

Vestibuloplasty using Diode Laser: A Case Report

Dr. Suraksha Subedi,¹ Dr. Rebicca Ranjit,¹ Dr. Soni Bista¹

¹Department of Periodontology and Oral Implantology, Gandaki Medical College, Pokhara, Kaski, Nepal.

ABSTRACT

Inadequate vestibular depth causes deficiency in width of keratinised gingiva which ultimately results in poor plaque control and difficulty in maintenance. Vestibuloplasty is a novel procedure for managing shallow vestibular depth and can be achieved with scalpel, electrocautery, cryosurgery, or laser. With the recent advancements in dentistry, laser therapy has gained popularity over conventional modalities as it is effective yet non-invasive procedure. Among various lasers available, diode lasers are extensively used in oral soft tissue surgery. This case report describes the management of a shallow vestibule using diode laser.

Keywords: Laser therapy; patient compliance; vestibuloplasty.

INTRODUCTION

Optimal vestibular depth helps in oral hygiene maintenance while its inadequacy leads to ineffective plaque control, gingival recession, and compromised aesthetics.¹ This can be corrected by vestibuloplasty technique using scalpel, electrosurgery, cryosurgery, or lasers. Soft tissue lasers have advantages of faster healing, better visualisation, and minimal requirement of anaesthesia. Diode laser is an effective alternative owing to its compact size and affordability.^{2,3} This case report presents management of shallow vestibule in lower anterior region by vestibuloplasty, using diode laser.

CASE REPORT

A 27-year-old female patient reported with complaint of difficulty in placing toothbrush in lower front tooth region for few years. On intraoral examination, gingiva was inflamed with generalised bleeding on probing. Furthermore, shallow vestibule of 3 mm in relation to (irt) 31 (according to two-digit numbering system) and 2 mm irt 41 was recorded using University of North Carolina-15 (UNC-15) periodontal probe (Figure 1, 2). Miller's class I recession irt to 31 and 41 was also noted. The diagnosis of chronic generalised gingivitis with mucogingival deformity irt 31 and 41 was made.

Following clinical examination, non-surgical therapy followed by vestibuloplasty using diode laser was planned.

The patient underwent scaling and root planing, advised with oral hygiene instructions and re-evaluated in two weeks. After obtaining written informed consent and normal complete haemogram values, preprocedural mouthrinse using 2 ml of 0.2% chlorhexidine solution was performed. Extraoral antisepsis was done by 5% povidone-iodine solution (Betadine). Topical anaesthetic was applied to lower vestibule and local anaesthetic infiltration using



Figure 1: Vestibular depth of 3 mm i.r.t 31.



Figure 2: Vestibular depth of 2 mm i.r.t 41.

Correspondence

Dr. Suraksha Subedi

Email: surakshya691@gmail.com

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Figure 3: Placement of diode laser tip.



Figure 4: After vestibular deepening.



Figure 5: Two weeks post-operative.



Figure 6: Vestibular depth of 5 mm i.r.t 31. after 1 month.



Figure 7: Vestibule depth of 4 mm i.r.t 41 one month.



Figure 8: Six months post-operative.

2% lignocaine with adrenaline 1:200,000 was administered. Laser protective eyewear were worn by operator, patient, and assistant. High-speed suction and surgical masks were used to prevent infection from laser plume. Diode laser (iLase™) emitting 940 nm wavelength was used for vestibuloplasty. It was adjusted at 1.5 watt power, pulsed contact mode, continuous pulse duration, and pulse interval of 1.00 ms. The incision was carried out at vestibule area using fibre optic laser tip of 300 µm diameter in a brushing stroke (Figure 3, 4). The procedure was painless with minimal bleeding, reduced intraoperative time, and also precluded the need for sutures. Periodontal dressing (COE-PAK) was then placed over the surgical area. Postsurgical instructions

were given with prescription of analgesic (Ibuprofen 200 mg, if needed) and warm saline rinse (three to four times per day for two weeks). Mechanical tooth cleaning was restricted on the surgical site for the first week with extraoral cold compression for the first day.

After a week, a protein coagulum was seen over the wound with uneventful healing, no pain or any infection. Gingival inflammation had resolved and complete epithelialisation was observed after two weeks (Figure 5). On recall after one month, excellent tissue healing was observed with increased vestibular depth to 5 mm irt 41 and 4 mm irt 31 (Figure 6, 7). On recall at six months, normal colour and consistency of gingiva was maintained (Figure 8).

DISCUSSION

Inadequate vestibular depth may be due to higher insertion of muscles such as mentalis that causes an insufficient width of keratinised gingiva and ultimately poor plaque control. Vestibuloplasty is a mucogingival procedure that aims at surgical modification of gingiva-mucous membrane relationships including deepening of vestibular trough, altering position of frenulum or muscle attachments, and widening of zone of attached gingiva.⁴ Several vestibuloplasty techniques advocated includes Edlanplasty, Kazanjian vestibuloplasty, etc. Most of these have been used as preprosthetic procedures to enhance vestibular depth related to edentulous areas while Clark's vestibuloplasty addresses mucogingival problem associated with dentition.¹

The advents of new technologies with introduction of lasers in dentistry have enabled clinicians to use it effectively for vestibuloplasty. Many literature support the role of various lasers like CO₂, Nd:YAG, Er,Cr:YSGG, Er:YAG and diodes in heightening a predictable outcomes in periodontal therapy.^{2,3}

This case report showed a successful management of shallow vestibule in lower anterior by vestibuloplasty using diode laser. It is an effective and non-invasive substitute to conventional methods. One-month post-operative result showed better healing without any pain or infection with increased vestibular depth without any contraction.

This result take supports from previous studies who had reported that laser treated wound exhibits less scar formation.^{1,5} This may be due to fewer number of myofibroblasts in the lased area resulting in minimal wound contraction.⁵ In accordance with this report's results, several studies reported less perioperative pain.^{1,6,7} The nerves, upon being sectioned, are sealed off with heat

of laser beam resulting in reduced pain.^{2,8} The patient in this study had minimal bleeding and oedema which is also in agreement with earlier studies.^{1,6} This is because tissues and blood vessels with a diameter smaller than laser beam are vaporised, and sealed off with heat of laser beam.⁸ Similarly, lesser post-operative infection could be due to laser's bactericidal effect and capacity of wound sterilisation.⁹ This finding is supported by the result of studies in past.^{1,6}

Good healing was observed post-operatively in this case. This can be justified with formation of a denatured protein coagulum over wound that protects against bacteria and friction from masticatory forces. Similar findings were presented by Kalakonda et al who had shown better post-operative healing outcomes after laser surgery.¹ Likewise, Walsh et al also reported enhanced phagocytic activity by macrophages and mast cell degranulation following laser therapy.¹⁰ These factors ultimately results in an effective wound debridement with slough reduction.

The entire procedure was performed with great precision in incision in lesser time without use of suture and antibiotics which is supported by study done by Kalakonda et al.⁵ This is explained due to effective haemostasis by enhanced stimulation of factor VII for clotting which ultimately reduces post-operative discomfort and also improves patients' compliance.⁴

SUMMARY

This case report presents laser-assisted vestibuloplasty with better patient perceptions and healing outcome with successful enhancement of vestibular depth. Thus, diode lasers prove to be a viable, safe alternative for vestibuloplasty. Despite the described advantages, laser surgery bear hazards and its equipment require higher cost.

Conflict of Interest: None.

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