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Research Article

# Vestibuloplasty: a Treatment for Residual Alveolar Ridge

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ABSTRACT

**Introduction*:*** The residual ridge is reduced after tooth loss or tooth extraction and is the major obstruction in fabrication of complete denture and implant supported prosthesis. In the formation of complete denture, many clinicians usually faces problems with resorbed mandibular ridges or with larger bony bases. It is mainly the presence of high muscle attachment and hypertrophic soft tissue which reduces the usable areas for retention of mandibular denture. Vestibuloplasty involves surgical procedure for reallocation of mucosa and muscle attachment thereby increasing the vestibular depth.In dentulous patient, shallow vestibule and inadequate attached gingiva may create a barrier in oral hygiene maintenance and gingival recession due to muscle traction. **Aim*:*** to present a clinical case of atrophid anterior mandibular ridge whereby performing modified kanzanjian transpositional flap technique, so we could successfully deliver the prosthesis. **Methodology*:*** A 65yr old female reported with atrophied mandibular ridge to prosthodontics department for fabrication of complete denture and then was send to periodontics and oral surgery for vestibuloplasty. Technique selected for vestibuloplasty was modified kanzanjian transpositional flap technique with acrylic stent balanced with stainless steel screws which was done to increase the vestibular depth. **Result*:*** Clinically by comparing the vestibular depth pre-operatively and post operatively, it was found that it increases from 7mm to 19mm checked by using standard metal scale. **Conclusion*:*** Vestibuloplasty involves surgical procedure for reallocation of mucosa and muscle attachment thereby increasing the vestibular depth. This incase of edentulous patients aids prosthodontist to deliver complete denture and incases of dentulous patient it supports to improve oral hygiene because we are dealing with unfavorable environment rather than a pathologic condition.

## INTRODUCTION

The residual ridge is usually reduced after tooth loss or tooth extraction and is the major obstruction in fabrication of complete denture and implant supported prosthesis. In the formation of complete denture, many clinicians usually faces problems with resorbed mandibular ridges or with larger bony bases. It is mainly the presence of high muscle attachment and hypertrophic soft tissue which reduces the usable areas for retention of mandibular denture . Hence, the denture may be uncomfortable and functionally unacceptable for the patient [1,2].

In dentulous patient, shallow vestibule may create a barrier in oral hygiene maintenance and may even cause gingival recession due to muscle traction. Inadequate vestibular depth in combination with inadequate attached gingiva is said to cause more food accumulation during mastication. Hence shallow vestibule impeding with oral hygiene maintenance requires correction. Vestibuloplasty involves surgical procedure for reallocation of mucosa and muscle attachment thereby increasing the vestibular depth [3].

As alveolar bone loss is almost generalized, the reduction of the residual mandibular ridge is initially high, approximately 12mm/year immediately after extraction and even up to an estimated 0.2 mm/year after 2 years. The average reduction in height of the front edge is between 0.12and 0.40mm/year. This

So, the loss of the teeth will result in continuous resorption of the remaining alveolar bone, resulting in decreased stability and retention of denture. In the patients that are using ill fitted dentures from prolonged period, the rate of resorption of alveolar ridge will increase manifolds. This will lead to attachment of adjacent muscles at or near the crest of alveolar ridge, leading to diminished labio-buccal vestibule and shallow lingual sulcus [6,7]. So vestibuloplasty is an elective surgical procedure where we are aiding the prosthodontist. In such cases, we are dealing with unfavorable environment rather than a pathologic condition [8]. Thus, the purpose of any vestibuloplasty technique is to create adequate vestibular space that helps in supporting and retaining the denture flange and to reposition the muscles to increase the stability of the denture [9].

The main aim of this paper is to present a clinical case of atrophid anterior mandibular ridge whereby performing modified kanzanjian transpositional flap technique, we could successfully deliver the prosthesis.

**CLINICAL REPORT**

A 65 year old female reported to prosthodontics department for fabrication of complete denture. On clinical examination and imaging, it was seen that lower edentulous lower ridge is highly atrophied. So, she was referred to department of Periodontics and OMFS for vestibular deepening procedure. By looking out the need for treatment, before the making of prosthesis, modified Kazanjian transpositional flap technique was performed with the aim of deepening the buccal groove and increasing the area for providing support to the rim conditions to improve the stability of the prosthesis. Pre-operative vestibular depth was noted by metal scale which measured to be 7mm. (figure 1). The surgery was performed under LA (lignocaine 2% Proken - AD). An introral transmucosal curvilinear incision was placed in labial mucosa approx 7-8mm away from attached mucosa between the foraminal area (figure 2). Careful sharp supraperiosteal dissection of muscle and connective tissue attachment was carried out till the desired depth (figure 3). Apically positioned flap was placed after surgery to the desired depth using 3-0 vicryl sutures. The periosteum was sutured with the raw surface of lip and musculature (figure 4). The modified flap was sutured in deep vestibular depth (figure 5). Hence the vestibular depth increased from 7mm to 19mm which was measured by metal scale (figure 6). Immediate impression was taken and acrylic stent was delivered on second day postoperatively. This stent was stabilized with bilateral stainless steel screws (measuring 2*8mm) for one month (figure 7). After one month, stent was removed and it was noticed that vestibular depth increases from 7mm to 19mm (figure 8). The patient was put on post-operative oral antibiotics and anti-inflammatory drugs (Cap. Amoxyclav & Tab. Dolomed MR). Post-operative instructions to patient includes soft diet and warm saline rinses after 24 hrs of surgery. Patient was examined on 3$^{rd}$ post-operative day, first week and first month in order to check healing and to avoid any undue complications like pain, swelling or any other discomfort. The clinical parameters included healing of mucosal flap and lip scar. It was also noticed that proper increase in vestibular depth was achieved approx. after one month of surgery. Suture removal was done on 10$^{th}$ post-operative day. Comparison of vestibular depth pre-operatively and post operatively were also done clinically and found out that vestibular depth increases from 7mm to 19mm (Figure 1 & 8) using standard metal scale. These parameters were checked by 3 investigators from oral surgery, periodontology and prosthodontics department and then patient was referred to dept of prosthodontics for early construction of complete denture.

**Figure 1: Pre-Operative Picture of the Patient Lip Switch Vestibuloplasty. Modified Kazanjian's transpositional flap technique. Vestibule depth increased from 7-19mm (12mm increase)**

**Figure 2: Incision on lip**

**Figure 3: Supraperiosteal dissection.**

**Figure 4: Suturing of periosteum with raw surface of lip**

**Figure 5: Suturing of modified Kazanjian's transpostional flap in deep vestibular depth.**

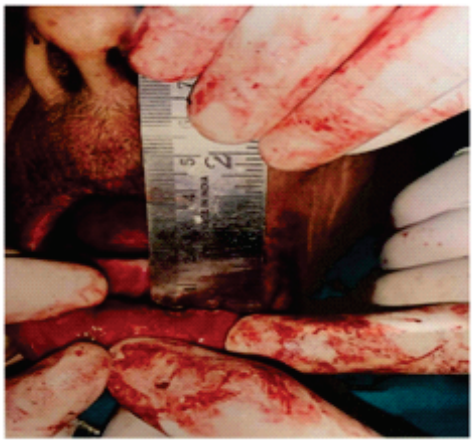

**Figure 6: Vestibular depth increased from 7-19mm.**

**Figure 7: Acrylic stent placed and stabilized with screw for 1 month.**

**Figure 8: Vestibular depth after stent removal (19mm)**

## DISCUSSION

Ideal ridge should be free from any bony prominence, sharp undercuts, pointed ridges, excessive hypertrophy of overlying soft tissue and any other bony pathology [1,10-14].

In cases of edentulous patients, where there is resorption of alveolar ridge, it is usually seen that the attachment of mucosa and muscles near the denture bearing area effects on retention and stability of denture. This is because of decrease in labial vestibular depth and also the factors like amount and quality of fixed tissue over the denture bearing area [15].

Thus, we can say that the main aim of vestibuloplasty procedure is mainly to improve denture retention and stability [16,17].

In dentulous patients, inadequate vestibular depth along with inadequate attached gingiva causes more food accumulation, thus, leading to poor oral hygiene. It can also cause gingival recessions.

Hillerup S et al, 1987 stated that the vestibular sulcus deepening has mainly three beneficial effects on the stability of mandibular denture [18]. These are:

1. As the mentalis muscle is neutralized, the displacing action on denture flange on this muscle is nullified.

2. As due to the deepening of vestibular space, the extended denture flange provides more stability of denture during mastication.

3. The load bearing area on the anterior region is increased specially in cases more horizontal frontal inclination of the mandibular region.

There are three methods by which the process of Vestibuloplasty may be done. These are mucosal advancement, secondary epithelization and grafting vestibuloplasty. The inclusive criteria for the selection of patients for this technique includes physical status and age of patient [10]. The presence of adequate bone and free mobile mucosa are two features on which the success of this procedure depends, as they provide deepening of vestibule without mucosal tension [19,20]. If quality and quantity of mucosa is not adequate, then submucosal vestibuloplasty is contraindicated, instead secondary epithelization technique should be preferred [12-19].

In cases with inadequate depth or poor quality of mucosa, Kazanjian was the first to describe 'secondary epitheliazation technique' in mandible. In this technique, labial incision was given followed by reflection of large labial and vestibular mucosal flap. The vestibular deepening is done by supraperiosteal dissection and is sutured to the periosteum at the desired depth. The secondary wound healing takes place with contracture of the epithelium . Scar the main disadvantage associated with this technique includes formation of scar, leading to relapse of vestibular depth to some extent [10,12,13].

'Lipswitch Vestibuloplasty' was advocated to overcome these drawbacks of Kazanjian technique. In this procedure, mucosal flap is reflected to cover the alveolar bone and periosteum is reflected to cover the raw surface of lip on labial side [10,21,22]. This will result in epitheliazation of periosteum in 2-3 weeks, without scar formation. Horizontal incision was given on periosteum at the desired depth and inferior posterior margin is sutured to labial mucosal flap. The major advantage with this technique is that it prevents the relapse of vestibular depth [23,24].

In this case, the modified Kazanjian transpositional flap technique (with acrylic stent stabilized with stainless steel screws) was performed. It was a simple procedure that can be performed under local anesthesia. It had provided an acceptable increase in vestibular depth without relapse. There were also absence of open area and less trauma and edema. It was well accepted by the patient. The amount of anterior vestibular depth had increased from 7mm to 19 mm which was measured using standard metal scale.

## CONCLUSION

Modification of Kazanjian transpositional flap technique with acrylic stent balanced with stainless steel screw is a well-tolerated surgical procedure. It can be performed under local anesthesia with satisfactory results. This will invalidate secondary relapse or use of free graft or splint.

## CONFLICTS OF INTEREST

Authors declared that there is no conflict of interest.

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## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All necessary consent & approval was obtained by authors.

## CONSENT FOR PUBLICATION

All necessary consent for publication was obtained by authors.

## REFERENCES

1. House MM. Classification of Osseous, Muscular, and Tissue Conditions of Edentulous Mouths; Nichols, IG: Prosthetic Dentistry, St.Louis: CV Mosby Co., Vol. 2, pp. 90-91
2. AhmedS,Patil M, Haneef M. Comparision between two surgical techniques for vestibuloplasty- a retrospective study; Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology:2020:6(4):199-204.
3. Benuja S, Pradhan S etal .Clark's technique of vestibuloplasty- A Case Report; Journal of napalese society of periodontology and oral implantology. 2020;4(2)(8):93-95.
4. Marzolla C. Cirurgia pre´-prote´tica. Sa˜o Paulo: Pancast, 2002
5. Atwood DA. Bone loss of edentulous alveolar ridges. J Periodontol 1979;50:11Y21
6. Starshak T, Sanders B. Preprosthetic oral and maxillofacial surgery. Mosby: St Louis; 1980.
7. Tallegran A. The continuing reduction of the residual alveolar ridges in complete denture wearers: a mixed longitudinal study covering 25 years. J Prosthet Dent. 1972;27:120–32.
8. Laney WR, Turlington EG, Devine KD. Grafted skin as an oral prosthesis-bearing tissue. J Prosthetic Dent. 1968;19(1):69–79. doi:10.1016/0022-3913(68)90012-7.
9. Macintosh RB, Obweggesser HL. Preprosthetic surgery: A scheme for its effective employment. J Oral Surg. 1967;25:397–413.
10. Starshak T, Sanders B. Preprosthetic oral and maxillofacial surgery. St Louis, MO, Mosby, 1980.
11. Shelton DW. Critical review of preprosthetic surgery, in Irby WB: Current Advances in Oral Surgery, Vol II. St Louis, MO, Mosby, 1977, Pp 362.
12. Kazanjian VH. Surgery as an aid to more efficient service with prosthetic dentures. J Am Dent Assoc. 1935;22(4):566-81.
13. Godwin JG. Submucous surgery for better denture service. J Am Dent Assoc. 1947;34(10):678-86.
14. Trauner R. Alveoloplasty with ridge extension on lingual side of the lower jaw to solve the problem of a lower

dental prosthesis. Oral Surg Oral Med Oral Pathol. 1952;5(4):340-46.

15. Bolender CL, Swenson RD. Cephalometric evaluation of a labial vestibular extension procedure. J Prosthetic Dent. 1963;13(3):416– 31. doi:10.1016/0022-3913(63)90096-9.
16. Alan AQ. The atrophic mandible. Aspect of technique in lower labial sulcoplasty. J Oral Surg. 1978;16:169–78.
17. Rajashekhar VV, Baliga M, Shetty P, Shenoy V. Mandibular anterior Ridge extension: A modification of kazanjian's vestibuloplasty technique. J Oral Maxillofac Surg. 2004;3:26–8.
18. Hillerup S. Preprosthetic mandibular vestibuloplasty with splitskin graft. A 2-year follow-up study. Int J Oral Maxillofac Surg. 1987;16(3):270–8. doi:10.1016/s0901-5027(87)80147-9.
19. Clark HB. Deepening the labial sulcus by mucosal flap advancement: Report of a case. J Oral Surg. 1953;11(2):165-68.
20. Obwegeser H. Surgical preparation of the maxilla for prosthesis. J Oral Surg Anesth Hosp Dent Serv. 1964;22:127-34.
21. Howe GL. Pre prosthetic surgery in the lower labial sulcus. Dent Pract Dent Rec. 1965;16(4):119-24.
22. Kethley JL. The Lipswitch: A Modification of Kazanjian's Labial Vestibuloplasty. J Oral Surg. 1978;36:701-05.
23. Al-Mahdy ABF. Mandibular Anterior Ridge Extension: A Modification of the Kazanjian Vestibuloplasty Technique. J Oral Maxillofac Surg. 1997;55:1057-60.
24. Ponzoni D, Jardim EC, de Carvalho PS. Vestibuloplasty by modified Kazanjian technique in treatment with dental implants. J Craniofac Surg. 2013;24(4):1373-75.