köşger, 2008) (Karthikeyan *et al.*, 2019) compare the clinical and microbiological effects of diode laser (DL) as an adjunct to Kirkland flap surgery which showed greater reduction when compared to Kirkland flap surgery alone for the treatment of generalized chronic periodontitis. Martins et

al, conducted a comparison of 2 types of flaps and found no significant differences relating to the second molar periodontal healing and consider other factors as are to be analyzed, patient age, presence of pre-existing periodontal inflammation, retention rate, amount of bone removed, area of contact between 2 and 3 molar pericoronal follicle size, amount of attached gingiva distal to 2 molar, proximity to the ramus of the mandible and type of suture and skill the professional (Barbosa-Rebellato *et al.*, 2011)(Gbotolorun *et al.*, 2007)

Suarez-Cunqueiro *et al.*, 2003 stated that Modified Widman flap surgery could be used to treat all types of periodontal pockets anywhere in the mouth, but it usually works for(1) deep pockets,(2) intrabony pockets, and(3) when minimal gingival recession is needed.. In a previous study,To achieve primary closure of the interproximal tissue over barrier membranes placed coronal to the alveolar crest, a variant of the papilla preservation technique has been used.(Cortellini, Prato and Tonetti, 1995) Recently,In order to achieve and preserve primary closure of the flaps in interdental spaces and also to avoid/limit the collapse of non-self-supporting barrier membranes into interproximal defects, a novel surgical method (simplified papilla preservation flap, SPPF) was developed. This procedure may also be performed in narrow and/or posterior interdental spaces.(Cortellini, Prato and Tonetti, 1999)

Flap designs can be conventional or papilla preservation flaps. In the conventional flap the interdental papilla is split beneath the contact point of the two approximating teeth to allow reflection of buccal and lingual flaps. (Suarez-Cunqueiro *et al.*, 2003)The incision is usually scalloped to maintain gingival morphology with as much papilla as possible. When the interdental papilla is too narrow to permit the preservation of papilla or when the flap is to be displaced then conventional flaps are raised. Conventional flaps include: The modified Widman flap, The undisplaced flap, Periodontal flap procedures, The apically displaced flap and the flap for regenerative procedures.(Kinumatsu *et al.*, 2014)The flap pattern has a massive influence on primary wound healing in lower third molar surgery,when a conventional sulcular flap is used, 56% of patients have trouble healing their primary wounds and found that the modified triangular flap is significantly less conducive to the development of wound dehiscence(Jakse *et al.*, 2002).Several research reported after lower third molar surgery, this periodontal complication was investigated. As compared to the envelope flap technique, only 10% of triangular flap designs dehisce, and the triangular flap design decreases tension in the area distal to wound closure. To avoid complications, a variety of surgical techniques have been tried, including the use of surgical drains, various wound closure procedures, and various surgical techniques.(Ash, Costich and Hayward, 1962; Kugelberg *et al.*, 1991),(Szmyd, 1971)

Each flap's application and design should be customized to the patient's condition and needs. Surgeons must be aware of the patient's condition, anatomical limitations, and the use of various flap designs. Final cosmetic outcomes or postoperative morbidity may be influenced by careful preparation, effects, and selection of appropriate flap designs, which could have significant medical-legal and financial implications. Our team has extensive knowledge and research experience that has translate into high quality publications(Anbu *et al.*, 2019; Bai *et al.*, 2019; Duraisamy *et al.*, 2019; Sekar, 2019; Sekar *et al.*, 2019; Sekar, Nallaswamy and Lakshmanan, 2020; Sivasamy, Venugopal and Mosquera, 2020; Preethi and Sekar, 2021; Preethi, Lakshmanan and Sekar, 2021),(Bakshi *et al.*, 2019; Ezhilarasan *et al.*, 2019; P. *et al.*, 2019; Balusamy *et al.*, 2020; Thakur and Devaraj, 2020; Ezhilarasan, 2021),(Ramadurai *et al.*,

2019; Varghese, Ramesh and Veeraiyan, 2019; Mathew *et al.*, 2020; Arvind and Jain, 2021; Venugopal, Vaid and Bowman, 2021) The aim of the present study was to determine the prevalence of age and gender with different flap techniques used in the posterior arch in periodontal surgery.

MATERIALS AND METHODS:

This retrospective radiographic study was conducted among patients reporting to the Outpatient Dental Department of Saveetha Dental College, Chennai during the period between June 2020- March 2021. A total of 1290 patient records were reviewed and analysed.

Inclusion Criteria:

- Patients between 16-70 years of age
- Both genders
- Patients who underwent flap surgery as records
- Patients with no history of trauma

Exclusion Criteria:

- Patients with a history of previous trauma or pathology.
- Patients with severe systemic diseases

Study Parameters:

The following data were extracted for the purpose of the study:

- Age of the patient
- Gender of the patient
- Type of Flap technique

The subjects were divided into five age groups- Group 1: 16-25 years, Group 2: 26-35years, Group 3: 36-50years, Group 4: 51-60 years, Group 5: 61-70 years

Data Collection:

The data related to the study parameters were obtained from among patients who reported to the Outpatient Department in Saveetha Dental College, Chennai from June 2020-March 2021. Approval for the study was obtained from the Institutional Ethical Committee of Saveetha University (SDC/SIHEC/2020/DIASDATA/0619-0320). All assessments were done by a single examiner and the findings were reviewed and recorded by two investigators. Informed consent was obtained from the patients.

Statistical Analysis:

The data was tabulated and analysed using IBM SPSS version 23.0 software. Non-parametric data were analysed using descriptive statistics measuring frequency and percentage. Pearson's Chi Square Test was used to assess the association between age and sex with different flap techniques used in posterior arch

RESULTS:

Out of 1290 patients included in the study, the distribution of study subjects based on different types of flap techniques revealed that 67.52% undergone kirkland flap, 20.51% undergone modified widman flap, 5.21% had papilla preservation flap, 2.25% had undisplaced flap, 1.55% had apically displaced flap and very less undergone distal wedge procedure which depicts that most commonly used flap technique was kirkland flap among other techniques. The distribution of study subjects based on age revealed that the majority of patients of 43.51% whose age group of 36-50years had flap surgery among other age groups. The distribution of study subjects based on gender revealed that the majority of male patients, 59.52% had flap surgery in the posterior arch than female participants. Based on age in relation to flap technique, the age group of 36-50 years had Kirkland flap technique(30.40%) as compared to other age groups. Also pearson chi square test was done to assess the association between the type of flap technique and age of patients. However, p value was >0.05, thus it was statistically insignificant. Based on gender in relation with flap techniques, the majority of male patients had kirkland technique(40.59%) when compared to modified widman flap(12.21%) and very less had distal wedge procedure and female patients undergone maximum with kirkland flap(25.82%), followed by modified widman flap(8.32%), papilla preservation flap, undisplaced flap and distal wedge procedure.

DISCUSSION:

The results of previous study suggest that combining Enamel matrix derivative(EMD) and Simple papilla preservation flap(SPPF) in the treatment of suprabony defects may lead to a greater clinical improvement compared to SPPF alone.(Tullio *et al.*, 2013). Yilmaz et al performed a study to assess the clinical and radiographic outcomes over a period of 8 months after periodontal surgery with the adjunctive use of EMD compared to conventional flap debridement alone in horizontal bone defects. Clinical improvement with Enamel matrix derivative application was found to be superior when it was compared to OFD procedures (Yilmaz, Kuru and Altuna-Kiraç, 2003). Similar results were obtained by Jentsch et al (Jentsch and Purschwitz, 2008)showing that the adjunct of EMD to an access flap surgical procedure significantly improves changes in clinical parameters. In these studies, conventional flap designs were used; in this clinical trial, a greater improvement of clinical parameters is observed when compared to the results of(Jentsch and Purschwitz, 2008)(Yilmaz, Kuru and Altuna-Kiraç, 2003)

Furthermore, the SPPF technique minimizes the damage of the microvasculature and allows a better preservation of the supra-periosteal gingival vascular plexus, producing a faster organization of the granulation tissue(Retzepi, Tonetti and Donos, 2007)

The technique of Apically positioned flap(APF) yielded a significant improvement in keratinized tissue, which is both functionally and esthetically acceptable by evaluating the clinical and esthetic outcome around dental implants(Reddy, Parthasarathy and Lochana, 2013)

Though a few studies have shown the effectiveness of APF in improving keratinising gingiva around natural teeth,(Wilson, McGuire and Nunn, 2005)(Allen and Murphy, 2009)(Mohammadi, Shokrgozar and Mofid, 2007)except a case report by Park et al.(Park *et al.*, 2010), no studies have been done so far to evaluate the gain of keratinized tissue around

dental implants using APF; In(Johnson *et al.*, 2020), Robinson devised a technique to eliminate the periodontal pocket on the distal of maxillary or mandibular second or third molars. The technique was introduced with three options for incision design described as triangular, square, and linear. The anatomy of this area typically presents with an excessive soft tissue volume, which makes plaque control more challenging.

Karaca et al. flap technique used during surgery to correct impacted third molars eliminates challenges associated with 2 molar periodontal status(Cetinkaya *et al.*, 2009) Suarez et al. believe that this design influences healing primarily. This prevents wound dehiscence and evaluates the suture technique to achieve this closure. In their research, Sandhu et al. stated considering two types of flaps, higher inflammation of the envelope flap dehiscence and bayonet (Triangular) flap used to assess the symptoms of discomfort, swelling, trismus, wound dehiscence after extraction of impacted third molars, the extent of inflammation according to different authors is influenced by the degree of eruption (Partial or Total) and angulation. If there was no discrepancy and there was a very low frequency of vertical molar inflammation relative to the mesio-angle, the degree of inflammation was not linked to the length of the procedure.(Kirk *et al.*, 2007) Kırtıloğlu et al., comparing 2 types of flap (Szmyd and Triangular or Paramarginal) found no difference in healing, recommend surgical removal with minimal trauma and flap Szmyd a distal intact gingiva to the second molar and periodontal healing compared other flap after completely impacted molar extraction or mesioangular horizontal position (Kırtıloğlu *et al.*, 2007).In most situations, favorable clinical results are achievable irrespective of the chosen distal wedge method, and technique selection is based more on operator preference than evidence. However, anatomic limitations can render distal wedge procedures challenging in some cases, and procedural advantages of specific techniques can simplify treatment. One systematic approach to distal wedge technique selection is presented in this report. Additionally, a laser-assisted distal wedge protocol is presented for cases in which unfavorable tooth-to-ramus distance or presence of a prominent external oblique ridge contraindicates conventional distal wedge techniques.(Johnson *et al.*, 2020)

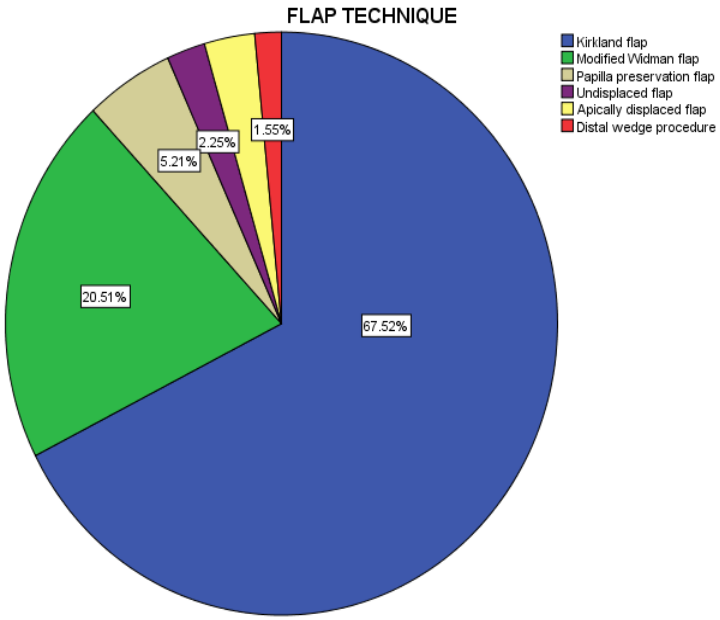

Figure 1: This pie chart depicts the different types of flap technique.

The type of flap technique most commonly used was kirkland flap(67.52%)(blue)

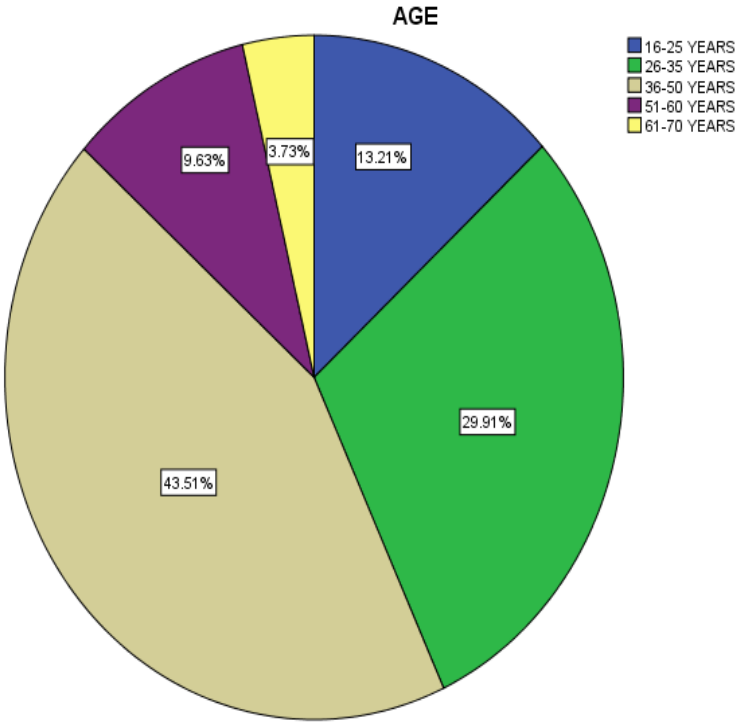

Figure 2: The above pie chart represents the age as baseline characteristics. From this pie chart we can infer that age group who mostly undergone flap surgery was between 36-50 years(43.51%)(grey)

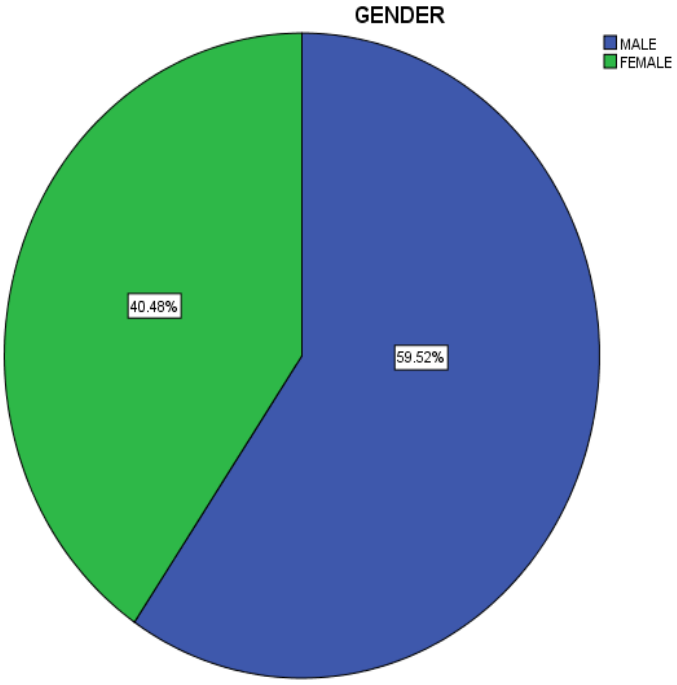

Figure 3: This pie chart represents the gender related baseline characteristics of patients, which shows majority of patients who undergone flap surgery was 59.52% of male(blue) and 40.48% of female(green)

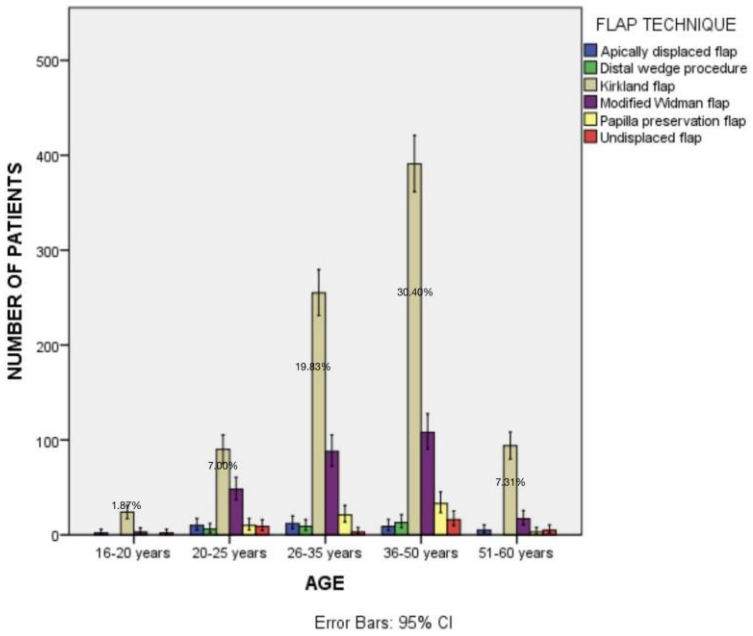

Figure 4: Bar graph representing the association between age and number of patients who had flap technique in posterior arch. X- Axis represents age from group-1 to group-5 depicts 16-25 years to 61-70 years and Y-Axis represents the number of patients who had kirkland flap(blue), Modified widman flap(green), Papilla preservation flap(Grey), undisplaced flap(purple), apically displaced flap(yellow), Distal wedge procedure(Red) . Majority of participants from age group 36-50 years undergone kirkland flap technique among other age groups, however it is statistically not significant, p=0.109(>0.05)

Pearson's Chi Square Test was done to assess the association between gender and different types of flap techniques(Pearson's Chi Square value: 2.8035; df: 2)

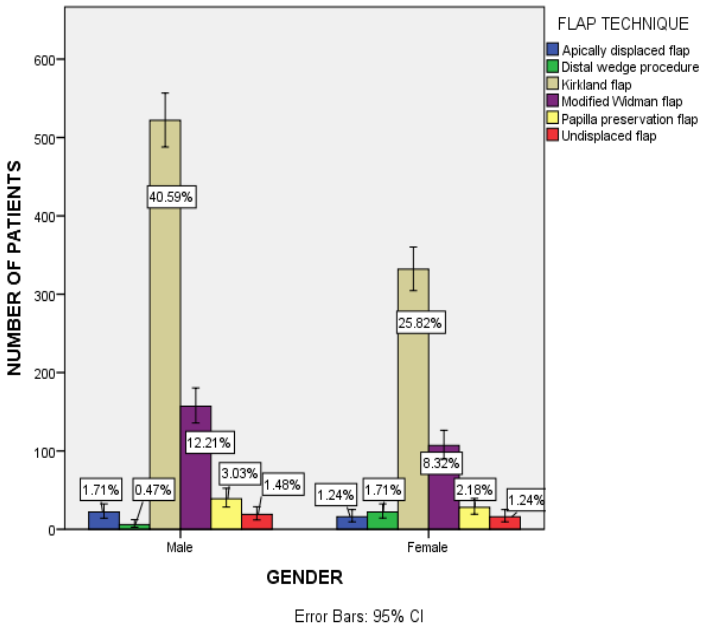

Figure 5: The above bar graph depicts the association between gender and number of patients who had flap technique. X- Axis represents gender who had flap surgery and Y-Axis represents the number of patients who had kirkland flap(blue), Modified widman flap(green), Papilla

preservation flap(Grey), undisplaced flap(purple), apically displaced flap(yellow), Distal wedge procedure(Red) . Majority of male underwent kirkland flap technique than female participants, however it is statistically significant, P=0.008(>0.05)
Pearson's Chi Square Test was done to assess the association between gender and number of patients associated with type of flap technique mostly(Pearson's Chi Square value:15.608, df=5)

LIMITATIONS OF THE STUDY

This study was restricted to a single study niche.

FUTURE SCOPE

An advanced intervention will help in better patient management and decision making as to perform specific types of flap technique and assess duration for wounds to heal.

CONCLUSION

Prevalence of flap techniques used in posterior arch in relation to gender and age is necessary to assess the widely used technique.Within the limits of this study, there is significant male predilection with an incidence of 59.52% in relation to flap surgery. The Most widely used technique was the kirkland technique of 67.52% among other types of flap techniques.

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CONFLICT OF INTEREST:

The author declares that there was no conflict of interest in the present study.

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