



Analysis of Resective Osseous Surgical Procedures- A Retrospective Hospital Based Study

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ABSTRACT

Resective osseous surgery is a procedure to modify osseous support either by reshaping the alveolar bone to achieve physiologic form without removal of supporting bone (osteoplasty) and by the removal of some alveolar bone (ostectomy). The aim of this study is to analyse the prevalence of resective osseous surgical procedures performed in the outpatient department of Saveetha dental college and hospitals. Overall, 100 case sheets were reviewed which were dated between June 2019 to March 2020. The data was collected by the patient records of a dental college hospital. From this study, we observed that resective osseous surgical techniques were done in 60% of male patients and in 40% of female patients and the most frequent technique performed was osteoplasty which was 68%. Within the limits of this study, the most common techniques used were osteoplasty and frequent anatomical site was upper first molar and male patients underwent more resective osseous surgery than that of females.

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INTRODUCTION

Periodontal therapy has been directed primarily at the elimination of disease and maintenance of a functional, healthy dentition and supporting tissues (Thamaraiselvan *et al.*, 2015; Ramesh *et al.*, 2017), More recently however it has become

increasingly focused on esthetic outcomes, which extend beyond tooth replacement and tooth colour to include the soft tissues framing the dentition (Ramesh *et al.*, 2016b; Kavarthapu and Thamaraiselvan, 2018). Periodontal disease is a chronic bacterial infection characterized by persistent inflammation, connective tissue breakdown and alveolar bone destruction (Varghese *et al.*, 2015; Avinash *et al.*, 2017). Periodontal tissue destruction is demonstrated by clinical attachment loss with formation of deep pockets with severe continuous bleeding and probing (Carnevale and Kaldahl, 2003; Ramesh *et al.*, 2019). Progression of the periodontal disease can further trigger the adaptive immune mechanism for release of inflammatory mediators resulting in further periodontal breakdown (Panda *et al.*, 2014; Mootha *et al.*, 2016).

The association of various herpes viruses with several types of periodontal disease has been estab-

lished by many studies (Ravi *et al.*, 2017). Among the viruses, cytomegalovirus (CMV), Torque Teno Virus (TTV), and Epstein–Barr virus (EBV) plays a major role (Hernández, 2016; Ramamurthy and Visha, 2018). Chemical antiplaque agents such as varnishes, dentifrices, and mouthwashes are used to improve oral health care (Kavarthapu and Thamaraiselvan, 2018). The use of mouthwash affects both the bacterial and plaque growth (Ramesh *et al.*, 2016b, 2017).

The reduction of the periodontal pocket is one of the goals of periodontal therapy (Khalid *et al.*, 2017, 2016). Plaque build-up allows the growth of anaerobic bacteria, which eventually leads to the activation of neutrophils (Ramesh *et al.*, 2016a). This results in the up-regulation of pro-inflammatory cytokines, leading to the release of neutrophil enzymes. Hence, prolonged exposure of connective tissue results in its degradation and the subsequent loss of ligamentous support and alveolar bone, eventually leading to tooth loss (Ramesh *et al.*, 2017; Kavarthapu and Thamaraiselvan, 2018).

Osseous resective surgery changes the diseased osseous contour to reproduce more physiological anatomy (Schluger, 1949; Smith *et al.*, 1980). Osteoplasty and ostectomy are the two techniques that have been followed in resective osseous surgery (Panda *et al.*, 2014). The steps to perform surgery were vertical grooving, radicular blending and gradualizing marginal bone (Friedman, 1955; Priyanka *et al.*, 2017).

Periodontal regeneration is a multifactorial process and requires a multi-dependent sequence of biological events, including cell-adhesion, migration, proliferation, and differentiation (Ramesh *et al.*, 2016a). A 5 year study was demonstrated that osseous surgery for 75 patients with advanced periodontal disease is highly effective and that maintenance of oral hygiene and frequent recalls are very important for long term stability (Carnevale *et al.*, 2007).

Instruments used for osseous surgery include chisels, rongeurs, files and rotating instruments such as diamond and carbide burs, steel burs and diamond burs (Kavarthapu and Thamaraiselvan, 2018). Recently, the Piezoelectric knife was introduced to enhance periodontal surgical procedures. The major complications of resective osseous surgical procedure are postoperative sensitivity, increased mobility of tooth in the area which was treated, permanent loss of attachment and gingival recession (Page and Schroeder, 1976). The aim of this study is to analyse resective osseous surgical procedures done in a private dental college.

MATERIALS AND METHODS

This study examined the records of patients from June 2019- March 2020 undergoing treatment at Saveetha Dental College and Hospitals. This study is mainly a type of University based and a single centered study. This study population included patients who underwent resective osseous surgeries. Overall, 100 case sheets were reviewed which were dated between June 2019 to March 2020. The data was collected by the patient records of a private dental institution.

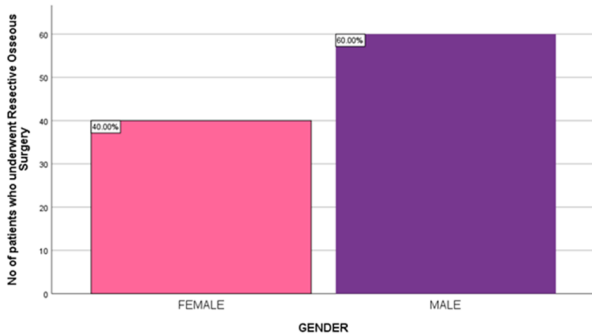
Relevant data such as gender, tooth number and techniques used were collected and recorded. Repeated patient records and incomplete records were excluded. Data was verified by an external reviewer. Data were recorded in Microsoft Excel and later exported to IBM SPSS (version 20.0 Chicago USA) and subjected to statistical analysis. Chi-square test was employed with a level of significance set at $p < 0.05$. Ethical clearance was sought prior to the study from the Institutional Ethical Committee. Ethical approval number SDC/SIHEC/2020/DIASDATA/0619-0320.

RESULTS AND DISCUSSION

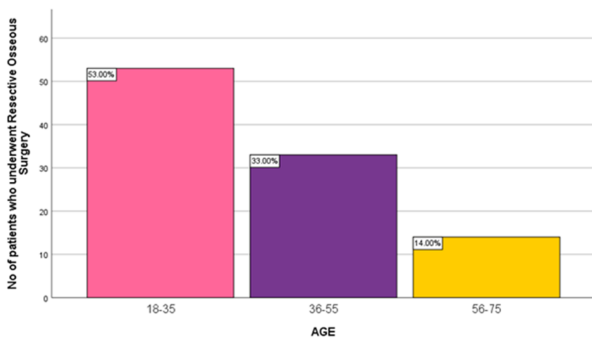
The reviewed case sheets consisted of 100 patients, while male patients 60% ($n=60$) and female patients were 40% ($n=40$) as shown in Graph 1. X-axis denotes the gender distribution and Y-axis denotes the number of patients who underwent resective osseous surgery. Age group were divided into 18-35 years (53%), 36-55 years (33%), 56-75 years (14%) Graph 2. X-axis denotes the age group and Y-axis denotes the number of patients who underwent resective osseous surgery. The most frequent technique performed during resective osseous surgery was osteoplasty (70%) which included 25 female and 10 male patients. Both techniques were employed in 5 female and 10 male patients Graph 3.

X-axis denotes the techniques and Y-axis denotes the percentage among total procedures performed. Correlation between the gender and frequency of techniques performed during resective osseous surgery revealed that 18-35 years of male patients underwent more resective osseous surgeries, p -value-0.05 (< 0.05) hence this difference is statistically significant Graph 4. Patients in the age group of 18-35 years underwent more resective osseous surgeries involving ostectomy than osteoplasty or both, however, not statistically significant, p -value:0.442 (> 0.05) Graph 5. Resective osseous surgery was most frequently done in the left upper first molar (9%) Graph 6.

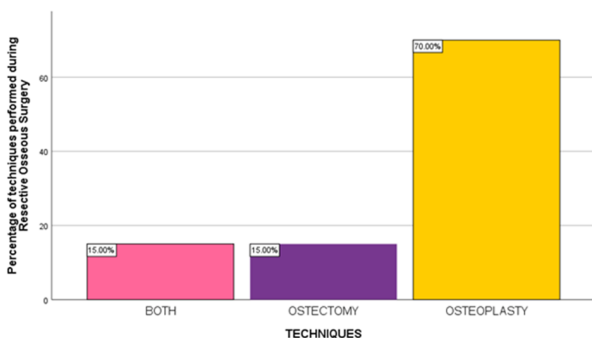
The study was aimed at evaluating different techniques of resective osseous surgery performed in a Dental College. Since all data available were included without sorting process, no bias was expected in selection of patients who underwent resective osseous surgery. (Q1- Right upper tooth region, Q2- left upper tooth region, Q3- left lower tooth region, Q4- right lower tooth region, S1- Right upper posterior teeth, S2- Upper anterior teeth, S3- Left upper posterior teeth, S5- Lower anterior teeth)



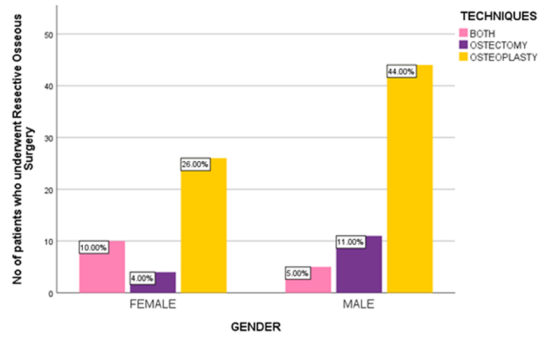
Graph 1: Bar graph represents the distribution of gender of the different patients



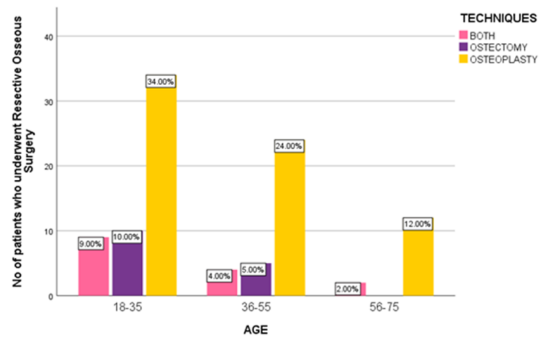
Graph 2: Bar graph represents the distribution of age group of the different patients



Graph 3: Bar graph represents the distribution of resective osseous surgery techniques used



Graph 4: Bar graph represents the association between the gender and frequency of techniques performed during resective osseous surgery

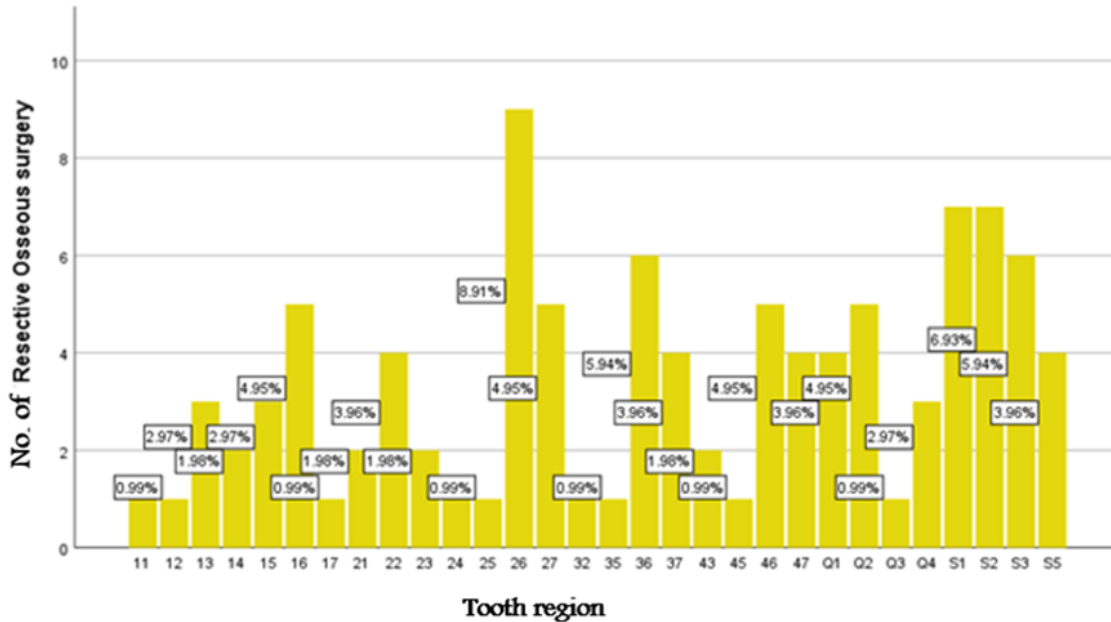


Graph 5: Bar graph represents the association between the age group and frequency of techniques performed during resective osseous surgery

A study conducted by Tomaso Vercellotti et al, reported that the most frequent site involved was the molar and premolar area and also reported that piezoelectric knives provide faster bone regeneration and healing process and more favourable osseous repair and remodelling in comparison with car-bide and diamond burs. Ramford et al. compared four modalities of periodontal treatment that was followed up for 5 years. Patients with periodontal pockets who had underwent resective osseous surgery had shown significantly higher reduction in mean probing depth after the first year of osseous surgery compared to those patients who had underwent root planing and modified widman flap (Ramfjord et al., 1987).

Rosling B compared apically positioned flap with osseous resection and apically positioned flap without osseous resection in 10 patients and after 2 years of supportive periodontal therapy, no significant difference in probing depth reduction was evident between the two groups (Rosling, 1983).

In 1989, Becker W et al, conducted a longitudinal study comparing two methods namely, osseous



Graph 6: Bar graph represents the distribution of resective osseous surgeries based on the teeth number/ sextants

surgery and modified Widman flap procedures in 16 periodontal patients. They reported that following resective osseous surgery in the sites with mean recession of 4- 6 mm, the recession was reduced to 1.84 mm after 8 weeks, 1.22 mm after 6 months and 1.25 mm at the end of 1 year postoperatively (Becker *et al.*, 2001). In 1967, Pennel BM *et al.*, reported that if the width and height of the bone is minimal, during the wound healing process, there will be higher osteoclastic activity and comparatively lesser osteoblastic activity.

This would result in progressive bone loss, thereby reducing the bone height and cause lack of retention and stability for prosthesis affecting the function (Pennel *et al.*, 1967). Moghaddas H reported that thin bone is affected more when compared to thick bone (Moghaddas and Stahl, 1980). Horton *et al.* reported that healing was rapid in bony defects made by chisel compared to cross cut fissure bur in a low speed handpiece (Horton *et al.*, 1975). Spatz reported that usage of high speed handpiece has shown reduced inflammation and rapid healing compared to slow speed handpiece (Spatz, 1965; Horton *et al.*, 1975).

Within the limitations of the current study, there was a decline in resective osseous surgical procedures performed in female patients the reason of which is unclear. The present revealed that the most frequent anatomical site in which resective osseous

surgery performed was upper first molar which implies that the bone deformities are prevalent in the maxillary first molar region. The most frequent technique performed was osteoplasty which points to the information that the current role of resective osseous surgical procedures involving osteotomy techniques is limited. The limitations of the present study include small sample size and geographical limitations as it is a single- centered study.

The future studies would determine the prevalence of type of osseous defects based on the tooth region and the outcome of periodontal management that is followed and may evaluate the practice of advanced techniques like hard tissue laser and piezoelectric surgery.

CONCLUSION

Within the limitations of the current study, it was evident that 18-35 years of male patients underwent more resective osseous surgeries compared to other age groups and there was a decline in resective osseous surgical procedures performed in female patients. The present study would help in knowing the current trends in the management of bony defects and the practice of resective osseous surgical procedures. The most frequent technique performed was osteoplasty which point out that the current role of resective osseous surgical procedures involving osteotomy technique is limited sug-

gesting to improvise the skills of advanced surgical techniques for ostectomy like piezosurgery which would bring out favourable outcomes.

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Conflict of interest

The authors declare that they have no conflict of interest for this study.

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