

Prevalence of Alveoloplasty among Complete Denture Patients- A Retrospective Study

Research Article

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Abstract

Pre-prosthetic surgery is an integral part of complete denture prosthodontics. Alveoloplasty is the common pre-prosthetic surgery carried out to smoothen and contour the bony edges which otherwise can cause hindrance in restoration of optimum health and function. The aim of this study was to analyse the prevalence of alveoloplasty among complete denture patients. We reviewed and analysed the data of 86000 patients who visited a dental institutional hospital between June 2019 and March 2020. Patients included in this retrospective study were those with complete edentulousness and who required complete denture. Documented information included patient's age, gender and treatment done (Alveoloplasty needed or not), tabulated in excel and analysed using SPSS software. During the study period, 393 patients presented with complete edentulousness and have been provided with complete denture. The peak age for the prevalence of Alveoloplasty was among 50-70 years, with a male predominance (10.4%). However, 10.4% only required alveoloplasty from the entire population. Within the limits of this study, patients belonging to the age group of 60 yrs and above were most predominantly subjected to complete edentulousness with a male predominance. Higher frequency for the need of alveoloplasty was seen among patients under 51-60 yrs. However, only 10.4% of the study population required alveoloplasty as a pre prosthetic surgery to provide better retention and comfort on insertion of complete denture.

Keywords: Alveoloplasty; Edentulousness; Complete Denture.

Introduction

A condition of being toothless is known as edentulism. Partial edentulism is the fall of some teeth, whereas loss of all the teeth results in complete edentulism. Periodontal complications are the most common cause of tooth loss and other causes include dental caries [22, 32, 44], trauma, etc [42]. Periodontitis is basically a chronic bacterial infection which is characterized by persistent inflammation, connective tissue breakdown and alveolar bone destruction [23, 29]. Edentulism can be accompanied by functional and sensory disturbances to the oral mucosa and salivary glands. Edentulism causes lack of confidence among people. An individual's social interactions are hindered due to edentulism. An individual's phonetics and mastication also gets affected due to

edentulism [25, 19].

Pre-prosthetic surgery is done to provide a better anatomic environment of the oral structures and to create proper supporting structures for denture construction [53]. The main function of preprosthetic surgery is the elimination of unwanted contours in the denture bearing soft and hard tissues and ridge improvement. The maximum preservation of hard and soft tissues of the denture base is of utmost importance to achieve this goal.

The denture bearing hard and soft tissues should be evaluated with great care before denture construction. Surgical improvement of existing anatomy should at least be considered in every patient for whom a conventional prosthesis is planned [12]. Cor-

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recting conditions that preclude optimal prosthetic function includes bony prominences, undercuts, hyperplastic replacement of resorbed ridges, unfavorable location of frenular attachments [10].

Alveoplasty is one of the most common pre-prosthetic surgeries done in dental practice. The bony prominences are removed by means of alveolectomy and alveoloplasty. Alveoloplasty is used to describe the contouring of the labial-buccal alveolar bone along with some interdental and interradicular bone and is carried out at the time of extraction of teeth. It involves smoothing and recontouring of alveolar arches and then covering the arched with healthy soft tissues which helps in providing a stable and retentive oral prosthesis. When surgery is planned on edentulous ridges, incision should be made on the crest of alveolar ridge, usually, the envelope flap would suffice, but the releasing incision can be made on the labial side to provide a broad base to the flap [7]. The objective of alveoloplasty is to round off sharp bony edges and to remove any gross bony irregularities and undercuts present after extraction. Mucosa covering the alveolar arches after alveoloplasty procedure should be of uniform thickness and density so that occlusal load is distributed equally throughout the dental arches [28].

A simple compression of socket walls after closed extraction can also be alveoloplasty. Another type of alveoloplasty is called interseptal bone and results in close approximation of labial and lingual cortical plates and relieves the undercut. This can be performed at the time of tooth extraction [46, 18]. Alveoloplasty helps in preserving the alveolar ridge height but decreases the thickness and width of the alveolar ridge [18]. Non-surgical extractions with properly compressed sockets and intraseptal alveoloplasty results in good long term preservation of alveolar ridge height in comparison to the labial bone reduction which is usually done in secondary alveoloplasty [34, 41].

In cases with severe undercuts or pre-radicular extraction cases requires radical alveoloplasty. This technique involves the removal of entire buccal or labial cortical plate after extraction in order to reduce the chances of osteoradionecrosis post radiation. [21] secondary alveoloplasty is a second surgical procedure that is carried out after the post extraction healing to eliminate the gross bony irregularities [1].

Previously our team has a rich experience in working on various research projects across multiple disciplines. [30, 15, 9, 38, 50, 37, 5, 58, 2, 26, 54, 57, 14, 48, 11]. Now the growing trend in this area motivated us to pursue this project.

However alveoloplasty which is performed on the day of extraction may lead to faster prosthetic replacement of edentulous space when compared to those that performed after a few days of extraction.

Materials and Methods

The retrospective study was conducted under an institutional setting. The advantage of conducting this study was the ease of data collection containing similar ethnicity with the involvement of both the genders. Ethical clearance was obtained from the institutional ethical committee.

Data collected for this study was from the patients who had visited the institutional dental hospital for treatment between June 2019 and March 2020. A total of 393 patients with complete edentulousness who had to undergo complete dentures were examined and compared on the need for alveoloplasty or not. Sampling bias for the study was minimised by including all the required data. Data was collected from the patient records maintained by the hospital and was then tabulated in excel and then imported into SPSS software. Incomplete data was verified with the concerned department or patient or excluded from the study.

The collected records were from the Dental Status and Oral Surgery status of the recorded details and it included the patient's age, gender and whether alveoloplasty was done or not. Statistical test was run using chi-square test with statistical analysis software SPSS by IBM. it's independent variables included gender, whereas the dependent variables included age and patient requiring alveoloplasty. All of this was analysed using correlation and association.

Results

The study had a total of 393 patients consisting 40% of female and 60% of male patients who required and has been provided with complete denture. Patients under the age group of 60 yrs and above were most predominantly subjected to complete edentulousness (Table 1). Higher prevalence of male patients with complete edentulousness was predominant among the age group of 60 yrs and above (65.55%), followed by 51-60 yrs (47.46%), 41-50 yrs (46.3%) and the least predominant age group with male population being 30-40 yrs (16.67%). Whereas, the prevalence of females with complete edentulousness was predominant among the age group of 30-40 yrs, followed by 41-50 yrs (53.7%), 51-60

Table 1: Describes the distribution of study population based on Age and Gender. It is found that the majority of the participants have complete edentulousness after 50 years of age. Among the study population, patients belonging to the age group of 60 yrs and above were most predominantly subjected to complete edentulousness.

Age in Years	Gender		Total
	Male	Female	
30-40	2(0.5%)	10(2.5%)	12 (3%)
41-50	25(6.4%)	29(7.4%)	54 (13.8%)
51-60	56(14.2%)	62(15.8%)	118 (30%)
60 and above	137(34.9%)	72(18.3%)	209 (53.2%)
Total	220 (60%)	173(40%)	393 (100%)

Figure 1: Bar chart depicts correlation of gender based on the age group of the study population. X axis denotes the gender based on the age group of the study population and Y axis denotes the number of patients in terms of percentage. The prevalence of female population was seen predominantly among the age group of 30-40yrs and of male population among 60 years and above. However the association between the gender and age group of the study population was found to be statistically significant with a p value <0.05. Pearson chi square value= 20.827, df= 3, p value= 0.000 (<0.05).

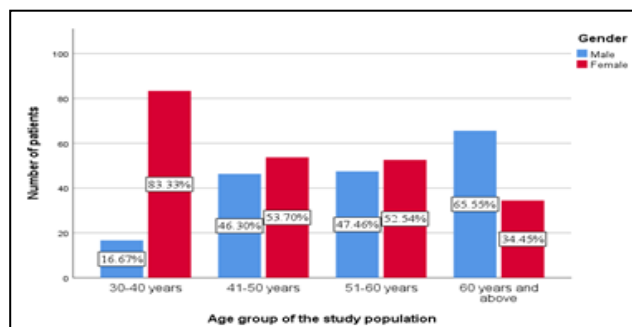


Figure 2: Bar chart depicts correlation of the need for alveoloplasty based on the age group of the study population. X axis denotes the need for alveoloplasty based on the age group of the study population and Y axis denotes the number of patients in terms of percentage. The prevalence for the need of alveoloplasty as a pre prosthetic surgery was predominant among the age group of 51-60 yrs followed by 41-50 yrs. However the association between the need for alveoloplasty and the age group of the study population was found to be statistically not significant with a p value >0.05. Pearson chi square value= 0.509, df= 3, p value= 0.917 (>0.05).

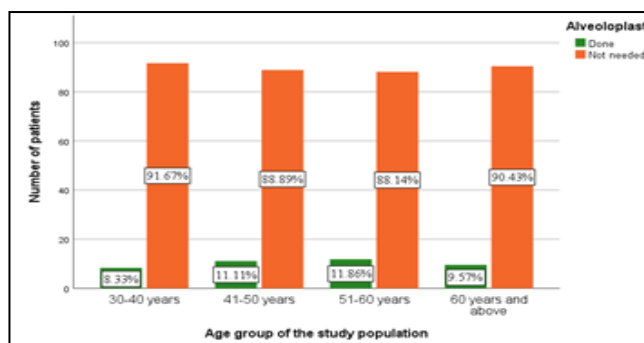
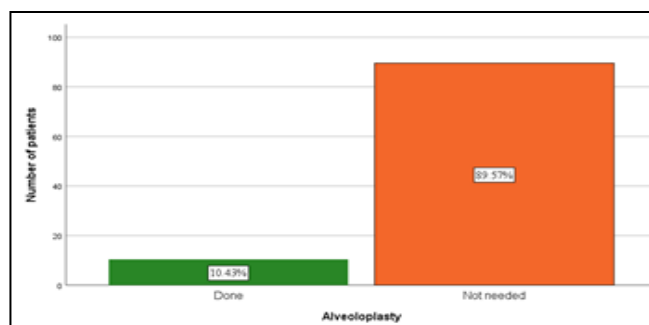


Figure 3: Bar chart representing the frequency distribution of Alveoloplasty among the study population. X axis denotes the need for alveoloplasty as a pre-prosthetic surgery and Y axis denotes the number of patients in terms of percentage. It was found that the requirement of alveoloplasty as a pre-prosthetic surgery prior to complete denture was the least predominant with 10.43%. Whereas 89.6% of the study population did not require alveoloplasty.



yrs (52.54%) and the least population of female patients belonging to the age group of 60 yrs and above (34.45%) with a statistically significant p value <0.05 (Figure 1). The prevalence for the need of alveoloplasty as a pre prosthetic surgery was predominant among the age group of 51-60 yrs with 11.86% (Figure 2). The requirement of alveoloplasty prior to complete denture was the least predominant with 10.43%. Whereas 89.6% of the study population did not require alveoloplasty (Figure 3).

Discussion

Teeth has a major role in facial appearance, speech and mastication.

There is much evidence demonstrating the negative effect of edentulism on oral health [52, 33, 17]. Edentulism causes compromised oral function which leads to low self-esteem and a fall in psychosocial well being [31]. Facial and oral appearance of these edentulous individuals can be improved by wearing dentures, this can also improve their self esteem and psychological well being [4, 20].

Proper knowledge of the anatomy of denture-bearing areas and the use of custom tray with a proper spacer design and its application during impression making is of utmost importance for stable, retentive prostheses that are in harmony with surrounding

and underlying tissues and in accordance to this, the preparation of the patient's mouth before the placement of a prosthesis is referred to as pre-prosthetic surgery. Some patients require minor oral surgical procedures prior receiving a denture to maximise the level of comfort. Pre-operative dental anxiety is a major predictor of pain experienced by patients during dental extractions [22]. A denture sits on the bony ridge, so it is very important that the bone is in the proper shape and one such procedure to be performed includes smoothing and reshaping, removal of excess bone or excess gum tissues. Every effort should be made to ensure that both the hard and soft tissues are developed in a form that will enhance the patient's ability to wear a denture. It is the practitioners' responsibility to carefully evaluate and identify the need for any alteration of the denture bearing areas and to educate the patient as to the importance of accomplishing this vital procedure [16].

In the present study, prevalence of the need for alveoloplasty was less (10.4%). This was in accordance to the study by Asma parvez et al, which reported 1.43% of alveoloplasty performed on a total of 2874 quadrants in which extractions were done in the year of 2009 [3]. This was reported to increase with upcoming years. In 2010 and 2011, 1.94% alveoloplasty was done of 3198 extracted quadrants, 3.82% alveoloplasty was done among 2802 extracted quadrants. This shows that there has been an increase in the need for alveoloplasty as the year passes by, but the frequency of the procedure done is significantly lesser in comparison to the total.

This study presents higher prevalence of the complete denture among the age group of 60 yrs and above (53.2%). This can be explained by the loss of tooth as the age increases due to increase in oral health related problems, periodontitis, dental caries, etc. Begum et al., showed an increase in tooth loss above 50 years of age (96%) in Nellore district [6]. A study in Piracicaba School of Dentistry, University of Campina, by Marilia Jesus Batista et al., revealed the highest prevalence of tooth loss among 65-74 years(93%) of the age [49]. The cumulative effect of dental lack of oral health care measures towards the older age groups. It may also reflect from the unavailability of case, past economic and social conditions, etc. It's also been reported that age alone is not responsible for the deterioration of oral health [36, 47]. Our institution is passionate about high quality evidence based research and has excelled in various fields [35, 40, 56, 13, 39, 51, 55, 8, 27, 8, 45]. We hope this study adds to this rich legacy.

The limitation of the study conducted includes the reduction or the availability of the amount of sample size, the unequal distribution of cases and the unavailability of location specific datas. Hence, the results of this study must be interpreted within the limitations of this study and further cohort studies must be done including larger sample size. Such study should also include other associated parameters like duration of extraction, completion of prosthetic replacement, etc.

Conclusion

Within the limits of this study, patients belonging to the age group of 60 yrs and above were most predominantly subjected to complete edentulousness with a male predominance. Higher frequency for the need of alveoloplasty was seen among patients under 51-60 yrs. However, only 10.4% of the study population

required alveoloplasty as a pre prosthetic surgery to provide better retention and comfort on insertion of complete denture.

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