Laser precision for the flawless fit of the denture -A Case Report

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Abstract

Preprosthetic surgical procedures are critical for achieving long-term success in complete denture rehabilitation. Vestibuloplasty, which aims to increase the depth of the vestibule and improve the denture-bearing area, is particularly beneficial in cases of severe ridge resorption. This case report describes the management of a completely edentulous elderly male patient who presented with inadequate denture retention and stability due to severe maxillary and mandibular ridge atrophy. A laser-assisted vestibuloplasty was performed to enhance the vestibular depth, followed by the fabrication of conventional complete dentures. The intervention led to improved denture fit, stability, and overall patient satisfaction. This report emphasizes the significance of vestibuloplasty as a viable alternative for patients ineligible or unwilling to undergo implant-based rehabilitation.

Keywords: Vestibuloplasty; Preprosthetic surgery; Complete dentures; Residual ridge resorption; Edentulous patient; Laser-assisted vestibuloplasty; Denture retention; Denture stability; Soft tissue management.

Introduction

The success of complete denture prosthodontics largely depends on the anatomical and functional integrity of the denture-supporting structures. Over time, edentulous patients often experience residual ridge resorption, which compromises denture stability, retention, and comfort. Preprosthetic surgical interventions such as vestibuloplasty aim to optimize the supporting tissues, thereby improving the prognosis of complete denture treatment.[1,2]

Vestibuloplasty refers to a group of surgical techniques designed to deepen the oral vestibule by repositioning muscle attachments and expanding the zone of attached mucosa.[3] The goal is to provide an increased denture-bearing surface and enhance the retention and stability of prostheses, especially in cases with severe ridge resorption. While dental implants offer a definitive solution in many cases, their cost and surgical invasiveness may limit accessibility for elderly patients or those with systemic comorbidities.[4]

This case report illustrates the role of laser-assisted vestibuloplasty as a preprosthetic surgical measure in a completely edentulous patient, followed by successful rehabilitation using conventional complete dentures.

Case Report

A male patient presented to the Department of Prosthodontics and crown & bridge, with the chief complaint of dissatisfaction with his existing complete dentures. The dentures, fabricated a few months earlier, exhibited poor retention and frequent dislodgement during speech and mastication.

The patient's medical history was non-contributory. He had been wearing removable complete dentures for over 11 years and had undergone three sets of replacements. Clinical examination revealed severely resorbed maxillary ridge with shallow vestibular sulci as shown in figure 1. The maxillary denture lacked stability and dislodged frequently during functional movements.

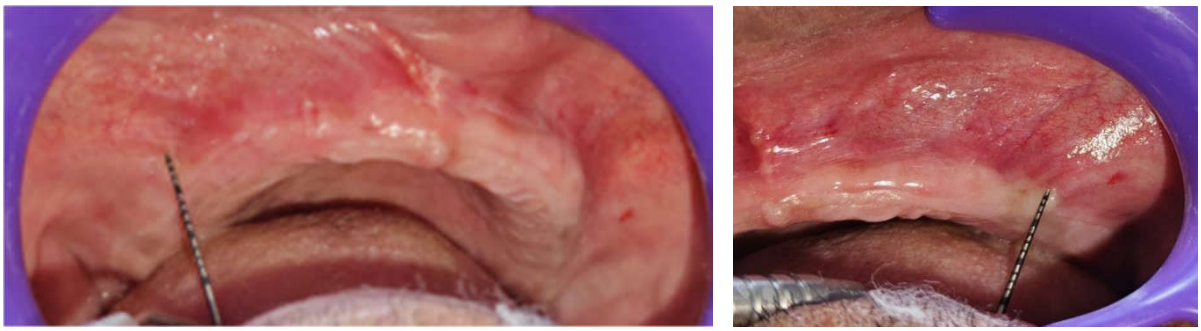

FIGURE 1: PRE-OPERATIVE SULCUS DEPTH

Based on the examination and diagnostic findings, three treatment options were discussed with the patient:

1. Implant-supported fixed prosthesis
2. Implant-supported overdentures
3. Vestibuloplasty followed by fabrication of new conventional complete denture

Due to financial constraints, the patient opted for vestibuloplasty and conventional denture therapy. A laser-assisted vestibuloplasty was performed using a soft tissue diode laser (Woodpecker LX-16) as shown in figue 2. A vestibular incision was made, and the mucosa was repositioned apically using a Clark's technique, under local anaesthesia. The LX-16 operates at a wavelength of 980 ± 10 nm, which is ideal for soft tissue procedures. The laser allowed for precise incision and tissue contouring with minimal bleeding, reduced intraoperative discomfort. Additionally, the use of the LX-16 diode laser promoted faster healing and provided a cleaner surgical field, thereby enhancing the overall success of the pre-prosthetic intervention (FIG 3).

FIGURE 2: SOFT TISSUE LASER- LX 16 (WOODPECKER)

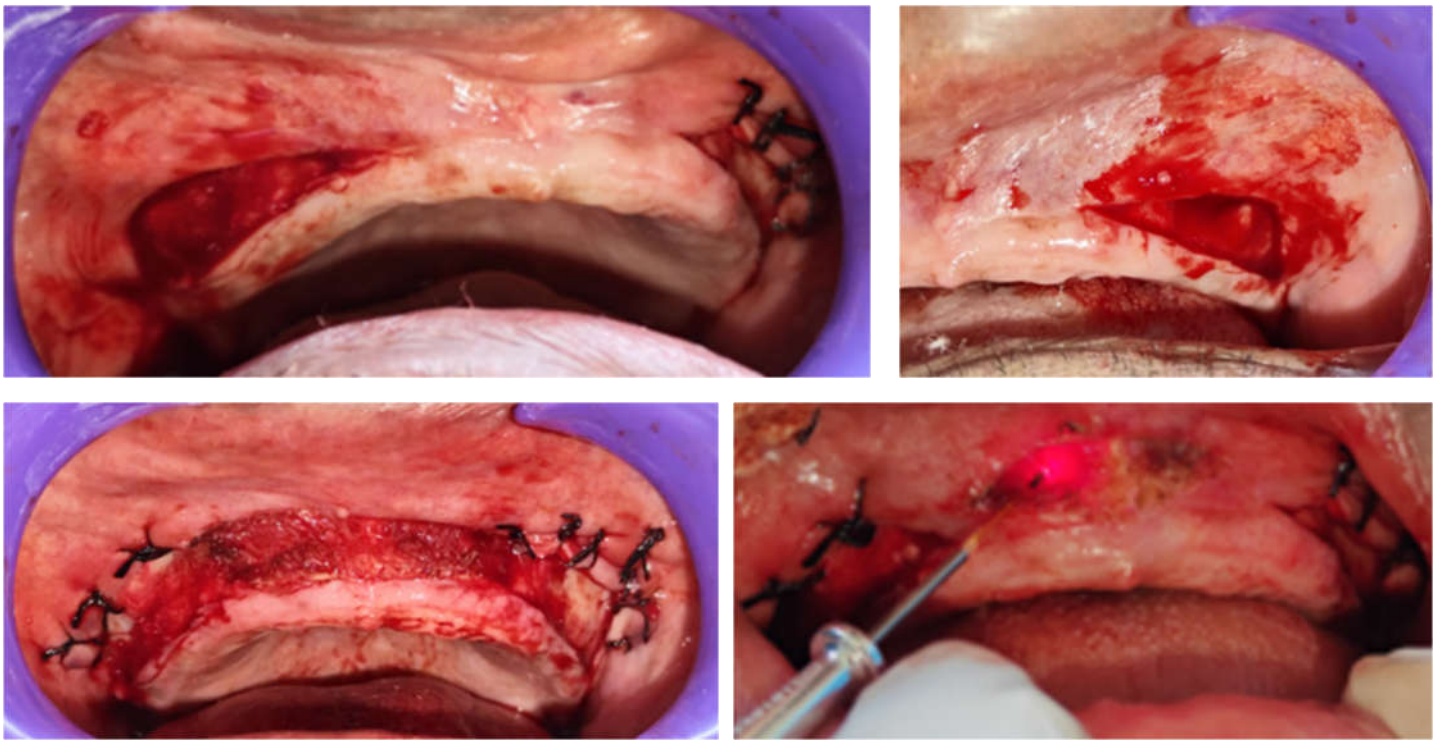

FIGURE 3: VESTIBULOPLASTY DONE

Healing was uneventful, with granulation tissue noted by day 7 and complete epithelialization by the third postoperative week. The vestibular depth increased by approximately 2 mm (FIG 4).

FIGURE 4: PRE AND POST- OPERATIVE SULCUS DEPTH (FROM LEFT TO RIGHT)

Conventional complete dentures were fabricated using standard protocols: primary impressions, custom tray fabrication, border molding, secondary impressions, jaw relation records, try-in, and final denture delivery (FIG 5 & 6).

FIGURE 5: TRY IN DONE

FIGURE 6: DENTURE INSERTION

Patient was kept on follow up for 6 months. The patient reported marked improvement in denture retention and stability, with high satisfaction in terms of comfort, function, speech and esthetics during follow-up visits.

Discussion

Residual ridge resorption presents a major challenge in complete denture prosthodontics. The loss of alveolar bone height and attached mucosa reduces the available denture-bearing area and compromises retention and support. In such cases, vestibuloplasty remains a viable and cost-effective option to restore vestibular depth and improve prosthesis function.[5]

Laser-assisted vestibuloplasty offers several advantages over conventional scalpel surgery, including reduced bleeding, minimal postoperative discomfort, enhanced healing, and greater patient acceptance.[6] In this case, the use of a diode laser facilitated precise soft tissue management with minimal trauma.

Elderly patients are often affected by systemic factors that influence bone remodeling, such as hormonal imbalances and nutritional deficiencies. Estrogen and testosterone levels decline with age, accelerating bone loss and complicating denture fabrication. Nutritional counseling should be incorporated into prosthodontic care, emphasizing the role of vitamin D, calcium, and protein in maintaining oral and systemic bone health.[7]

While implant-supported dentures are increasingly popular, vestibuloplasty continues to be relevant for patients who are medically or financially unsuitable for implant therapy. This case demonstrates that vestibuloplasty can significantly enhance the fit and function of conventional complete dentures, even in elderly patients.

Conclusion

Vestibuloplasty is an effective pre-prosthetic surgical procedure that enhances the retention and stability of complete dentures in patients with inadequate vestibular depth. Laser-assisted techniques further improve the clinical outcomes by promoting faster and more comfortable healing. When combined with comprehensive prosthodontic planning, vestibuloplasty serves as a valuable tool in the rehabilitation of completely edentulous patients, especially those contraindicated for implant therapy.

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