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Evaluation of Site Predilection of Alveoloplasty in Complete Denture - A Retrospective Study

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Abstract

Alveoplasty is the common pre prosthetic procedure. It is done to provide a better anatomic environment and create proper supporting structures for denture construction. The aim of the pre prosthetic surgery is to improve the better retention and stability of complete denture. Alveoloplasty is done to improve the quality and condition of the hard and soft oral aiding structures, so that they can provide retentive, supportful and stable dentures.The aim of the study is to evaluate the site predilection of alveoplasty procedure for complete denture.The Retrospective study was conducted in the University setting. Data were collected from the patients who visited Dental college. We Reviewed patient records and analysed the data of 86000 patients between June 2019 and March 2020, 120 patients data were included out of 86000 patients. The reports included Age , Gender , anatomical site of alveoloplasty done. Records on each case were examined and tabulation of the data was done in excel sheets followed by statistical analysis using SPSS software with Chi - Square test.The results were obtained as graphs and charts. The study had a total sample of 120 subjects out of which 52.5% were male and 46.7% were female. Carried out in a age group of 33 - 83 years. 35% of participants in the age group of 55 - 65 years had undergone Alveoloplasty more when compared to other age groups. 62% of Males underwent Alveoloplasty more when compared to females (38%). Alveoloplasty was performed more in lower arch (32.9%) when compared to other sites. Within the limitation of the study ,Males underwent Alveoloplasty more when compared to females. Alveoloplasty was performed predominantly more in lower arch when compared to other sites.

Keywords: *Edentulism;Preprosthetic Surgery;Residual ridge;Lower arch*

Introduction

Edentulism is a debilitating and irreversible condition and is described as the "final marker of disease burden for oral health". Complete loss of all teeth results in complete edentulism [1,2]. Smile is the key component of the self esteem of an individual [3,4]. Bone loss is an ongoing process following tooth loss, affecting the mandible four times more than the maxilla [5] Edentulism was found to have a significant effect on residual ridge resorption , which leads to a reduction in the alveolar bone and the size of the denture bearing area. This reduction affects face height and facial appearance.[6] Edentulism patients are at greater risk of cardiovascular disease [7] Edentulism may induce oral dyskinesia, defined as abnormal involuntary, patterned or stereotyped and purposeless orofacial movements [1]

Alveoloplasty is the preprosthetic surgery done to improve the quality and condition of the hard and soft oral aiding structures, so that they can provide retentive, supportful and stable dentures[8,9].It is carried out by recontouring and smoothening the alveolar arches followed by covering them with healthy soft tissue which helps in providing a stable and retentive oral prosthesis

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[10] .Alveoloplasty is the term used to describe the trimming and removal of the labiobuccal alveolar bone along with some interdental and interradicular bone and is carried out at the time of extraction of teeth and after extraction of teeth. The main objective is a) Hyperplastic replacement of resorbed ridges b) Unfavourable located frenular attachments c) Bony prominences , undercuts [11,12].

The pattern of bone loss differs in maxilla from mandible. In maxilla, the usual resorption is on the buccal and inferior portion of the alveolar ridge[13]. The pattern of edentulous bone loss results in upward and inward loss of structures [14,15]. In the anterior maxilla, there is less horizontal bone loss and posterior drift of anterior rest is seen more than in edentulous mandible[16,17]. In the posterior maxilla, there is an invented drift of posterior rest. The width of maxilla is reduced[11].The mandible is subjected to the effect of early atrophy to a much greater extent than the maxilla, and many reasons for this are postulated. Most are based on the vascular phenomena related to the changing blood supply to the mandible that occurs with increasing age, with a consequence that periosteal compression by a prosthesis results in ischemia which hastens the rate of bone loss.[18]

The purpose of this procedure can be two-fold:

1. When performed before (partial or complete) denture construction, it's used to optimize the shape of the patient's jawbone (ridge) so to avoid complications with appliance insertion, comfort stability, and/or retention

2. When performed in association with tooth extractions, it also establishes a jawbone shape that helps to facilitate the healing process that follows

3. An alveoplasty also aims to facilitate the healing procedure as well as the successful placement of a future prosthetic restoration.[19]

Some patients require minor oral surgical procedures before receiving a partial or complete denture to ensure the maximum level of comfort [20,21]. A denture sits on the bone ridge, so it is very important that the bone is the proper shape and size [22,23]. One of several procedures that might be needed to be performed to prepare the mouth for a denture include bone smoothing and reshaping, removal of excess bone, and/or removal of excess gum tissue [24,25].

However, the aim of the is to determine the evaluation of site predilection of alveoloplasty in complete denture by retrospective analysis.

Materials And Methods

The retrospective study was conducted in a hospital setting. The available data with similar ethnicity was collected from the particular geographic location. The trends in other locations were not assessed in this study setting. Ethical approval was given by the institutional ethical committee.We Reviewed patient records and analysed the data of 86000 patients between June 2019 and March 2020. About 120 patients data were included out of 86000 patients. Case sheets were reviewed and cross verification done by another examiner to avoid errors. To minimise the sampling bias all available data was included and no sorting process was done. The parameters include age, gender , the site of alveoloplasty done followed by complete denture.

These data were entered in an excel sheet and tabulated and SPSS importing was done including chi - square test. Site of alveoloplasty, complete denture, residual ridge were considered as dependent variables, Age and gender were considered as independent variables.The data was correlated with site of alveoloplasty followed by complete denture with respect to age and gender were analysed.

Results and Discussion

During the period of June 2019 - March 2020, a total of 120 subjects underwent Alveoloplasty. Out of which 52.2% of Male and 46.7% of female carried out in a age group of 33 - 83 years. The anatomical site of Alveoloplasty was included as upperI arch, lower arch and both arch. The highest percentage of participants who had undergone Alveoloplasty were the age group of 55 - 65 years (42participants, 35%). While the lowest percentage of participants aged between 77 - 83 years (4 participants, 3.3%). The other age group had similar rates like 14.2% were in the age group of 33 - 43 years ; 29.2% were in the age group of 44 - 54 years; 17.5% were in the age group of 66 - 76 years (Figure 1). The frequency distribution of gender in which 52.5% (63 participants) of Male and 47.5% (57 participants) of

female had undergone Alveoloplasty (Figure 2). The frequency distribution of anatomical site of alveoloplasty in which the highest percentage of participants had undergone Alveoloplasty in lower arch (47 participants, 39.2%); 35.8% of participants had undergone in upper arch ; 25% of participants had undergone Alveoloplasty in relation to both arch (Figure 3).

Kushal D. Gangwani et al…[26] studied with a sample of 35 subjects in which 25 were men and 10 were women. Studied with the age group of 38 - 83 years. 60 - 65 years of participants underwent Alveoloplasty more. 62% of Male had undergone Alveoloplasty predominantly more when compared to females (38%). He concluded that the goal of Alveoloplasty is to gain favourable tissue support for the designed prosthesis while conserving as much soft tissue and hard tissue as possible.Previous literature was consensus with the present study.

Nandhana S et al.. conducted a retrospective study with a sample size of 30 subjects in which 18 were male and 12 were female. Male had undergone alveoloplasty more when compared to females (56% : 46%). He concluded that ill fitting dentures and unstable prosthesis can be the outcome of not performing the Alveoloplasty immediately after post extraction. Previous literature consensus with the present study.

Medha Vivek Bhuskute… conducted a retrospective study with a sample size of 64 subjects in which 34 were Male and 32 were female. Studied with a age group of 40 - 86 years in which 58 - 65 years of participants underwent Alveoloplasty more.53% of Male had undergone Alveoloplasty in relation to lower arch. Males had undergone Alveoloplasty predominantly more when compared to females.Previous literature consensus with the present study.

Veeramalai Nadu Devaki et al….[11,27] conducted a retrospective study with a sample size of 42 subjects in which 31 participants were female and 11 participants were Male. Studied with the age group of 46 - 72 years in which 65 years of aged participants underwent Alveoloplasty more.73% of females had undergone Alveoloplasty more when compared to females.Previous literature was not in consensus with the present study.

Teeth have a major role in facial appearance, speech, and eating. There is much evidence on oral health [28]. Edentulism has a negative influence in oral health function, social behaviour and day to day activities [29]. Compromised oral function leads to self esteem and a fall in psychosocial well being [30].Edentulous people may restrict themselves from participating in social activities as they feel embarrassed to speak, smile or eat in front of others, which eventually keep them in an isolated state. In these individuals wearing dentures could improve their facial and oral appearance. It can improve social interactions which may increase their self esteem and can lead to psychological well being [31]

This study was undergone with a small sample size, hence it should be generated for larger population study. This altered response was obtained because of the absence of patterns own perception which was affected by the time of calling, social factors.In future long term research will be done with larger populations.

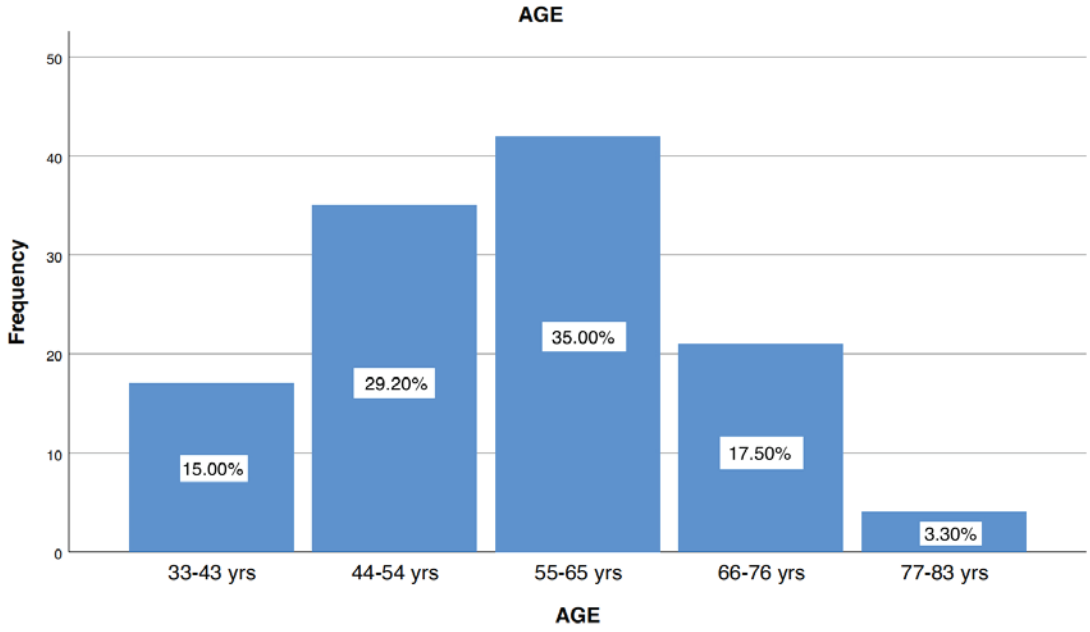

Figure 1: Bar graph represents the age group of people who had undergone Alveoloplasty. X axis represents the age group and Y axis represents the frequency of patients who had undergone Alveoloplasty. It shows that the age group of 55 - 65 years (35%) was seen predominantly more when compared to other age groups.

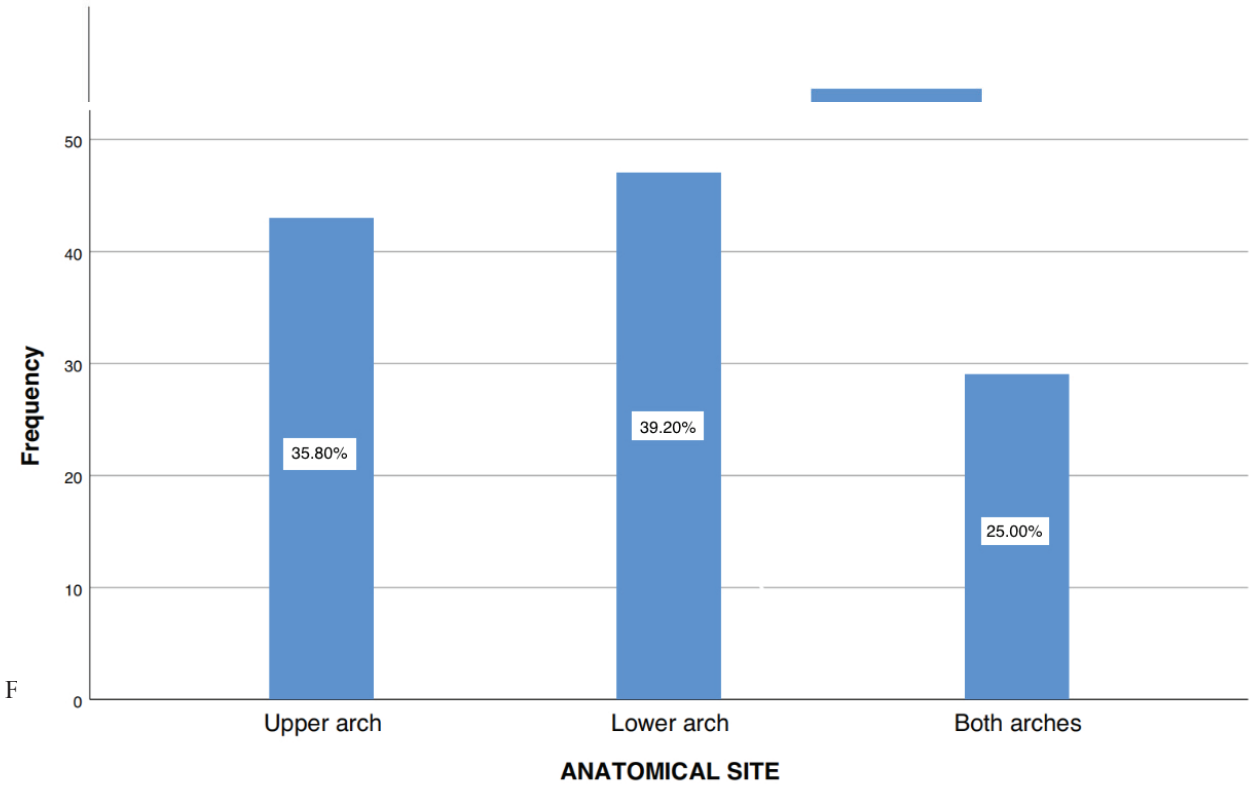

Figure 3: Bar chart represents the frequency of anatomical site. X axis represents the anatomical site and Y axis represents the frequency of patients who had undergone Alveoloplasty. It shows that Alveoloplasty was performed predominantly more in lower arch (39.20%) when compared to other sites.

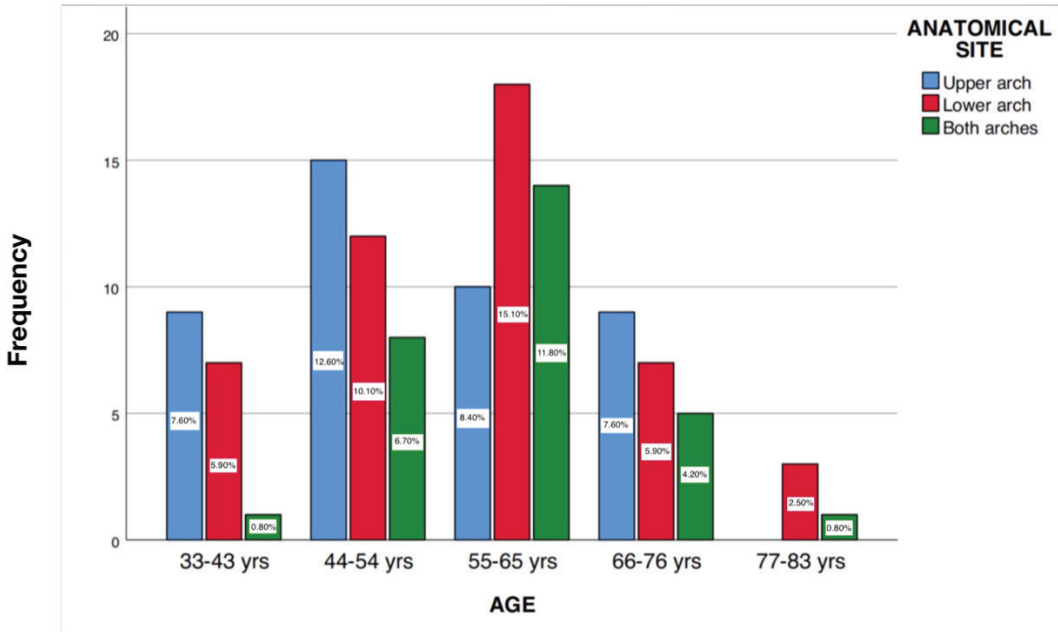

Figure 4: Bar chart represents the association between age group and the anatomical site of alveoloplasty. X axis represents the age group and Y axis represents the frequency of patients who had undergone Alveoloplasty. It shows that the age group of 55 - 65 years had undergone Alveoloplasty predominantly more with respect to lower arch (Red) when compared to other age groups, upper arch (Blue) and Both arch (Green). The association was found to be statistically not significant using chi square test (Pearson's Chi square : 10.897, DF: 8, p value: 0.208 (p>0.005)). Even though it is not significant Alveoloplasty was done predominantly more in the age group of 55 - 65 years.

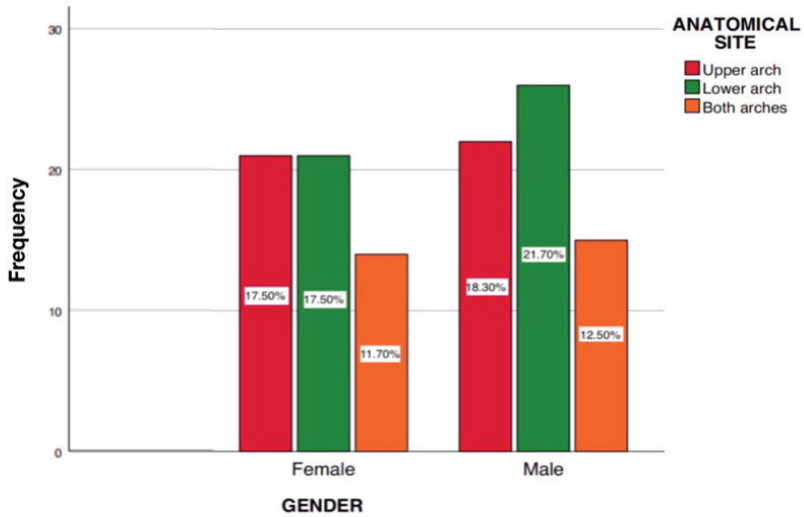

Figure 5: Bar chart represents the association between gender and the anatomical site of alveoloplasty. X axis represents the gender and Y axis represents the frequency of patients who had undergone Alveoloplasty. It shows the Males had undergone Alveoloplasty predominantly more in relation to the lower arch (21.70% - Green), upper arch (18.30% - Red) and both arch (12.50% - orange) when compared to females. The association was found to be statistically not significant using chi square test (Pearson's chi square: 12.180, DF: 6, p value: 0.621 (p>0.005)).

Conclusion

Alveoloplasty was performed more in lower arch (32.9%) when compared to other sites. Within the limitation of the study, Males underwent Alveoloplasty more when compared to females. As far as the arch was concerned alveoloplasty was performed predominantly more in the lower arch when compared to the upper arch.

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References

1. Emami E, de Souza RF, Kabawat M, Feine JS. The impact of edentulism on oral and general health. Int J Dent. 2013 May 8;2013:498305.
2. MacEntee MI, Glick N, Stolar E. Age, gender, dentures and oral mucosal disorders [Internet]. Vol. 4, Oral Diseases. 2008. p. 32–6. Available from: http://dx.doi.org/10.1111/j.1601-0825.1998.tb00252.x
3. Ariga P, Nallaswamy D, Jain AR, Ganapathy DM. Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review [Internet]. Vol. 9, World Journal of Dentistry. 2018. p. 68–75. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1509
4. Jyothi S, Robin PK, Ganapathy D, Anandiselvaraj. Periodontal Health Status of Three Different Groups Wearing Temporary Partial Denture [Internet]. Vol. 10, Research Journal of Pharmacy and Technology. 2017. p. 4339. Available from: http://dx.doi.org/10.5958/0974-360x.2017.00795.8
5. Tallgren A. The continuing reduction of the residual alveolar ridges in complete denture wearers: a mixed-longitudinal study covering 25 years. 1972. J Prosthet Dent. 2003 May;89(5):427–35.
6. Divaris K, Ntounis A, Marinis A, Polyzois G, Polychronopoulou A. Loss of natural dentition: multi-level effects among a geriatric population [Internet]. Vol. 29, Gerodontology. 2012. p. e192–9. Available from: http://dx.doi.org/10.1111/j.1741-2358.2010.00440.x
7. Selvan SR, Ganapathy D. Efficacy of fifth generation cephalosporins against methicillin-resistant Staphylococcus aureus-A review [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 1815. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00369.3
8. Ganapathy DM, Kannan A, Venugopalan S. Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis [Internet]. Vol. 8, World Journal of Dentistry. 2017. p. 496–502. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1493
9. Ashok V, Suvitha S. Awareness of all ceramic restoration in rural population [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 1691. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00340.1
10. Institute NC, National Cancer Institute. Alveoloplasty [Internet]. Definitions. 2020. Available from: http://dx.doi.org/10.32388/nwb29q
11. Devaki VN, Balu K, Ramesh SB, Arvind RJ, Venkatesan. Pre-prosthetic surgery: Mandible. J Pharm Bioallied Sci. 2012 Aug;4(Suppl 2):S414–6.
12. Basha FYS, Ganapathy D, Venugopalan S. Oral Hygiene Status among Pregnant Women [Internet]. Vol. 11, Research Journal of Pharmacy and Technology. 2018. p. 3099. Available from: http://dx.doi.org/10.5958/0974-360x.2018.00569.3
13. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, Sivaprakasam AN. Compatibility of Nonoriginal Abutments With Implants [Internet]. Vol. 28, Implant Dentistry. 2019. p. 289–95. Available from: http://dx.doi.org/10.1097/id.0000000000000885
14. Ganapathy D, Sathyamoorthy A, Ranganathan H, Murthykumar K. Effect of Resin Bonded Luting Agents Influencing Marginal Discrepancy in All Ceramic Complete Veneer Crowns. J Clin Diagn Res. 2016 Dec;10(12):ZC67–70.
15. Subasree S, Murthykumar K, Dhanraj. Effect of Aloe Vera in Oral Health-A Review [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 609. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00116.5
16. Ranganathan H, Ganapathy DM, Jain AR. Cervical

and Incisal Marginal Discrepancy in Ceramic Laminate Veneering Materials: A SEM Analysis. Contemp Clin Dent. 2017 Apr;8(2):272–8.

17. Vijayalakshmi B, Ganapathy D. Medical management of cellulitis [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 2067. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00422.4

18. Davis WH, Howard Davis W, Delo RI, Ward WB, Terry B, Patakas B. Long term ridge augmentation with rib graft [Internet]. Vol. 3, Journal of Maxillofacial Surgery. 1975. p. 103–6. Available from: http://dx.doi.org/10.1016/s0301-0503(75)80026-9

19. Topazian RG, Hammer WB, Boucher LJ, Hulbert SF. Use of alloplastics for ridge augmentation. J Oral Surg. 1971 Nov;29(11):792–8.

20. Taylor RL. A chronological review--1960-1985 of the changing concepts related to modifications, treatment, preservation and augmentation of the complete denture basal seat. Aust Prosthodont Soc Bull. 1986 Dec;16:17–39.

21. Ajay R, Suma K, Ali S, Sivakumar JK, Rakshagan V, Devaki V, et al. Effect of surface modifications on the retention of cement-retained implant crowns under fatigue loads: An In vitro study [Internet]. Vol. 9, Journal of Pharmacy And Bioallied Sciences. 2017. p. 154. Available from: http://dx.doi.org/10.4103/jpbs.jpbs_146_17

22. Venugopalan S, Ariga P, Aggarwal P, Viswanath A. Magnetically retained silicone facial prosthesis. Niger J Clin Pract. 2014 Mar;17(2):260–4.

23. Kannan A, Venugopalan S. A systematic review on the effect of use of impregnated retraction cords on gingiva [Internet]. Vol. 11, Research Journal of Pharmacy and Technology. 2018. p. 2121. Available from: http://dx.doi.org/10.5958/0974-360x.2018.00393.1

24. Ramkumar V. Preprosthetic Surgery [Internet]. Viva in Oral Surgery for Dental Students. 2012. p. 122–122. Available from: http://dx.doi.org/10.5005/jp/books/11701_20

25. Ashok V, Nallaswamy D, Benazir Begum S, Nesappan T. Lip Bumper Prosthesis for an Acromegaly Patient: A Clinical Report [Internet]. Vol. 14, The Journal of Indian Prosthodontic Society. 2014. p. 279–82. Available from: http://dx.doi.org/10.1007/s13191-013-0339-6

26. Gangwani KD, Shetty L, Kulkarni D, Seshagiri R, Chopra R. Piezosurgery Versus Conventional Method Alveoloplasty. Ann Maxillofac Surg. 2018 Jul;8(2):181–7.

27. Bhuskute M, Shet RK. Preprosthetic surgery: An adjunct to complete denture therapy [Internet]. Vol. 11, Journal of the International Clinical Dental Research Organization. 2019. p. 49. Available from: http://dx.doi.org/10.4103/jicdro.jicdro_6_19

28. Heydecke G, Thomason JM, Lund JP, Feine JS. The impact of conventional and implant supported prostheses on social and sexual activities in edentulous adults: Results from a randomized trial 2 months after treatment [Internet]. Vol. 95, The Journal of Prosthetic Dentistry. 2006. p. 396. Available from: http://dx.doi.org/10.1016/j.prosdent.2006.02.014

29. Hugo FN, Hilgert JB, de Sousa M da LR, Cury JA. Oral status and its association with general quality of life in older independent-living south-Brazilians [Internet]. Vol. 37, Community Dentistry and Oral Epidemiology. 2009. p. 231–40. Available from: http://dx.doi.org/10.1111/j.1600-0528.2009.00459.x

30. Naik AV, Pai RC. Study of Emotional Effects of Tooth Loss in an Aging North Indian Community [Internet]. Vol. 2011, ISRN Dentistry. 2011. p. 1–4. Available from: http://dx.doi.org/10.5402/2011/395498

31. Jones JA, Orner MB, Spiro A, Kressin NR. Tooth loss and dentures: Patients' perspectives [Internet]. Vol. 53, International Dental Journal. 2003. p. 327–34. Available from: http://dx.doi.org/10.1111/j.1875-595x.2003.tb00906.x