

Evaluation of Clark's Technique and Fenestration Technique in Vestibuloplasty Procedures

Running Title: A study evaluating the use of Clark's and fenestration technique in vestibuloplasty procedures

Vunnam Sri Sai Charan

Saveetha Dental College And Hospitals, Saveetha Institute Of Medical And Technical Sciences
Saveetha University, Chennai, India. Email: 151501057.sdc@saveetha.com

Nashra Kareem*

Senior Lecturer, Department of Periodontics, Saveetha Dental College And Hospitals, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai, India. Email: nashrak.sdc@saveetha.com

Kiran Kumar

Senior Lecturer, Department of Prosthodontics, Saveetha Dental College And Hospitals, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai, India. Email: kirankumar.sdc@saveetha.com

Article Info

Volume 83

Page Number: 2298 - 2305

Publication Issue:

July-August 2020

Abstract

Vestibuloplasty, ridge augmentation and different types of implants were used to overcome the problems of flat alveolar ridge. The oral rehabilitation of patients after loss of teeth has made much progress in recent times. Vestibuloplasty, ridge augmentation and different types of implants were used to overcome the problems of flat alveolar ridge. The aim of this study is to evaluate the clarks and fenestration technique used for vestibuloplasty. The study included 11 patients. The data is calculated from Saveetha dental college and recorded. The data was recorded to evaluate Clark's and fenestration technique in vestibuloplasty procedures. The results show that vestibuloplasty procedures were mostly done in the age group of 26-33 years. Results show most vestibuloplasty procedures mostly done in females rather than males and fenestration technique is mostly used technique compared to that of Clark's technique in vestibuloplasty procedures. In this study most of the patients had undergone fenestration technique rather than Clark's technique.

Keywords: vestibuloplasty; alveolar ridge; fenestration; augmentation.

Article History

Article Received: 06 June 2020

Revised: 29 June 2020

Accepted: 14 July 2020

Publication: 25 July 2020

Introduction:

The oral rehabilitation of patients after loss of teeth has made much progress in recent times. Vestibuloplasty, ridge augmentation and different types of implants were used to overcome the problems of flat alveolar ridge (Thamaraiselvan *et al.*, 2015), (Ramesh, Sheeja Saji Varghese, *et al.*, 2016). Many different methods have been described for regenerating or replacing bone for secondary

implant placement but until now no substantial progress has been made in soft tissue management. The most common procedure in vestibuloplasty are submucosal vestibuloplasty, secondary epithelial vestibuloplasty, soft tissue graft vestibuloplasty and Edlanplasty. (Varghese *et al.*, 2015), (Avinash, Malaippan and Dooraiswamy, 2017) The aim of all these techniques is to create adequate vestibular depth and limit the traction of fiber and

muscle attachments , In secondary epithelial vestibuloplasty, there is a need to cover the exposed periosteum because a nearly complete relapse could be proven during secondary healing with contraction and epithelialization of the vestibular periosteum. To date various autogenous soft tissue grafts from autogenous mucosal to allogeneic collagen membrane. have been used for vestibular extension.(Panda *et al.*, 2014),(Moothaet *al.*, 2016) All grafts have the disadvantages of increased morbidity, postoperative pain and risk of surgical complications in the donor site.This led to search for an alternate graft material.Biological membrane obtained from placenta opens new perspectives.(Ravi *et al.*, 2017),(Khalid *et al.*, 2017)The human amnion membrane is a biological graft which has unique properties like antiadhesive effects, bacteriostatic properties, wound protection, pain reduction and epithelization effects. It's easy availability, low cost makes it the best material.The use of amnion in vestibuloplasty has been first reported by Guler et al.who concentrated on the blood flow to the graft. Lawson studied the use of amniotic membrane along with pectoralis major muscle for oral reconstruction. Most of these methods have been subjected to different modifications and improved ever since. The first reports of free gingival transplants were de- scribed by Bjorn and Nabers. The free autogenous gingival graft is a surgical procedure with a high degree of predictability of success in producing an increased zone of keratinized gingiva.(Khalid *et al.*, 2016),(Ramesh, Sheeja S. Varghese, *et al.*, 2016) Nevertheless this method has a lot of disadvantages – the use of palatal donor tissues increases morbidity, delays healing and leads to esthetic alterations. Platelet-rich fibrin, or PRF, is a second-generation autogenous, containing an increased amount of leukocytes and platelets, solid biomaterial.(Kavarthapu and Thamaraiselvan, 2018),(Ramesh, Ravi and Kaarthikeyan, 2017) PRF has the ability to form natural fibrin matrix composed of growth factors, cytokines, platelets and stem cells

and because of that it is successfully used as a stimulating factor for soft and bone tissue regeneration in dental implantology and periodontal surgery.(Ramesh *et al.*, 2019),(Priyanka *et al.*, 2017),(Ramamurthy and Mg, 2018)Therefore the aim of this study is to evaluate the clarks and fenestration technique used for vestibuloplasty.

Materials And Methods:

Study Setting:

This was a university-based study, cross-sectional, uni-centred study. The ethical board clearance was obtained from the institutional ethics committee of Saveetha Dental College and hospitals, Chennai. IEC approval number: SDC/SIHEC/2020/DIASDATA/0619-0320. The data was obtained by reviewing 86,000 case sheets of patients who reported to Saveetha Dental College and hospitals. Informed consent was obtained from the patients.

Sampling:

All the data samples used in this study were obtained by reviewing the case sheets of patients belonging to Saveetha dental college and hospital. The data samples were collected from June 2019 to March 2020. All the case sheets of patients who had undergone vestibuloplasty procedure. No sorting of data was done.

Data Collection:

The data collected included, gender, periodontal diagnosis. Patient case sheets with incomplete data were excluded if the data required could not be obtained from the intra oral photographs. The data samples obtained were collected and tabulated in excel sheets and were exported for statistical analysis.

Statistical Analysis:

The present study was conducted in 11 patients who underwent vestibuloplasty procedures. The samples were selected from the Department of Periodontics, Saveetha dental college. The values and variables were tabulated and analysed using the SPSS software by IBM. Chi-square tests were done to assess associations. Any p-value of less than 0.05 was considered as statistically significant.

Results:

Eleven patients underwent vestibuloplasty procedures using Clark's and fenestration technique (sample size; n=11). These 11 patients belonged to the age group 24-34 years (n=6), 35 to 45 years (n=2), 46-56 years (n=2) and 57-67 years (n=1). Most of the vestibuloplasty procedures were done in the age group of 24-34 years (Figure 1). With regard to gender distribution 4 males and 7 females underwent vestibuloplasty procedures using clarks and fenestration technique (Figure 2). According to Figure 3, four patients (36.36%) underwent vestibuloplasty using Clark's technique and 7 patients (63.64%) underwent vestibuloplasty using fenestration technique. Figure 4 reveals the association between vestibuloplasty procedures and the different age groups. Clark's and fenestration techniques were equally used in the age group of 26-33 years (n=3; 27.27%) Clark's technique and fenestration technique were equally used in the age group of 34-41 years (n=1;9.09%) whereas fenestration technique was mostly used in the age group of 42-49 years (n=2;18.18%) and 50-58 years (n=1;9.09%) p-value = 0.502 (<0.05) hence statistically not significant. Figure 5 reveals the association between vestibuloplasty procedures and gender. Both Clark's technique and fenestration technique (n=2;18.18%) were equally used in males. However in females, fenestration technique was most commonly used (n=5; 45.45%), p-value = 0.477 (<0.05) hence statistically not significant.

Discussion:

Lack of an adequate residual alveolar ridge and basal seat severely compromises the success of prosthodontic treatment. It has been suggested that expansion of the denture-bearing area by means of a vestibuloplasty would reduce denture load per square unit of supporting bone and thus reduce the bone resorption caused by transfer of occlusal forces(Hillerup, Eriksen and Solow, 1989).Numerous graft materials are available but all suffer from certain limitations. In order to overcome the same there is a search for more appropriate graft material. Skin graft, mucosal grafts, palatal graft(Hillerup, 1982),buccal graft,(Amphlett and Colwell, 1982)cultured mucosal grafts, allogeneic collagen membrane,(Raghoebaret al., 1995)dural graft,(Martiset al., 1979) placental graft were suggested. Split skin graft is well-tolerated, but can be subjected to postoperative shrinkage,(Raguse and Gath, 2005) and when compared with the surrounding mucosa, the grafted area displays a marked clinical difference in consistency and color. Common complications of the donor site include susceptibility to Candida infection, pain, discomfort, delayed healing, hypertrophic or discolored scars and dysesthesia. The problem with mucosal (buccal and palatal grafts) is the limited amount of mucosa available for grafting. Possibility of nerve damages and an increased rate of ulceration altogether prevent its use for prosthetic purposes. Palatal mucosal wounds leave an open wound with a healing course of 4-6 and half weeks possible complications of soreness, ulcers, and difficulty in wearing an upper denture.To circumvent these disadvantages biological membranes have been suggested as options including fetal membranes. The amniotic membrane is formed from the ectoderm of the fetus. It has a stromal matrix, a thick collagen layer, and an overlying basement membrane with a single layer of epithelium. It closely resembles the epidermis of the skin and has been used as a physiological wound dressing with great success

(Güler *et al.*, 1997) The amnion has the following advantages: it promotes secondary epithelialization, vascularized healthy granulation tissue and stimulates the neovascularization in neighbouring tissues and it is antibacterial. Another characteristic of amniotic membrane is the lack of immunogenicity as it did not express antigens of histocompatibility, the allograft was never rejected. They are inexpensive, readily available, used fresh or lyophilised, and stored at room temperature after sterilisation by γ -irradiation. Human amnion has been known to be an effective dressing since John Staige Davis used it way back in 1910. Since then extensive studies on amnion have been performed all over the world and it has been proved to be an excellent biological dressing with almost all the qualities of an ideal dressing. Chao *et al.*, were the first who used it for the coverage of huge dural defects. Lawson placed amnion over the deep aspect of the pectoralis major muscle for oral cavity reconstruction. A single layer of fresh amnion for surgical treatment of oral submucous fibrosis. Güler *et al.*, used the grafts of amnion in mandibular vestibuloplasty. To evaluate the efficacy of human amniotic membrane as a graft material in vestibuloplasty, we conducted the present clinical study comparing vestibular depths between group I where the denuded surface of periosteum in mandibular labial surface was covered with glycerol-preserved amnion graft using Clark's technique and group II where standard Clark's technique was performed without graft.

Future Scope:

The present study indicates that reduction in post operative vestibular depth is less when human membrane is used as graft material to cover the periosteum when compared to standard Clark's technique without graft. The concept of using biodegradable amniotic membranes could lead to better results.

Conclusion:

In the present study, Clark's and fenestration techniques were equally done in the younger age groups, whereas in the older age groups, fenestration technique was most commonly performed. With regard to gender, both Clark's and fenestration techniques were equally used in males. However in females, fenestration technique was most commonly used. To conclude, most of the patients had undergone fenestration technique rather than Clark's technique for vestibuloplasty. Further studies with larger sample size should be carried out in order to evaluate the efficacy of such techniques and their significance in both genders and different age groups.

References:

1. Amphlett, J. and Colwell, W. C. (1982) 'Edentulous vestibuloplasty using the palatal graft technique', *The Journal of prosthetic dentistry*, 48(1), pp. 8–14.
2. Avinash, K., Malaippan, S. and Dooraiswamy, J. N. (2017) 'Methods of Isolation and Characterization of Stem Cells from Different Regions of Oral Cavity Using Markers: A Systematic Review', *International journal of stem cells*, 10(1), pp. 12–20.
3. Güler, R. *et al.* (1997) 'Measurement of blood flow by the ^{133}Xe clearance technique to grafts of amnion used in vestibuloplasty', *The British journal of oral & maxillofacial surgery*, 35(4), pp. 280–283.
4. Hillerup, S. (1982) 'Preprosthetic mandibular vestibuloplasty with buccal mucosal graft. A 2-year follow-up study', *International journal of oral surgery*, 11(2), pp. 81–88.
5. Hillerup, S., Eriksen, E. and Solow, B. (1989) 'Reduction of mandibular residual ridge after vestibuloplasty. A two-year follow-up study comparing the Edlan flap, mucosal and skin graft operations', *International Journal of Oral and Maxillofacial Surgery*, pp. 271–276. doi:

- 10.1016/s0901-5027(89)80093-1.
6. Kavarthapu, A. and Thamaraiselvan, M. (2018) 'Assessing the variation in course and position of inferior alveolar nerve among south Indian population: A cone beam computed tomographic study', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(4), pp. 405–409.
 7. Khalid, W. *et al.* (2016) 'Role of endothelin-1 in periodontal diseases: A structured review', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 27(3), pp. 323–333.
 8. Khalid, W. *et al.* (2017) 'Comparison of Serum Levels of Endothelin-1 in Chronic Periodontitis Patients Before and After Treatment', *Journal of clinical and diagnostic research: JCDR*, 11(4), pp. ZC78–ZC81.
 9. Martis, C. *et al.* (1979) 'Free transplantation of lyophilized dura for vestibuloplasty: a clinical and histological study', *Journal of oral surgery*, 37(9), pp. 646–649.
 10. Mootha, A. *et al.* (2016) 'The Effect of Periodontitis on Expression of Interleukin-21: A Systematic Review', *International Journal of Inflammation*, pp. 1–8. doi: 10.1155/2016/3507503.
 11. Panda, S. *et al.* (2014) 'Platelet rich fibrin and xenograft in treatment of intrabony defect', *Contemporary clinical dentistry*, 5(4), pp. 550–554.
 12. Priyanka, S. *et al.* (2017) 'Detection of cytomegalovirus, Epstein-Barr virus, and Torque Teno virus in subgingival and atheromatous plaques of cardiac patients with chronic periodontitis', *Journal of Indian Society of Periodontology*, 21(6), pp. 456–460.
 13. Raghoobar, G. M. *et al.* (1995) 'Use of cultured mucosal grafts to cover defects caused by vestibuloplasty', *Journal of Oral and Maxillofacial Surgery*, pp. 872–878. doi: 10.1016/0278-2391(95)90271-6.
 14. Raguse, J. D. and Gath, H. J. (2005) 'A metabolically active dermal replacement (Dermagraft) for vestibuloplasty', *Journal of Oral Rehabilitation*, pp. 337–340. doi: 10.1111/j.1365-2842.2004.01430.x.
 15. Ramamurthy, J. and Mg, V. (2018) 'Comparison Of Effect Of Hiora Mouthwash Versus Chlorhexidine Mouthwash In Gingivitis Patients: A Clinical Trial', *Asian Journal of Pharmaceutical and Clinical Research*, p. 84. doi: 10.22159/ajpcr.2018.v11i7.24783.
 16. Ramesh, A., Varghese, S. S., *et al.* (2016) 'Chronic obstructive pulmonary disease and periodontitis – unwinding their linking mechanisms', *Journal of Oral Biosciences*, pp. 23–26. doi: 10.1016/j.job.2015.09.001.
 17. Ramesh, A., Varghese, S. S., *et al.* (2016) 'Herbs as an antioxidant arsenal for periodontal diseases', *Journal of intercultural ethnopharmacology*, 5(1), pp. 92–96.
 18. Ramesh, A. *et al.* (2019) 'Esthetic lip repositioning: A cosmetic approach for correction of gummy smile - A case series', *Journal of Indian Society of Periodontology*, 23(3), pp. 290–294.
 19. Ramesh, A., Ravi, S. and Kaarthikeyan, G. (2017) 'Comprehensive rehabilitation using dental implants in generalized aggressive periodontitis', *Journal of Indian Society of Periodontology*, p. 160. doi: 10.4103/jisp.jisp_213_17.
 20. Ravi, S. *et al.* (2017) 'Additive Effect of Plasma Rich in Growth Factors With Guided Tissue Regeneration in Treatment of Intrabony Defects in Patients With Chronic Periodontitis: A Split-Mouth Randomized Controlled Clinical Trial', *Journal of Periodontology*, pp. 839–845. doi: 10.1902/jop.2017.160824.
 21. Thamaraiselvan, M. *et al.* (2015) 'Comparative

clinical evaluation of coronally advanced flap with or without platelet rich fibrin membrane in the treatment of isolated gingival recession', *Journal of Indian Society of Periodontology*, 19(1), pp. 66–71.

22. Varghese, S. S. *et al.* (2015) 'Estimation of salivary tumor necrosis factor-alpha in chronic and aggressive periodontitis patients', *Contemporary clinical dentistry*, 6(Suppl 1), pp. S152–6.

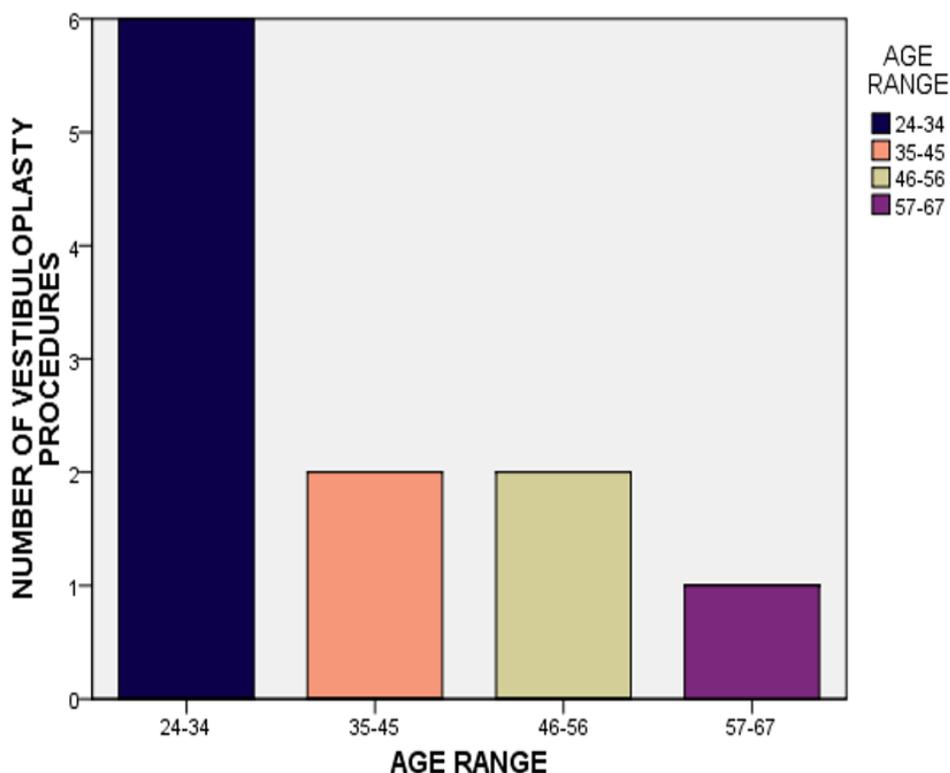


Figure 1: This bar graph shows frequency distribution of vestibuloplasty procedures among different age groups. The X-axis denotes the age range and the Y-axis denotes the number of vestibuloplasty procedures. From this graph we infer that, most of the vestibuloplasty procedures were done in the age group of 24-34 years(black).

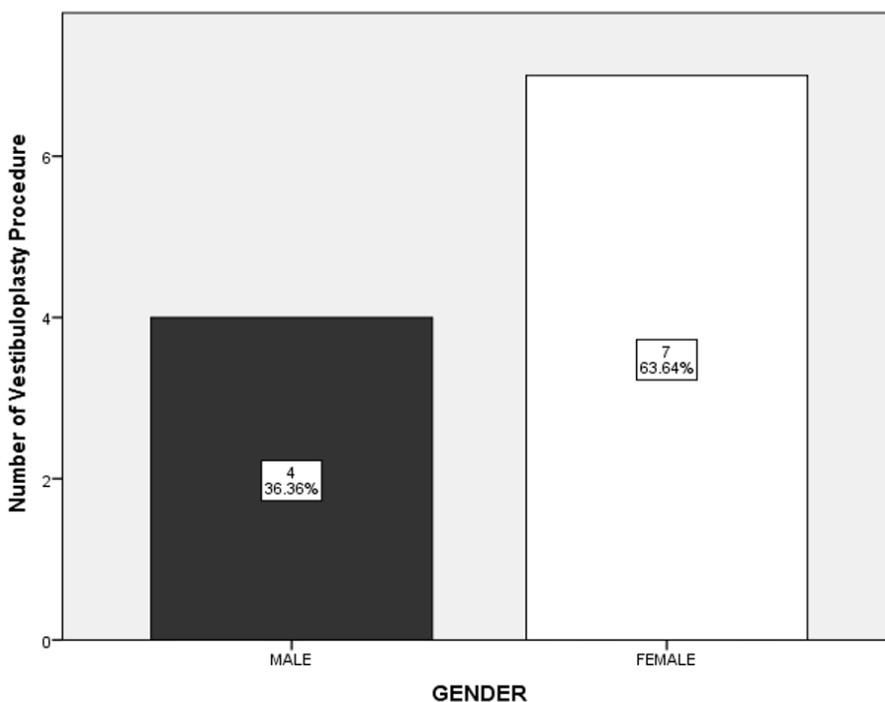


Figure 2: This bar graph shows the frequency distribution of vestibuloplasty procedures among males and females. The X-axis represents gender and Y-axis represents the number of vestibuloplasty procedures. This graph denotes that most of the vestibuloplasty procedures were done in females (white) than males (black).

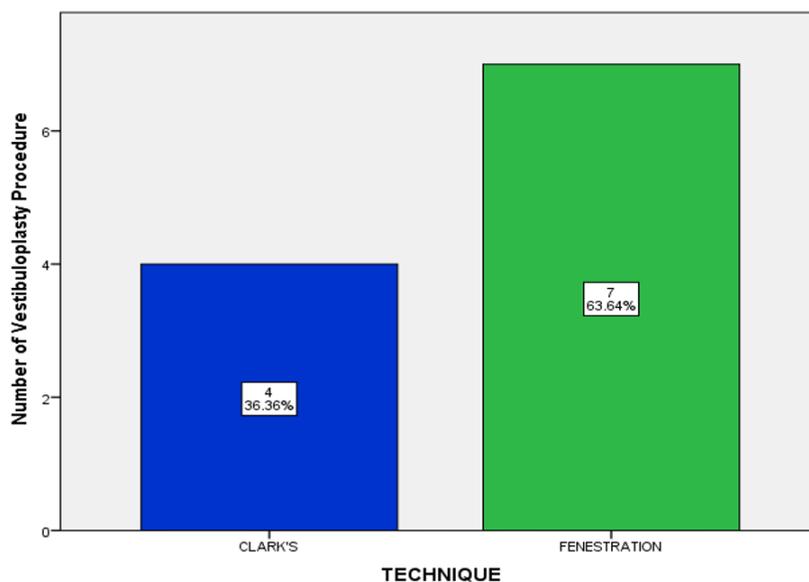


Figure 3: This bar graph shows the frequency distribution of the techniques used for vestibuloplasty procedures. The X-axis represents technique and the Y-axis represents the number of vestibuloplasty procedures. This graph denotes that the most commonly used technique is fenestration technique (Green) rather than Clark's technique (Blue).

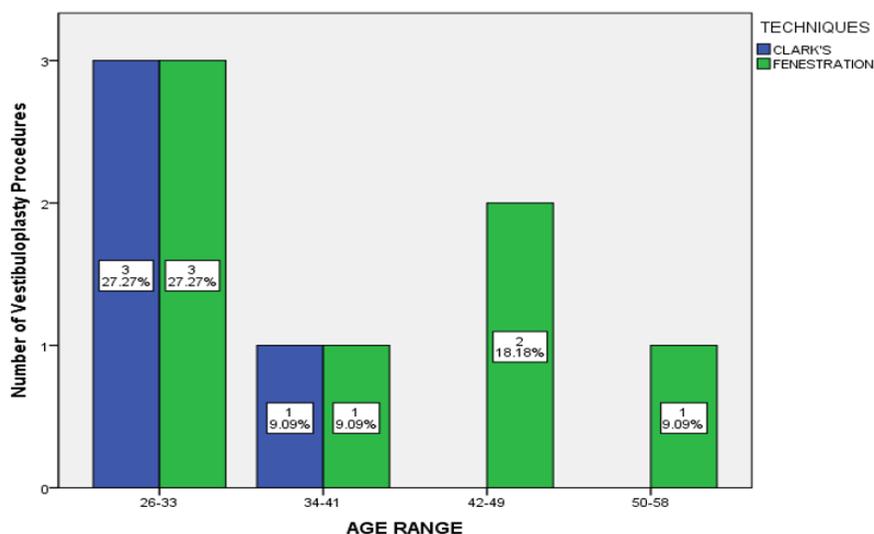


Figure 4: This bar graph shows the association between vestibuloplasty procedures and the different age groups. The X-axis represents age range and Y-axis represents the number of vestibuloplasty procedures done. From this graph we can infer that, both Clark’s (blue) and fenestration techniques were equally used in the age group of 26-33 years and 34-41 years; whereas fenestration technique (Green) was mostly used in the age group of 42-49 years and 50-58 years. Pearson’s Chi square value=2.357, df =3, p-value 0.502; hence statistically not significant.

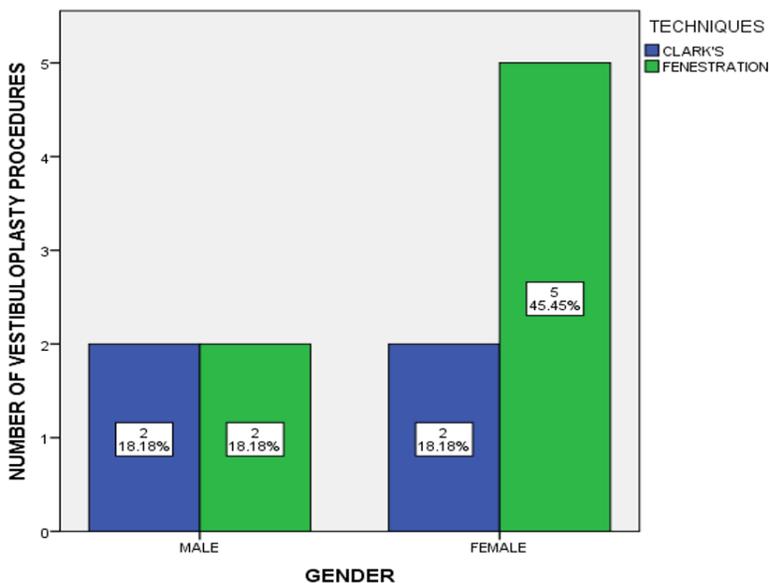


Figure 5: This bar graph shows the association between vestibuloplasty procedures and gender. The X-axis represents gender and the Y-axis represents the number of vestibuloplasty procedures done. This graph denotes that both Clark’s technique (Blue) and fenestration technique (Green) were equally used in males. However in females, fenestration technique was most commonly used. Pearson’s Chi square value=0.505, df =1, p-value 0.477; hence statistically not significant.