

Clark's Vestibuloplasty: Sculpting The Alveolar Ridge - A Case Report

Dr Zibran Khan

Reader, Dept Of Oral And Maxillofacial Surgery, Pacific Dental College And Hospital, Debari, Udaipur

Dr. Sambhav Kaul

Post Graduate Scholar, Dept Of Oral And Maxillofacial Surgery, Pacific Dental College, And Hospital, Debari, Udaipur

Dr. Ruchit Dave

Post Graduate Scholar, Dept Of Oral And Maxillofacial Surgery, Pacific Dental College, And Hospital, Debari, Udaipur

Dr Akshaya Vaikundam

Post Graduate Scholar, Dept Of Oral And Maxillofacial Surgery, Pacific Dental College, And Hospital, Debari, Udaipur

Abstract

Vestibuloplasty is surgery performed to deepen a shallow vestibule and leads to increase of keratinised gingiva. Different vestibuloplasty techniques are used to deepen the shallow vestibule by modifying the soft tissue attachment. It may turn out to be essential when a rehabilitation of an edentulous patient with a removable denture is going to be done on an alveolar ridge with a poor height, compromising the optimal retention and stability of the denture. There are a variety of operative techniques used to achieve these goals, and each of them has advantages and disadvantages. This paper describes a case of 40-year-old male with the diagnosis of Atrophic mandible who was referred to the Department of Oral and Maxillofacial Surgery, Pacific Dental College, Udaipur, India for increasing the vestibular depth for denture stability. The Clark's technique of vestibuloplasty was performed to achieve benefit of increasing the vestibular depth. There was an increase of vestibular depth after the complete healing of the soft tissues, improving the stability of the denture. The operative technique was relatively simple, easy, and reproducible, allowing its application without any skills.

Keywords: Vestibuloplasty, Clark's technique, Alveolar ridge, Shallow vestibule

Date of Submission: 11-04-2024

Date of Acceptance: 21-04-2024

I. Introduction

When fabricating a complete denture for a patient, one of the most frequent and difficult issues is an atrophic alveolar ridge. The areas that can be used for support are limited by high muscular and membrane attachments, even though the bone basis may be broader. This is frequently a very distressing emotional, physical, and social condition.¹

Alveolar ridge resorption is a continual process that occurs after tooth loss. Denture stability and retention decrease with decreasing denture bearing surface.² Adjacent muscles are observed to attach at or close to the crest of residual ridges as the alveolar processes resorb. The lingual sulcus, labio-buccal vestibule, and remaining gingival tissue all become shallow.^{2,3}

Retention and stability of removable dentures not supported by implants are dependent on the alveolar crest's adequate height. However, a vestibular depth reduction may result from a protracted edentulous crest, alveolar traumatism, or severe periodontitis. A removable denture rehabilitation may be compromised by insufficient remaining alveolar ridge.

Surgery to address these abnormalities was rarely attempted until recently. To get beyond these obstacles, the dentists turned to mechanical methods. In these cases, surgery is performed to support the prosthodontist because, often, we are treating an adverse environment rather than a pathologic problem.⁴

A surgical technique called vestibuloplasty makes it possible for the oral vestibule to become deeper. It is usually recommended in periodontology to thicken the keratinized gingiva and in pre-prosthetic surgery to

rectify the insufficient height of the alveolar ridge.^{5,6,7} Any vestibuloplasty technique's primary goal is to augment the bone foundation so that a denture may be supported and retained in place. Repositioning muscles to reveal more of the mandibular ridge is the method by which it is accomplished.⁸

Although numerous surgical techniques for vestibuloplasty have been documented, the Kazanjian and Clark secondary epithelialization methods as well as the Edlan-Mejchar lipswitch vestibuloplasty are the most well-known and often employed techniques.⁹⁻¹¹ Numerous changes have been made to these techniques, including those that Obwegeser, Godwin, Trauner, Steinhauser, and Tortorelli have detailed. The application of alloderm and xenoderm grafts, or various bioactive materials, is one of the further changes.¹²⁻¹⁴ The novel vestibuloplasty techniques have been documented with the expansion of laser use in oral medicine. These treatments are based on a basic fenestration on the alveolar ridge's soft tissues, without the addition of any flaps, grafts, or biomaterials. However, it does not appear that the subsequent epithelialization in this instance causes the same scarring consequences as those noted in the Kazanjian and Clark techniques.¹⁵⁻¹⁷

This case report presents a 40-year-old male with the diagnosis of Atrophic mandible who was referred to the Department of Oral and Maxillofacial Surgery, Pacific Dental College, Udaipur, India for increasing the vestibular depth for denture stability. The Clark's technique of vestibuloplasty was performed to achieve benefit of increasing the vestibular depth. The rehabilitation with removable denture was indicated in both cases and required vestibuloplasty to deepen the oral vestibule and improve the denture stability.

II. Case Presentation

A 40-year-old male with the diagnosis of Atrophic mandible was referred to the Department of Prosthodontics to the Department of Oral and Maxillofacial Surgery, Pacific Dental College, Udaipur, India for increasing the vestibular depth for denture stability. The clinical evaluation was done, and the depth of the vestibule was 5mm and the length of attached gingiva was 2mm. After proper Anamnesis and clinical evaluation, the Clarks Vestibuloplasty Technique was planned (Fig. 1, Fig. 2, Fig. 3).



Fig 1: Preoperative Extraoral Front profile



Fig 2: Preoperative intraoral (vestibular depth=5mm)



Fig 3: Preoperative intraoral (Length of Attached gingiva=2mm)

Patient was referred to department of prosthodontics for fabrication of acrylic stent so that the proper depth of the vestibule required for denture fabrication is acquired.

Impression was made and cast was poured. The vestibular depth was then increased by trimming the cast and then the material was overflowed so that the idea of the depth of vestibule required for denture fabrication was discerned (Fig. 4).



Fig 4: Acrylic Stent

The surgery was then done under local anaesthesia. After the extra and intraoral asepsis, the 2% Lignocaine was administered. A horizontal crestal incision was performed in the soft tissues of the vestibule from anterior border of ramus to premolar area bilaterally, with the scalpel blade being parallel to the alveolar ridge (Fig. 5).



Fig 5: Horizontal crestal incision

The mucoperiosteal flap was raised supra periosteally and the fibrosis and the muscle insertions were gradually dissected in an apical direction without detaching the periosteum (Fig. 6). The height was corresponding to the desired depth as discerned from the cast (Fig. 7).



Fig 6: Mucoperiosteal flap raised supra periosteally



Fig 7: Required depth reached

The sutures were placed in the depth of epithelial borders of flap and were made to be held by extra-oral bolsters made of cotton to prevent it from coming back to the original position. The sutures were placed

such that one bite was taken on the flap then in the required depth of the vestibule and brought extra orally and fixed around the bolsters(Fig. 8, Fig. 9).



Fig 8: intraoral sutures placed



Fig 9: Extraoral cotton bolsters placed

The patient was given proper instructions and kept on follow up. The postoperative medication consisted of an oral intake of 625 mg of amoxicillin twice a day, 500 mg of paracetamol and iodinated mouth rinse three times per day. The follow-up at 5 days (Fig. 10), twelvedays (Fig. 11) and nineteen days (Fig. 12) allowed us to verify the complete healing of the soft tissues, and to measure the vestibular depth which was 12 mm. The definite rehabilitation was performed with a complete removable denture.



Fig 10: Postoperative Followup (19 days, vestibular depth = 12mm)

III. Discussion

One of the biggest challenges for patients who require a removable denture for rehabilitation after tooth loss is an inadequate residual alveolar ridge. The denture's unsteadiness and the apparatus's malfunction are both uncomfortable. Moreover, the increased pressure that the denture base will place on the alveolar ridge will accelerate the rate at which the alveolar bone resorbs, causing the denture to become unstable.¹⁴

Vestibuloplasty for deepening of a shallow vestibule, is a commonly used procedure.¹⁸ The main goal of this case is to maximise the retention and stability of a prosthetic rehabilitation with a removable denture by extending the associated gingiva, raising the residual alveolar ridge, and creating a deeper vestibule. The primary cause of a shallow vestibule after tooth extraction is ridge resorption. Positive frenal attachment of a hard muscle pull or insertion may be another factor contributing to shallow vestibule.¹⁹ Techniques for vestibuloplasty can be roughly categorised into three groups: grafting vestibuloplasty, secondary epithelization vestibuloplasty, and mucosal advancement vestibuloplasty.²⁰

Mucosal progression depends on the amount of free mobile mucosa in the vestibule and the height of the bone in order to achieve proper depth.²¹ An improved prognosis for the secondary epithelization procedure exists if there is no vestibule and no free mobile mucosa.²² As far as vestibuloplasty techniques go, Kazanjian's method from 1924 was the most widely acknowledged. Kazanjian's method has the drawback of leaving the lip with significant scarring. The labial flap, which has a pedicled off alveolar process and covers the alveolar bone side, is mostly the reason for this scarring. By subsequent epithelization, the labial surface mends. Instead of leaving the bare area on the labial side, Clark (1953) advised pedicling the flap off the lip and raw area to be left on alveolar side.²³

In this case report the simple Clark's technique was performed. The suturing of epithelial borders was done with the required depth of the vestibule which was at risk of relapse.²² To overcome this disadvantage of the technique and prevent it from coming back to original position, it was secured extra orally with cotton bolsters. By realising an interface between the two surfaces of the new vestibule, the cotton bolsters prevented the reinsertion of the dissected muscle fibers. Moreover, the initial depth of the vestibule was estimated by exceeding the desired final depth to compensate the light reduction occurring during the healing process.⁷ The vestibular depth was thus maintained at a reasonable level until the complete epithelialization of the surgical wound.

IV. Conclusion

This case report shows the successful outcome of vestibuloplasty in the mandible. The Clark's technique of vestibuloplasty showed the benefit of increasing the vestibular depth and attainment of a thick gingival phenotype. The surgical technique used in our case allowed us to recreate a vestibular morphology which was compatible with an optimal rehabilitation with removable denture. The deeper vestibule will also make routine oral hygiene possible and prevent the accumulation of plaque as well.

Bibliography

- [1] Landesman Hm, Levin B. A Patient Survey Of Denture Tolerance Before And After A Mandibular Vestibuloplasty With Skin Grafting. *J Am Dent Assoc.* 1975;90(4):806-10.
- [2] Starshak T, Sanders B. *Preprosthetic Oral And Maxillofacial Surgery.* Mosby: St Louis; 1980.
- [3] 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.
- [4] Laney Wr, Turlington Eg, Devine Kd. Grafted Skin As An Oral Prosthesis-Bearing Tissue. *J Prosthetic Dent.* 1968;19(1):69-79.
- [5] S.U. Rahman, K.A. Mattoo, T.M.H. Qassadi. Vestibuloplasty As An Aid To Enhance Complete Denture Stability. *J Med Sci Clin Res.* 2020, 8 (4): 331-334
- [6] S. Ahmed, M.A.R. Patel, M. Haneef. Comparison Between Two Surgical Techniques For Vestibuloplasty – A Retrospective Study. *J Oral Med Oral Surg Oral Pathol Oral Radiol.* 2020, 6 (4):199-204
- [7] B. Shrestha, K.P. Lamichhane, S. Pradhan, R.S. Gorkhali, P.K. Koirala. Clark's Technique Of Vestibuloplasty - A Case Report. *J Nepal Soc Perio Oral Implantol.* 2020, 4 (8): 93-95
- [8] Macintosh Rb, Obweggesser Hl. Preprosthetic Surgery: A Scheme For Its Effective Employment. *J Oral Surg.* 1967; 25:397-413.
- [9] D. Konstantinova, E. Djongova, H. Arnautska, T. Georgiev, S. Peev, M. Dimova. Presentation Of A Modified Method Of Vestibuloplasty With An Early Prosthetic Loading. *J Imab,* 21 (4) (2015), Pp. 964-968
- [10] B.Kalakonda,S.Farista,P.Koppolu,K.Baroudi,U.Uppada,A.Mishra,Et Al.Evaluation Of Patient Perceptions After Vestibuloplasty Procedure: A Comparison Of Diode Laser And Scalpel Techniques. *J Clin Diagn Res.* 2015, 10 (5): 96-100
- [11] A.J. Diaz-Caballero, Dg Del Rio Rocha, J.H. Ricardo. Vestibuloplasty With Edlanmejchar Technique: Description Of Four Clinical Cases. *Univodontol.* 2018, 37 (78).
- [12] C.D. Dhalkari, M.S. Indurkar, O.A. Bagade, A.R. Parate. Godwin's Modification Of Mandibular Labial Vestibuloplasty: A Case Report. *J Med Sci Clin Res.* 2020 8 (4): 532-535
- [13] M.Metin D. Dolanmaz, A. Alkan. Evaluation Of Autogenous Grafts Used In Vestibuloplasty. *J Int Med Res.* 2003, 31: 335-339
- [14] B.C. Sikkerimath, S. Dandagi, S.S. Gudi, D. Jayapalan. Comparison Of Vestibular Sulcus Depth In Vestibuloplasty Using Standard Clark's Technique With And Without Amnion As Graft Material. *Ann Maxillofac Surg.* 2012, 2 (1): 30-35
- [15] S. Nammour, E. Gerges, R.B. Tayeh, T. Zeinoun. Oral Crest Lengthening For Increasing Removable Denture Retention By Means Of Co2 Laser. *Scien World J.* 2014, 5

- [16] K.P. Akhil, R. Paramashiviah, M.L.V. Prabhuji. Vestibuloplasty Following Denture Hyperplasia Resection With Diode Laser. J Indian Soc Periodontol. 2020, 24 (6): 583-587
- [17] M. Kacarska, O. Dimitrovski, D.P. Monevska. Preprosthetic Laser Assisted Mandibular Vestibuloplasty. Balk J Dent Med. 2020, 20: 182-185.
- [18] Ozgul O, Senses F, Er N, Et Al.: Efficacy Of Platelet Rich Fibrin In The Reduction Of The Pain And Swelling After Impacted Third Molar Surgery: Randomized Multicenter Split-Mouth Clinical Trial. Head Face Med. 2015,11:37.
- [19] Natarajan S, Banu F, Kumar M, Lavu V: Management Of Shallow Vestibule With Reduced Attached Gingiva In Fixed Prosthetic Intervention. Cureus. 2019, 11: E4975.
- [20] Cl Hb Jr: Deepening Of Labial Sulcus By Mucosal Flap Advancement. J Oral Surg (Chic). 1953, 11:165-8.
- [21] Chari H, Shaik Kv: Preprosthetic Surgery: Review Of Literature. Ijss Case Reports. 2016, 3:9-16.
- [22] Hillerup S: Healing Reactions Of Relapse In Secondary Epithelization Vestibuloplasty On Dog Mandibles. Int J Oral Surg. 1980, 9:116-27.
- [23] Kayaalti-Yüksek S, Yaprak E: The Comparison Of The Efficacy Of Gingival Unit Graft With Connective Tissue Graft In Recession Defect Coverage: A Randomized Split-Mouth Clinical Trial. Clin Oral Investig. 2022, 26:2761- 70