

CASE REPORT

Improving Denture-bearing Area using Diode Laser

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ABSTRACT

The ultimate goal of mouth preparation is to modify the oral environment to render it free of disease and make its form more compatible with the requirements of the complete dentures.

We are reporting a case of improving the denture-bearing area for a complete denture for better retention and stability. The procedures of frenectomy and vestibuloplasty in an edentulous patient were carried out using a diode laser.

Keywords: Diode laser, Frenectomy, Preprosthetic surgery.

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INTRODUCTION

For edentulous patients, successful denture therapy is influenced by the biomechanical phenomena of support, stability and retention. The successful construction of removable full and partial dentures mainly depends on the preoperative evaluation of the supporting hard and soft-tissue structures and their proper preparation.¹

The ultimate goal of mouth preparation is to modify the oral environment to render it free of disease and make its form more compatible with the requirements of the complete dentures.²

Well established preprosthetic preparations can enable the patient to wear the denture comfortably and efficiently. Since the retention, stability and support of a denture depends on the quality and quantity of bone and border seal, every effort should be made to preserve alveolar bone extension. If the frenum is close to the crest of the bony ridge, it may be difficult to obtain the ideal extension and borders of the flange of the denture. It may interfere with peripheral seal of the denture.³ Frenectomy or frenal revision releases a mobile band of tissue that is in contact with the denture. If frenectomy

is not done, problems like dislodgment of the denture or poor retention may be encountered.

Vestibuloplasty is any series of surgical procedure designed to restore alveolar ridge height and or width by lowering muscle attachments and unattached mucosa from the ridge crest of maxilla or mandible to a deeper position.⁴

The most common techniques for pre-prosthetic procedures are: surgical scalpel, electrical scalpel, carbon dioxide laser, erbium:YAG laser, neodymium:YAG laser, and diode laser. Diode laser is one of the best lasers as an alternative to the surgical scalpel on oral soft tissues. Conventional surgical procedures, such as removal of frenum with a scalpel, cause bleeding and postoperative pain, and require sutures and sometimes tissue grafts. In contrast, with diode laser, a dry treatment area is provided, there is minimal pain after surgery, and no sutures are needed. This article describes a clinical case of maxillary frenectomy and mandibular vestibuloplasty in an edentulous patient using diode laser.

CASE REPORT

A 52-year-old male completely edentulous patient reported to the department of prosthodontics for a removable complete denture.

On examination, it was observed that he had a high frenal attachment (Fig. 1) and loss of vestibular depth (Fig. 4) which would be a hindrance for the proper seating of the complete denture.

Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery or by using lasers. The conventional technique involves excision of the frenum by using a scalpel. However, it carries the routine risks of surgery, like bleeding and patient compliance.²

In this case, we decided to use the diode laser (Fig. 7) for pre-prosthetic surgery.

The patient, assistant and the surgeon were protected with laser safety glasses. The local anesthesia used before laser irradiation was minimal.

The power setting for these procedures was 2.8 and 2.5 W for frenectomy and vestibuloplasty respectively in a pulsed mode. High vacuum suction was used continuously to remove the laser plumes.

Figures 2 and 5 show the immediate postoperative status.

The healing of the surgical wound after 7 days is shown in Figures 3 and 6. There was no evidence of any

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Fig. 1: Preoperative view



Fig. 2: Immediate postoperative view



Fig. 3: Postoperative view after 7 days



Fig. 4: Preoperative view

postoperative complications. The complete denture was successfully delivered after 2 weeks.

DISCUSSION

In spite of the various modifications which have been proposed for frenectomy and vestibuloplasty, the widely followed procedure which remains is the classical technique. The classical technique leaves a longitudinal surgical incision and scarring, which may lead to periodontal problems and an unesthetic appearance, thereby necessitating other modifications.⁵

In comparison with conventional scalpel, laser has many benefits, such as ease of soft-tissue ablation, hemostasis, instant sterilization, reduced bacteremia, little wound contraction, reduced edema, minimal scar, reduced mechanical trauma, less operative and post-operative pain, increased patients' acceptance, no or few sutures, no need for topical anesthesia.⁶

Lasers may now be used to perform most pre-prosthetic surgeries. These procedures include hard and soft-tissue tuberosity reduction, torus removal, and treatment of unsuitable residual ridges, including undercut and irregularly resorbed ridges, treatment of unsupported soft tissues, and other hard and soft-tissue abnormalities. Lasers also may be used to treat the problems of

denture stomatitis, and other problems associated with long-term wear of ill-fitting dentures. Stability, retention, function, and esthetics of removable prostheses may be enhanced by proper laser manipulation of the soft tissues and underlying osseous structure.⁶

Soft-tissue lasers are characterized by a high absorption in chromophores found in soft tissue, e.g hemoglobin, resulting in excellent soft-tissue incision, ablation and coagulation performance as well as antimicrobial effectiveness, due to relatively deep highly localized tissue heating.⁷

In the present case, no hemorrhagic episodes or infection occurred during postoperative period. With lasers, a coagulum of denatured collagen on the surface is formed and with laser sterilization of wound, the acute inflammation reaction is delayed and minimal. Reduced pain can be attributed to the fact that the inflammatory reaction associated with laser application is reduced, since blood and lymphatic vessel sealing occurs, with prevention of the extravasation of fluids responsible for inflammation and pain. Moreover, laser irradiation cause sealing of the nerve endings in the surgical contact area and the denaturalized collagen layer formed on the surface of the surgical wound serves to isolate from the oral fluids.

Diode lasers are normally used in soft-tissue procedures and it does not cause any risk of injuring the



Fig. 5: Immediate postoperative view



Fig. 6: Postoperative view after 7 days



Fig. 7: Diode laser

enamel, because the wavelength of diode laser does not interact with the tooth structure. In addition to this, it is relatively low cost and compact.⁸

CONCLUSION

This case report clearly shows that diode lasers have an advantage over conventional methods as it prevents bleeding swelling and postoperative pain associated with these procedures. Thus, clinicians should consider using diode lasers in such procedures as it is of more comfort to the patients and less time consuming.^{9,10}

We were successful in relieving the frenum and increasing the vestibular depth with satisfactory healing in 10 days. It also helps in clean field with good vision, less postoperative bleeding or discomfort. Early recovery is an added advantage, since the patient can be delivered denture early and they can resume their regular activities in lesser time.

The clinicians should understand the basic science of laser, the risks associated with laser and the safety measures to be used.¹¹

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