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### **Laser assisted vestibuloplasty with second stage free gingival unit graft : A case report**

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#### **ABSTRACT:**

Gingival recession presents a significant challenge in periodontal therapy, spurring the exploration of innovative management methods. Laser technology, with its benefits including reduced pain, faster healing, and improved patient compliance, offers promise in addressing this challenge. Traditional scalpel-based vestibuloplasty can cause discomfort and post-surgery complications, while laser surgery is well-tolerated due to its minimally invasive nature and fewer complications. We present two cases where vestibuloplasty was conducted using diode lasers in combination with free gingival unit grafts to treat gingival recession.

#### **Keywords:**

Diode laser, vestibuloplasty, gingival graft, recession, laser surgery

**Introduction:**

Maintaining sufficient keratinized gingiva is crucial for ensuring optimal oral hygiene and periodontal health. Anatomical variations resulting in reduced vestibular depth can affect plaque management and lead to various pathological conditions, including gingival inflammation, challenges with Edlanplasty or Kasanjian procedures, severe recession, vestibuloplasty, and pocket development.[2]

Periodontal plastic surgery plays a vital role in enhancing smile aesthetics and supporting oral hygiene. Shallow vestibules may hinder effective plaque removal, potentially resulting in oral health complications. Moreover, muscular tension in the vestibule and the presence of labial frenulum attachments can contribute to gingival recession. Measuring vestibule depth from the coronal aspect of the attached gingiva to the muco-buccal fold is crucial for assessing oral health. [2]

Vestibuloplasty is undertaken to deepen a shallow vestibule, utilizing various techniques to modify soft tissue attachment. This case report discusses Clark's technique of vestibuloplasty for treating a shallow vestibule and the use of free gingival autografts to augment attached gingiva for addressing Miller's recession. [4]

Diode lasers offer clinical advantages over conventional surgery in vestibuloplasty, including sterilized working areas, reduced need for anesthesia and sutures, and precise hemostasis control due to high hemoglobin absorption. [3]

Class III Miller mucogingival problems present significant complications in periodontics as they involve both soft tissue and underlying bone loss. Traditional methods often fall short of treating these variations due to decreased tissue quality, altered anatomy, and patient-specific factors. [5] Second surgeries have emerged as crucial components in managing Class III Miller cases, enhancing both the aesthetic and functional aspects of soft tissue and reconstructing lost bone when necessary. [6]

Laser integration in free gingival unit graft procedures represents the next frontier in mucogingival surgery, aiming to optimize outcomes and ensure both esthetic and functional success. [3] The clinical application of laser technology in vestibuloplasty involves precise incisions and minimal bleeding, resulting in a clean surgical area and reduced postoperative complications. [8]

The second stage of free gingival unit grafting, typically performed using a scalpel, involves careful harvesting of donor tissue, typically from the palate, and precise placement of the graft in the recipient site to augment keratinized gingiva and improve tissue quality. [4] Combining laser and scalpel approaches in this stage offers an improved method that capitalizes on the strengths of both techniques. [7]

The application of laser technology in both vestibuloplasty and the second stage of free gingival unit graft processes signifies significant advancements in mucogingival surgery, addressing initial tissue changes and subsequent grafting. This combined procedure holds promise for delivering optimal results, enhancing patient satisfaction, and contributing to long-term oral hygiene.

**Case Presentation:**

Two patients presented complaints of receded gums in the lower front tooth region persisting for one year to the Department of Periodontology at Sree Balaji Dental College and Hospital. This case report explores the successful management of gingival recession in these two patients through a comprehensive approach, which included laser vestibuloplasty and second-stage free gingival unit grafts harvested from the palate region.

**CASE 1:**

A 39-year-old man presented with a two-year history of gum recession in the lower front tooth region and difficulty maintaining routine oral hygiene due to a shallow vestibule. He had no previous dental history and did not engage in tobacco chewing habits. Examination revealed missing teeth, attrition, and bleeding on probing, along with gingival recession classified as Miller's Class I & II in relation to teeth 31, 32, 33, 41, 42, and 43. (Figure 1)

After phase I therapy, which included full mouth scaling and gingival curettage in the lower anterior, the patient was advised to undergo vestibuloplasty to address the shallow vestibule, along with a free gingival autograft to augment the thin attached gingiva.

Under local anesthesia, laser vestibuloplasty was performed in the 33–43 region with a power of 1W and surgical tips (Figure 2), followed by depapillation from 42–32 after a two-month healing period. (Figure 3) A free gingival unit graft was harvested from the palate's 24, 25

region and delicately placed from 2-42, secured with 3-0 Vicryl sutures, and complemented with a platelet-rich fibrin (PRF) clot. (Figure 4)

The patient demonstrated effective resolution of complaints, experiencing improved gingival aesthetics and enhanced stability. A follow-up period of one month revealed no complications. (Figure 5)

## **CASE 2:**

A 40-year-old female presented with a three-year history of recessed gums and sensitivity experienced while consuming cool drinks. He had no previous dental history and did not engage in tobacco chewing habits. Examination revealed missing teeth, carious teeth, and bleeding on probing, along with gingival recession classified as Miller's Class I in relation to teeth 31, 32, 33, 41, 42, and 43.

Examination revealed missing and carious teeth, along with inadequate vestibular depth and width of associated gingiva in the lower anterior area. Laser vestibuloplasty was performed under local anesthesia in the 43–33 area, using a power of 1W and surgical tips (white color), followed by depapillation from 41–31 after a two-month interval.

A free gingival unit graft harvested from the palate's 24 region was intricately placed in the 31 region, secured with 3-0 Vicryl sutures, and augmented with a PRF fibrin clot. The patient reported relief from sensitivity, accompanied by a significant improvement in vestibular depth and attached gingival width.

These cases highlight the effective use of laser vestibuloplasty and free gingival unit grafts in treating gingival recession, focusing not just on improving aesthetics but also resolving patient concerns. The comprehensive treatment approach, which includes laser techniques, depapillation, and grafting procedures, showed positive results, prompting further investigation into its clinical applications.

### **Discussion:**

The effective management of gingival recession through a comprehensive approach, which includes laser vestibuloplasty and second-stage free gingival unit grafts harvested from the palate region, highlights the transformative power of modern techniques in periodontal care. The cases discussed in this report serve as compelling evidence of the efficacy of laser technology in addressing mucogingival issues. Importantly, they emphasize not only the enhancement of aesthetics but also the successful resolution of patient complaints.

Vestibuloplasty involves surgical modifications of the gingival mucous membrane, which can include deepening the vestibular trough, adjusting the position of frenulum or muscle attachments, and widening the zone of attached gingiva. [16] There are several types of vestibuloplasty, including mucosal advancement vestibuloplasty, secondary epithelization vestibuloplasty, and grafting vestibuloplasty. [17]

In the current case report, due to inadequate mucosa, secondary epithelization vestibuloplasty was deemed preferable. Kazanjian's technique (1924) serves as the prototype for vestibuloplasty, wherein a labial flap pedicled off the alveolar process is utilized to cover the alveolar bone side, allowing the labial surface to heal through secondary epithelization.

However, a significant drawback of this procedure is the potential for severe lip scarring, leading to reduced lip flexibility. To address this issue, Clark (1953) recommended pedicling the flap off the lip, leaving a raw area on the alveolar side instead of the labial side. Nonetheless, Clark's technique may present challenges such as an unpredictable amount of relapse in gained vestibular depth and scarring of the vestibule. [18]

Laser vestibuloplasty has emerged as a minimally invasive alternative to traditional methods, presenting several advantages such as reduced pain, discomfort, and accelerated healing. The utilization of diode lasers in vestibuloplasty procedures enables precise incisions, efficient hemostasis, and a sterile surgical field. These benefits collectively enhance patient comfort during the procedure and may foster improved compliance with postoperative care. Ultimately, these advantages contribute to enhanced treatment outcomes in periodontal care. [34]

Extensive literature exists regarding the application of diode lasers in diverse soft tissue procedures such as frenectomy, gingivectomy, crown lengthening, gingival depigmentation, and gingival troughing, among others. Our clinical study endeavors to assess patients' perceptions and the healing outcomes following vestibuloplasty, comparing the efficacy of diode laser usage with traditional scalpel methods. Through this investigation, we aim to contribute insights into patient experiences and treatment effectiveness, thereby enriching the understanding of diode laser applications in periodontal surgery. [32, 33]

Diode lasers, with an effective tissue penetration depth of 2mm, are capable of sealing small lymphatic vessels, thereby minimizing post-surgical edema. [20] In our study, the majority of patients in the laser group reported higher comfort levels, attributed to reduced bleeding and postoperative discomfort compared to traditional methods. [2]

The multidimensional treatment approach utilized in both cases, which integrated laser techniques, epithelization, and grafting procedures, resulted in satisfactory outcomes. These



cases not only highlight the effective utilization of laser technology in mucogingival surgery but also underscore the significance of a personalized approach tailored to address each patient's specific clinical needs. [36, 38]

Class III Miller mucogingival issues present intricate challenges, demanding innovative solutions to achieve optimal outcomes. Traditional approaches often encounter limitations in addressing compromised tissue quality and altered anatomy. The integration of lasers in both vestibuloplasty and free gingival unit graft procedures represents a significant advancement, enabling precise modifications and graft placement, thereby enhancing overall treatment success. [10, 14]

The discussion underscores the potential of combining laser vestibuloplasty with second-stage free gingival unit grafts to tackle gingival recession, improve aesthetics, and address patient concerns. The incorporation of laser technology in periodontal care holds promise for shaping the future of mucogingival surgery, optimizing patient outcomes, and contributing to the advancement of periodontology. [31]

### **Conclusion :**

Laser vestibuloplasty and second-stage free gingival unit grafts represent groundbreaking advancements in managing gingival recession, offering reduced discomfort, accelerated healing, and enhanced patient compliance. The combined approach, utilizing both laser and scalpel techniques, showcases the versatility and precision of the treatment protocol. The successful resolution of patient issues, such as improved aesthetics and sensitivity reduction, underscores the overall effectiveness of the treatment. Consequently, free gingival unit grafting emerges as a reliable technique for addressing Miller's class 2 and class 3 recession defects in isolated single or adjacent recession defects in the mandibular anterior region.

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Figure 1: Pre operative



Figure 2: Laser incision followed by vestibular deepening is done 33-43



Figure 3: Depapilation is done 31,41 using 15C scalpel



Figure 4: a) pointing the free gingival unit, b) free gingival unit is placed, c) 3.0 vicryl suture is placed, d) PRF fibrin clot



Figure 5: After 1 months follow up