CASE REPORT

A newer technique of suture placement in scalpel and laser-assisted vestibular deepening

Naila Nehal,¹ Deepti Chandra,² Rais Ahmed,³ Charanjit Singh Saimbi⁴¹Department of Periodontology, CPGIDS, Lucknow, Uttar Pradesh, India²Department of Periodontology, Career Post Graduate Institute of Dental Sciences & Hospital, Lucknow, Uttar Pradesh, India³Department of Plastic Surgery, King George's Medical University, Lucknow, Uttar Pradesh, India⁴Department of Periodontology, King George's Medical University, Lucknow, Uttar Pradesh, India

Correspondence to

Dr Rais Ahmed,
drraischd@gmail.com

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SUMMARY

Surgical vestibular deepening procedures are well established and are being routinely performed. In spite of being an old technique, postoperative results in most of the instances are disappointing. Usually eventual loss of the clinically gained vestibular depth obtained through the surgical procedures occurs. This happens mainly due to rapid epithelialisation of the surgical wound and healing by scarring. Therefore, in the present case, after the initial incision, the labial free end of flap was sutured by a new technique so as to prevent rapid epithelialisation. Finally, the incision was completed and vestibular deepening was achieved with the help of diode laser as they are reported to produce remarkably less scarring at the surgical site.

BACKGROUND

Vestibular depth is defined in the terms of its lower limit, as the point of greatest concavity of the mucogingival junction. Its upper limit may be taken as either crest of lip, incisal edge of tooth, gingival margin or mucogingival junction. Inadequate vestibular depth leads to accumulation of food particles during mastication thus compromising the oral hygiene. This further leads to the progression of gingival recession, and consequently oral health is deteriorated. Therefore, to circumvent these problems, vestibular deepening procedures are undertaken. Traditionally, this procedure is achieved by incising the mucogingival line under local anaesthesia (2% lidocaine with epinephrine) by surgical blade followed by placing a Coe-Pak.

Commonly recommended surgical procedures include Clark's technique,¹ periosteal fenestration

technique² and Naber's repositioned flap³ with a minimal postoperative exposure of bone. Loss of vestibular depth is unavoidable through conventional surgical procedures as rapid epithelialisation and severe contraction or healing by scar is there.⁴ With technological advancement, the introduction of various types of lasers, such as erbium: yttrium-aluminum-garnet, neodymium: yttrium-aluminum-garnet and diode, into dentistry has enabled practitioners to perform new types of vestibuloplasty procedures.⁵ The diode laser is an effective choice for most clinicians worldwide owing to its compact size and affordability. They are used either in continuous or pulsating modes with fibre optic surgical tips. The lasers provides excellent soft tissue ablation, dry surgical area, less postoperative pain, haemostatic characteristics and sterilisation effect and less scarring at the surgical sites.⁶ The special features of laser to give less scarring after surgical procedure is indeed an additional advantage for procedures where scar formation is undesirable such as the surgical procedures of correcting shallow vestibule, that is, vestibuloplasty method.

Moreover, the depth of the vestibule is also lost because there is rapid epithelialisation of the surgical wound postsurgery. Re-approximation of the two edge of the surgical wound or incision can be delayed by suturing one of the edges of flap after first incision. The basic idea of suturing in the present case was obtained from the previous literature on the surgical management of pterygium which is a thickening of outer coating (conjunctiva) of eye that grows into cornea. The authors of the above study had concluded that the growth of the fibro vascular tissue, in the gap created between the conjunctiva and Tenon's capsule after the excision of pterygium, can be stopped by the placement of suture in the gap.⁷ So with this basic idea in mind the present case of vestibular deepening was decided to be treated, and laser was integrated along with this to obtain better results.

Presently reported case is probably the first of its kind, to the best of our knowledge, where this combined surgical protocol, that is, suturing of the epithelium edge and deepening of the vestibule with lasers, was undertaken for the surgical correction of inadequate vestibular depth.

CASE PRESENTATION

A 22 year systemically healthy male reported with the chief complaint of bleeding on brushing from gums in lower jaw. On further questioning, it was known that the patient was not able to do normal

Figure 1 Pretreatment intraoral frontal photograph showing shallow labial vestibule, attachment loss and marginal calculus deposition.

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Figure 2 Intraoperative intraoral photograph showing black silk 000 suture placed along the free edges of the labial flap to fold it inwardly.

brushing movements in lower anterior tooth region. Intraoral examination revealed Miller's grade I recession in relation to 31,32,41,42 regions. The vestibular depth was inadequate being just 2–3 mm in lower anterior region ([figure 1](#)). With detailed history and examination, a provisional diagnosis of 'shallow labial vestibule without underlying pathology' was made. Ultra-sonic oral prophylaxis was done and further investigations were advised.

INVESTIGATIONS

Blood investigation was done and all the parameters were found to be within normal limits.

TREATMENT

Based on clinical features, past and present medical and dental history, and blood investigation, a final diagnosis of 'Shallow labial vestibule without underlying pathology' was determined. Finally, a treatment plan of combined surgical and laser technique along with a new approach of suturing the free labial flap was made. After attaining adequate local anaesthesia with local infiltration (2% lidocaine), incision was made at the base of mucogingival junction with a number 15 Bard Parker blades. Subsequently, black silk 000 sutures were placed along the free edges of the labial side flap to fold it inwardly. The continuous suture was placed starting from distal to mesial direction

Figure 3 Intraoperative intraoral photograph showing the use of diode laser to further increase the depth of vestibule.

Figure 4 Intraoral photograph showing a bloodless clean wound post laser irradiation.

by passing a semilunar needle through external surface of the wound. The needle was passed through the buccal flap of wound by inverting the epithelial margin of wound inwards and was brought back to starting point. The position of flap was adjusted and secured by placing surgeon's knot ([figure 2](#)). Following suturing, the depth of the vestibule was further increased with diode laser ([figure 3](#)). Although the procedure was almost bloodless, the surgical site was irrigated with normal saline ([figure 4](#)). Coe-pak dressing was placed. Oral hygiene instructions were given, and proper medications were prescribed. A 0.2% chlorhexidine mouth rinse was prescribed two times daily for 14 days.

OUTCOME AND FOLLOW-UP

The healing process took an uneventful pathway. The sutures were removed after 14 days, thus allowing epithelium to proliferate and approximate with the opposite side. Adequate vestibular depth of almost 7 mm, measured with Williams probe, was obtained at 6 months postsurgery ([figure 5](#)). Patient was able to maintain oral hygiene easily after the healing period was over. No deleterious effect on root surface was noticed. It was also found that bleeding during and after surgery was minimal. Moreover, it healed with excellent amount of vestibular depth, relieving the tension over the marginal gingiva.

This improved gingival height can be clearly attributed to normalised vestibular depth and the creeping attachment gained due to improved oral hygiene. Hence, patient was saved from further root coverage surgical procedures.

DISCUSSION

Narrow gingiva with a shallow vestibule favours the accumulation of food particles during mastication, thus exerting excessive force on attached gingiva resulting in gingival recession. This condition is further aggravated with hampered oral hygiene measures. Studies have shown that gingival recession increases with age.⁸ If gingival recession is not treated and the oral hygiene is also not taken care of, then the disease progression is faster as compared with the cases in which gingival augmentation procedure has been carried out and oral hygiene is maintained. The present case showed grade I Miller's gingival recession with inadequate vestibular depth. There were plaque and calculus depositions on lower anterior ([figure 1](#)).

The conventional methods are also successful in gaining the adequate depth but there is loss of vestibular depth within few weeks of surgical procedure.⁴ This is due to rapid epithelialisation

Figure 5 Six-month post-treatment intraoral photograph showing an adequate vestibular depth of about 7 mm.

and scarring of tissue postsurgically. However, with the application of this suturing method in the present case, the rapid epithelialisation was regulated to achieve optimum result. This novel approach is likely to be helpful in checking the loss of vestibule depth attained.

Another challenge, as already mentioned, is scar formation due to which about 50% of the clinically gained vestibular depth is lost.⁹ The minimised scarring in laser-assisted surgery can be

Patient's perspective

- I am able to do the brushing movements in lower teeth area easily after the treatment. My teeth are cleaner now than before and the bleeding from gums has also stopped. I am satisfied with the surgical procedure because there was no pain during and after the surgery.

Learning points

- Use of laser for vestibular deepening surgery and suturing the edge of the wound may be advantageous both for the patient and the operator.
- The common problem of rebound of the vestibular depth achieved by surgery due to rapid epithelialisation and scarring of the wound may be checked by suturing the epithelium end and carrying out laser-assisted vestibuloplasty, respectively.
- The surgical protocol is an easy and quick procedure with good quality of healed tissue.
- The vestibular depth attained at the end of 6 month was appreciably 7 mm. This may be attributed to the combined surgical protocol and the newer approach of suture placement.
- Although the case report yielded positive results. Further studies on predictability and outcome of these procedures should be conducted and compared.

attributed to the sparse presence of myofibroblasts in the laser wound. It has been shown that the number of myofibroblasts in laser wounds is three times less than that found in scalpel wounds.¹⁰

This additional property of laser for the management of vestibuloplasty resolves the reported problems of surgical relapse in conventional procedures (scalpel use).¹¹ However, another retrospective study showed no difference between the two treatment modalities.¹² The patient experienced absolutely no pain postoperatively. Previous literatures have mentioned that reduced sensory nerve conduction by laser therapy is one of the major mechanisms in pain relief.¹³ Another advantage of using a diode laser was that it has a strong bactericidal effect, and hence prevents secondary infection of the wound.¹⁴ As they are gentle, the overall patients' acceptance is high. Thus, using soft-tissue diode laser along with suturing of the incised edge is beneficial to the patient and to the operator as the results are more predictable and less stressful to patients and clinicians.

Contributors DC has done the records and NN has done planning of the case. RA was part of planning. Patient was treated together by NN and DC and some literature search was done by NN. NN did the initial manuscript writing. RA did further literature search, prepared the photographs according to the journal and prepared the manuscript and referencing. CSS did the final corrections.

Competing interests None declared.

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