Case Report

Vestibuloplasty following denture hyperplasia resection with diode laser

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INTRODUCTION

Vestibuloplasty is a surgical procedure performed on the soft tissues of the upper or lower jaw to increase the depth of the vestibule. The primary purpose of this technique is to correct the inadequate depth of the vestibule and also to increase the width of the keratinized gingiva. Placement of dentures and attaining adequate retention is difficult in edentulous mandible and maxilla due to progressive bone resorption. This is the primary reason why patients often suffer from non-retentive complete prosthetic dentures with functional and esthetic limitations, including difficulties with eating and speaking, pain, loss of soft-tissue support, and compromised facial esthetics.

Commonly performed preprosthetic surgical procedures are frenectomy, ridge augmentation, submucosal vestibuloplasty, soft-tissue grafting vestibuloplasty, and secondary epithelial vestibuloplasty. The most widely used procedures for vestibuloplasty are Kazanjian’s technique, Clark’s apically positioned flap, the lip-switch technique with different modifications, and the Edlan-Mejchar technique. Majority of these techniques have been subjected to different modifications by several authors.

MATERIALS AND METHODS

This case report describes the conventional vestibuloplasty technique performed with a diode laser and an aluminum foil used to maintain the vestibular depth until healing is complete.

A 56-year-old female patient, completely edentulous, was referred to the outpatient department with red and swollen palatal mucosa. On clinical examination and history recording, it was found that the patient has been wearing complete non-retentive complete dentures for the past 15 years.

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How to cite this article: Akhil KP, Paramashiviah R, Prabhuji ML. Vestibuloplasty following denture hyperplasia resection with diode laser. J Indian Soc Periodontol 2020;24:583-7.

Abstract:
Denture hyperplasia is a common clinical finding in patients wearing dentures. In this case report, a patient who was treated for denture hyperplasia presented with a post operative complication which led to inadequate vestibular depth. Inadequate vestibule is a common challenge dental surgeons encounter while considering fixed or removable prostheses and implants. Objective is to achieve acceptable retention and aesthetics for the prosthesis by increasing the vestibular depth and also to manage the complication encountered during the resection procedure. Several techniques have been employed to increase the vestibular depth and the width of attached gingiva in the literature. In this case the denture hyperplasia was resected using diode laser which resulted in bone necrosis and opening of the wound post surgically. This was managed with curettage and PRF application. Following this the patient presented with inadequate vestibular depth. Vestibuloplasty was performed with Diode laser to deepen the vestibular depth and augment keratinized tissue to facilitate prosthetic rehabilitation. Three months following vestibuloplasty, patient presented with adequate vestibule. At six months follow up there was sufficient keratinized tissue to facilitate prosthetic rehabilitation. This case presents a unique way of managing a complication encountered after denture hyperplasia resection followed by vestibuloplasty with diode laser. The results obtained were clinically acceptable. PRF provides excellent results when used for the management of surgical complications like wound exposure. Laser technique is optimal for the treatment of soft tissue defects and is proven to be ideal for vestibuloplasty.

Key words:
Denture hyperplasia, diode laser, platelet-rich fibrin, vestibuloplasty
denture for more than 10 years both day and night and have never removed it after it was delivered to her 10 years ago. However, the patient never complained of any discomfort, soreness, or burning sensation. As the bone started resorbing and the soft tissues underneath became flabby, she noticed that the dentures were loosening and that was her primary complaint to visit the dentist.

Severe hyperplasia of the soft tissues (denture-bearing areas) was noted [Figure 1]. The patient was advised to use astringents and antifungal agents to reduce the erythema and also to prepare the tissue for resection. The hyperplastic tissue was then resected with a diode laser.
One week after the surgery, the patient reported back with pain and swelling at the treated area. On examination, there was an exposure of the alveolar bone in the right maxillary quadrant with bone necrosis [Figure 2].
The vestibular depth was already compromised due to the resection of the soft tissue above the alveolar bone crest to facilitate denture placement.

We decided to debride the area with povidone-iodine and saline and close the wound with platelet-rich fibrin (PRF) membrane to attain closure, as necrosis resulted in loss of soft tissue to achieve primary closure [Figure 3].

PRF has been used since a very long time as a wound-healing therapy in mucosal wounds. Recent evidences have suggested its usage in the oral cavity for different treatment procedures. In a healing wound, inflammation and cellular activity lead to increased metabolic demands which require the surgeon to critically appraise and selectively use the growing array of biologic approaches that seek to assist healing by favorably modulating the wound microenvironment. PRF is one such biologic approach to wound healing. [8]

Five milliliters of venous blood was collected from the antecubital fossa of the patient [Figure 4] and was immediately transferred to a sterile test tube. The blood was centrifuged at 3000 rpm for 10 min, following which the PRF was obtained [Figure 5]. The area was anesthetized, and bleeding was induced at the site of infection from the surrounding tissues.

Presuturing was performed with simple continuous suture. [Figure 3] PRF was collected [Figure 4]. A layer of platelet-rich fibrin was inserted and covered on the wound surface. Sutures were tightened and knotted [Figures 5 and 6].

One month after the surgery, the patient was recalled. On examination, she presented with a shallow vestibule on the right maxillary quadrant [Figure 7].

On the same day, vestibuloplasty was performed with a diode laser.

After achieving adequate anesthesia, a deep vestibular incision was given [Figure 7]. The depth of the incision was double the desired depth of the vestibule to facilitate denture insertion and retention.

The diode laser unit used was ARC Fox™ Surgical Laser, (Medical technology manufacturer in Nuremberg, Germany, Europe) 810 nm. The parameters used were 3.0 W in continuous wave mode.

Simple continuous sutures were placed on the buccal wound margins [Figure 8].

A silver foil was cut into the desired shape and depth of the vestibule to be deepened. The foil was then placed into the surgically deepened vestibule and sutured onto the periosteum in the apical end and palatal wound margin in the coronal end. Crisscross braded silk sutures were placed to stabilize the foil [Figures 9 and 10].

The patient was advised not to do vigorous mouth rinsing for 1 week. The sutures stayed in position for a week followed by which the crisscross sutures and foil were removed.

The sutures in the wound margins were removed at 2 weeks postoperatively.

Antibiotics and analgesics for 7 days and nutritional supplements for a month were prescribed.

The patient was recalled 3 months after the surgery. Adequate depth of the vestibule was noted, but there was a lack of keratinized gingiva on the treated area [Figure 11].

At 6-month and 1-year follow-up, the patient presented with good keratinized tissue and adequate vestibular depth. The final denture was then delivered [Figures 12 and 13].

**DISCUSSION**

Bone exposure and necrosis are common complications in extensive oral surgical procedures, the management of which can be challenging as well.

In this case, we opted to close the exposed area with a PRF membrane after careful debridement. Several methods such as collagen dressing and autologous grafts are commonly used to treat such postsurgical complications, with each of them having its own advantages and disadvantages.

PRF offers advantages such as simplified preparation, accelerated healing rate, and autologous blood sample, which make it least antigenic and absolutely no risk of infection transmission and minimal blood manipulation.

Three main growth factors, in high quantities, are released by PRF, mainly transforming growth factor β-1, platelet-derived growth factor AB, and vascular endothelial growth factor, and an important coagulation matricellular glycoprotein (thrombospondin-1) during 7 days. The platelet concentration in PRF is believed to be 87% of the whole blood in a study by Karde et al. in 2017. [9] Apart from these, PRF also secretes epidermal growth factor, fibroblast growth factor, and three important pro-inflammatory cytokines namely interleukin (IL)-1β, IL-6, and tumor necrosis factor-α. PRF membranes are viable material for all types of superficial

**Figure 13:** One-year postoperative picture with denture
cutaneous and mucosal healing due to their mechanical function as a membrane/barrier, angiogenesis-promoting ability, and PRF assist in the remodeling of fibrin matrix into scar in a more resistant connective tissue.\textsuperscript{[11]} Kazanjian in 1924 was the first to introduce techniques to deepen the vestibule in edentulous patients.\textsuperscript{[10]} Several techniques have been developed since 1956, but most of them are unsatisfactory due to scar formation and frequent relapse of the vestibular depth and also due to its invasiveness. Most of the techniques leave the extensive areas of bone exposed and are covered only with a periodontal dressing, which causes severe postoperative discomfort to the patient and may also lead to infection and necrosis of bone.\textsuperscript{[12]} The technique used in this case is the conventional vestibuloplasty which is performed with a diode laser. Diode laser has the potential to reduce bleeding intraoperatively and also to reduce the pain both intra- and postoperatively. It is also relatively simple to execute and the incisions placed are fine and regular.

After conventional vestibuloplasty, an extended flange appliance inserted into the sulcus to prevent wound closure in the deepened sulcus is usually required. Another method is placement of grafts or periodontal dressing for the same purpose, but this is merely impossible in edentulous areas due to lack of teeth to stabilize sutures or dressing. The technique described in our case avoids the usage of any expensive biomaterials or complex appliances and is relatively more feasible and predictable.

**CONCLUSION**

This technique is a one-stage procedure for deepening the vestibule and augmenting keratinized tissue in edentulous areas to facilitate prosthetic rehabilitation. The usage of diode laser probably enhances soft-tissue healing and optimizes the outcome.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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