



Vestibuloplasty using Diode Laser: A Case Series

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Abstract

Numerous mucogingival issues include pockets that extend up to the mucogingival junction, inadequate width of attached gingiva, abnormal frenal attachment, gingival recession, inconsistent gingival margin, excessive gingival display, and abnormal gingival colour. One of the mucogingival issues Friedman mentioned in the late 1950s that called for apicocoronal gingival dimension was the shallow vestibule. Vestibuloplasty is the surgical modification of the gingiva-mucous membrane interactions, which includes enlarging the zone of connected gingiva, deepening the vestibular trough, and moving the frenulum or muscle attachments. In this case report, a soft tissue diode laser was used to provide vestibular extension.

Keywords: Vestibuloplasty; Vestibular Depth; Shallow Vestibule; Diode Laser; Mucogingival Problem

Introduction

The vestibular fornix is created where the orofacial muscles attach to the soft tissues that cover the alveolar process. There are two ways to define vestibular depth

- The distance between the crest of the lip and the point on the greatest concavity of the mucobuccal fold vertically below.
- The distance between a point on the coronal margin of the attached gingiva, which corresponds to the base of the gingival crevice, and the point on the greatest concavity of the mucobuccal fold vertically below. This is equivalent to the width of attached gingiva plus the width of alveolar mucosa.

This is equal to the depth of the alveolar mucosa plus the width of the attached gingiva [1].

One of the mucogingival issues mentioned by Friedman in the late 1950s was shallow vestibule. Among the issues with a shallow vestibule are

- Intra sulcular cleaning, also known as the modified Bass method, involves inserting the bristle of the toothbrush into the gingival sulcus. This is not possible in patients with limited vestibular depth. As a result, it hinders oral hygiene practises, which results in inefficient plaque control.
- It weakens the stability and retention of the dentures, increases the risk of gingival recession and degrades aesthetics.

Vestibuloplasty is the surgical modification of the gingiva-mucous membrane associations, which includes expanding the zone of attached gingiva, deepening the vestibular trough, and repositioning the frenulum or muscle attachments [2]. Sulculoplasty, Sulcus deepening process, Vestibular extension procedure, and Sulcus extension technique are further names for vestibuloplasty.

Vestibuloplasty is recommended to slow down the development of gingival recession, to restore the width of attached gingiva, for efficient plaque control methods, for better aesthetics, for improved denture retention and stability, and to prohibit inflammatory changes and tissue recession around implants. It shouldn't be attempted in cases of ridge resorption surrounding implants, chronic periodontitis, traumatic extractions, or bone loss in such locations.

Although the traditional scalpel technique is still the gold standard for vestibuloplasty, the patient may experience pain. During the surgical process, patients who underwent scalpel vestibuloplasty frequently experienced higher post-operative pain and bleeding. Soft tissue lasers in dentistry have a potential future in preventing these issues.

The benefits of using a laser over a scalpel include reduced or no need for anaesthesia, a bloodless surgical site that improves vision for the surgeon, the elimination of sutures, tissue surface sterilisation, less postoperative discomfort, and good healing results.

In this article, vestibuloplasty utilising a soft tissue diode laser is used to treat shallow vestibule in the lower anterior region.

Case Report 1

A 24 year old female patient came with the chief complaint of spacing in upper and lower anterior tooth-bearing region. Patient also complains of difficulty in placing the tooth brush in lower anterior region. Intra oral examination reveals that the vestibular depth of 2 mm seen in lower anterior region (Figure 1). Prior to the fixed orthodontic therapy, Vestibuloplasty was planned in order to correct the shallow vestibule. Vestibuloplasty was carried out by NovoLase Gold soft tissue diode laser with the power setting of 810nm, 2.0 W. A depth of 6 mm was achieved. Periodontal dressing was placed over the raw wound surface till the desired depth. (Figure 2.a, b, and c) Patient was recalled after one week for review. After one week a Protein coagulum was seen to occupy the healing area. Complete epithelialization was observed after 2 weeks. Patient was recalled for regular follow up, in the third, fifth, eighth and ninth month after surgery. Excellent tissue healing was observed and the vestibular depth had increased up to 6 mm after 15 days of healing (Figure 3). The postoperative healing was uneventful, without pain or any signs of infection. Sealing of the blood and lymph vessels minimize the postoperative swelling, while sealing of the nerve endings reduced pain and discomfort. The required vestibular depth was gained and maintained without contraction.



Figure 1: Pre-operative view.



Figure 2: Intra-operative view.



Figure 3: Post-operative view. 15 Days Post-operative healing.

Case report 2

A 26 year old male patient came with the chief complaint of receding gums in the lower anterior region. Intra-oral examination revealed inadequate width of attached gingiva and insufficient vestibular depth of 2mm (Figure 4). Prior to recession coverage procedure, vestibuloplasty was planned to increase the vestibular depth to aid in increasing the width of attached gingiva. Vestibuloplasty was carried out with NovoLase Gold soft tissue diode laser with the power setting of 810nm, 2.0 W. The surgical and post-surgical protocol was the same as carried out for CASE 1. A depth of 8mm was achieved. (Figure 5 A). Stay sutures were placed followed by periodontal dressing. (Figure 5 B and C)



Figure 4: Pre-operative view.



Figure 5: Intra-operative view.



Figure 6: 15 days Post-operative.

Case report 3

A 28 year old male patient came with the chief complaint of spacing in upper and lower anterior tooth-bearing region. He also has difficulty in placing the tooth brush in lower anterior region. Intra oral examination reveals an insufficient vestibular depth of 2 mm in lower anterior region (Figure 7). Prior to the fixed orthodontic therapy, Vestibuloplasty was planned in order to correct the shallow vestibule. Vestibuloplasty was carried out by NovoLase Gold soft tissue diode laser with the power setting of 810nm, 2.0 W. A depth of 7 mm was achieved. (Figure 8 A). Stay sutures were

placed followed by periodontal dressing. (Figure 8 B and C) The surgical and post-surgical protocol was the same as carried out for CASE 1 and Case 2.



Figure 6: 15 days Post-operative.



Figure 7: Pre-operative view.

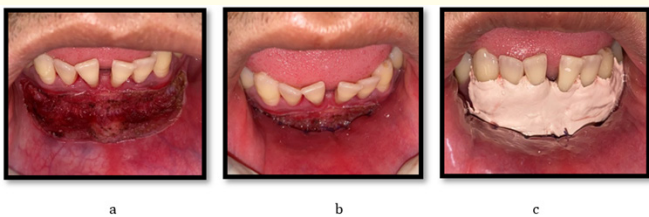


Figure 8: Intra-operative view.

Discussion

A typical vestibule helps maintain healthy dental hygiene and helps minimise plaque. There are times when an anatomical variation, such as a higher insertion of the vestibular mentalis and other associated muscular attachments, causes the vestibular depth to decrease. To make matters worse, the condition is made worse by inadequately keratinized gingiva, a crucial element for maintaining periodontal health [3].

Poor plaque management is caused by insufficient vestibular depth and insufficient width of keratinized gingiva.

Vestibuloplasty, which can be carried out with a scalpel, electrocautery, or lasers, gives the required vestibular depth [4].

With the emergence of new technology and the use of lasers in dentistry, practitioners are now able to perform vestibuloplasty operations using a variety of lasers, including diode lasers, Er. YAG lasers, and Nd. YAG lasers [5].

The Diode laser, a modern non-invasive alternative to the traditional knife procedure, is used for laser vestibuloplasty. Here, the patient's distress was reduced by using a 810nm Novolase Gold

soft tissue laser. Additionally, laser speeds up wound recovery and minimises scarring [6]. Diode lasers with an efficient tissue penetration depth of 2 mm close the tiny lymphatic channels, reducing postoperative edoema [7].

After surgery, there was no discomfort or indication of an infection. According to Kalakonda, *et al.* (2016), patients undergoing vestibular extension procedures with lasers had lower VAS scores for pain and discomfort than those undergoing the procedure with scalpels [4].

In our situation, vestibular depth rose to 6-8 mm in all three cases after 15 days and remained constant without contracting. As a result of the patient's improved ability to control plaque, the prevalence of periodontal illnesses is decreased.

Conclusion

Lasers are a terrific tool and are helpful for soft tissue surgery in contemporary dentistry because of the quick procedures and regular wound healing without sutures. The major barriers to its widespread use may be the cost and the laser safety measures.

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