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# COMPARING DIODE LASER AND SCALPEL TECHNIQUES FOR ASSESSING PATIENT PERCEPTIONS FOLLOWING VESTIBULOPLASTY PROCEDURE: A CASE REPORT

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**ABSTRACT**

Maintaining optimal vestibular depth aids in maintaining good dental hygiene, but inadequate vestibular depth can result in gingival recession, poor plaque control, and reduced aesthetics.[1] This can be fixed with a variety of vestibuloplasty techniques, including the use of a scalpel, cryosurgery,or laser. lasers come in different strengths and wavelengths, and they can be utilized for procedures that would typically be done with a scalpel or electrosurgery. Compared to other surgical methods, laser dentistry produces hardly little heat at all. Dental lasers can be utilized precisely, safely, and successfully to remove soft tissue when used correctly. This case reports is done to the management of shallow vestibular depth using soft tissue laser by scalpel and laser techniques.

## INTRODUCTION

An appropriate vestibule promotes optimal dental hygiene and helps minimize plaque. Anatomical variations, such as a insertion of the vestibular mentalis and different associated muscle groups' muscular attachments, can occasionally bring about a reduction in vestibular intensity . Insufficient connected gingiva and poor vestibular depth make it difficult to control plaque and can lead to pathologic outcomes such pocket formation, recession, and gingival inflammation. A variety of treatment treatments, including vestibuloplasty through secondary epithelization and gingival augmentation using grafts, intended to enhance the vestibular depth. The goal of vestibuloplasty, a mucogingival treatment, is to surgically modify the interactions between the gingiva and mucous membranes. This includes enlarging the zone of attached gingiva, deepening the vestibular trough, and changing the position of the frenulum or muscle attachments..[4]There are variety of vestibuloplasty procedures, including Edlanplasty and Kazanjian vestibuloplasty, have been recommended in the literature. Most of these techniques have been utilized as preprosthetic interventions to enhance vestibular depth in regions that accommodate edentulous dentures. When Clark's vestibuloplasty gained popularity, it was more well-liked for improving vestibular depth and working well to treat the dentition's mucogingival issue.[5,6]The major disadvantages of these traditional methods are more painful producing discomfort and delayed healing and a high chances of relapse. Lasers have gained new popularity in periodontal procedures making clinicians to use variety of lasers Yttrium-Aluminium-

Garnet(Nd: YAG) and diode for vestibuloplasty procedures.[10]Due its low cost and small size, the diode laser has proven to be a useful option for the majority of clinicians across the globe. Semiconductor lasers having a wavelength ranging from 805 to 980 nm are called diode lasers. They are employed with a fiber-optic surgical tip in both continuous and pulsing modes.[11] This case report aims to assess patient perceptions and healing outcomes in the treatment of insufficient vestibular depth, utilizing either a diode laser or a scalpel.

CASE REPORT 1- using soft tissue laser

A male patient of 36 yrs came to the Department of Periodontics complaining of deposits on the teeth. On intra oral examination Gingiva appears to be inflamed bleeding on probing in the lower anteriors with high frenal attachment in lower anterior region 31 region was recorded using Williams Periodontal probe (Fig1,2).On clinical examination patient is well oriented and conscious in time and place, well built. On intra oral examination carious teeth in 26,37,17. Open contact (13,12)(12,11)(11,21),(21,22)(22,23)(33,34), Vestibular pull is seen in lower, anterior region, Inadequate width of attached gingiva, gingival recession class 2-41, class 1 in 42,31,32. After conducting a clinical examination, a non-surgical treatment plan for vestibuloplasty utilizing a diode laser was established. Lignocaine combined with adrenaline in a ratio of 1:200,000 was administered. The Patient Assistant, and the operator all wearing laser safety glassesTo stop laser plume infections, surgical masks and high-speed suction were employed. The vestibuloplasty procedure was performed using the iLaseTM diode laser, which emits a wavelength of 940 nm for vestibuloplasty . It was set to pulse contact mode, 1.5 watt power, continuous pulse length, and 1.00 ms pulse interval. Using a 300 µm diameter fiber optic laser tip in a brushing motion, the incision was made in the vestibule area(Fig3,4).The surgery required no sutures, procedure was painless, and resulted in decreased blood and intraoperative time. Subsequently, the surgical site was covered with COE-PAK periodontal dressing.

A warm saline solution should be used for rinsing three to four times each day for a duration of two weeks. and an analgesic (200 mg of Ibuprofen, if needed) were prescribed along with postoperative instructions. On the first day of the first week, extraoral cold compression A week later, the wound had a protein coagulum covering it, and it was healing without any problems or infections. The patient was reviewed after three days then reviewed after two weeks(Fig 5). After two weeks, the gingival inflammation had subsided and full epithelialization was observed in 2 weeks( Fig 6) .After a recall of six months of time excellent tissue healing was observed normal colour consistency of gingiva was observed.

CASE REPORT 2 using surgical technique

A Female Patient named Ms Usha aged 38 reported to Department of Periodontics with chief compliant of sensitivity in lower front tooth region for the past 6 months. Sensitivity occurs on intake of hot and cold food substances and relived at rest. On General examination patient is well oriented in time and place and well built. On intraoral examination Decayed teeth present 18, open contact in 31 and 41, Examination of Gingiva reveals Class 2 Gingival Recession in31 and 41 and Class 1 in 32 and 42 (Fig 7). Trauma from occlusion is present. Inadequate vestibular depth is present . In the course of the initial consultation, the patient was provided with education and encouragement, underwent comprehensive scaling and root planing of the mouth, received measurements for at-home care, and was given guidance on maintaining oral hygiene. The main concern of the patient will be managed through a vestibular deepening procedure utilizing standard surgical methods. Prior to the operation, the patient's blood pressure was recorded at 120/80 mmHg . Prior to surgery, surgical preparation was completed by rinsing with a povidone iodine solution for thirty seconds. Subsequently, aseptic measures were implemented utilizing povidone iodine in the vicinity of the surgical site. Local infiltration anesthesia was administered with 2% lidocaine combined with 1:80,000 epinephrine on the labial side of the lower anterior teeth . The procedure for enhancing the vein through traditional surgical methods commences with a horizontal incision at the base of the vein, executed with a number 15c blade at a 450 angle (Fig 7& Fig 8). Adjust the vestibule to the base at the necessary depth and execute five interrupted sutures. ( Fig 9 &Fig 10). Irrigation with Normal saline was done and periodontal dressing with (Coe-pak®) was placed in operating area for 7days to reduce bleeding , Prevent tissue relapse and Patient discomfort while eating and drinking. The Patient was given antibiotics for 5 days post operatively along with that 0,2 % of chlorhexidine mouth rinse was suggested. The patient was instructed to follow a soft diet for

one week, in addition to other postoperative guidelines. The patient was scheduled for a follow-up appointment two weeks later for suture removal. (Fig 11). A week following the surgical procedure, satisfactory healing was observed, leading to the removal of the Periodontal Coe-Pack on the fifth day post-surgery. The sutures were subsequently taken out on the fourteenth day after the operation. No pain and discomfort was observed by the patient.

## DISCUSSION

Insufficient vestibular depth may result from the elevated insertion of muscles like the mentalis, leading to a narrow width of keratinized gingiva and consequently hindering effective plaque control. Neckel et al. conducted a study involving 40 patients who underwent vestibuloplasty, utilizing either conventional scalpel surgery or laser techniques. The findings indicated a comparable increase in vestibular height between the two groups; however, the laser group experienced significantly reduced postoperative pain and discomfort.[7] There are several methods of vestibuloplasty such as clark's method, corn's method, Friedman's method, Edlan-Mejchar's Method or Modified Kazanjian's technique, seems to be less effective both in terms of healing process and treatment outcomes.Another study conducted by Haytac and Ozcelik, the perceptions of patients following frenectomies performed using CO2 laser and scalpel techniques were compared. Patients reported a more favorable experience regarding postoperative pain and functionality with CO2 laser surgery compared to traditional scalpel surgery. The article concluded that "CO2 laser presents a safe, effective, acceptable, and remarkable alternative to the scalpel.[8]There are various results that support that laser treated wounds exhibit less scar formation.1,2 The primary drawback of the scalpel procedure, when compared to the CO2 laser, is the potential for intraoperative hemorrhage. Historically, electrosurgery has been employed for vestibuloplasty; however, contemporary studies do not endorse the use of this technique for vestibular extension.

In a study that examined the thermal damage caused by CO2 lasers in comparison to that produced by electrosurgery across various types of soft tissue, Pogrel and his associates determined that the comparatively narrow width of thermal tissue necrosis associated with CO2 laser excision renders it more advantageous for histological analysis of excised specimens than the results obtained from electrosurgery . [9] Laser vestibuloplasty offers numerous benefits compared to traditional surgical methods, including reduced intervention time, enhanced precision in incisions, improved asepsis, effective analgesia, minimized blood loss, and limited inflammation and edema. This is achieved as the laser vaporizes tissues and blood vessels that are smaller than its beam diameter, while the heat generated by the laser effectively seals off nerves when they are cut. The advent of new technology of lasers in dentistry have enabled the clinician to use it effectively for vestibuloplasty. Evidence support that various lasers such as CO2, Nd:YAG, Er,Cr:YSGG, Er:YAG and diodes in heightening a predictable outcomes in periodontal therapy. Surgical techniques also have equal advantage over laser technique in minimal inflammation, such as absence of redness, pain and bleeding.

## CONCLUSION

Laser are very vast and considered to be an helpful procedure in soft tissue surgeries because of its quick procedure and quick healing without sutures.It also has its own barrier due to its cost and laser safety measures.Surgical procedure has its own advantage in its healing outcomes has better patient's perception .

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Fig 1 & Fig 2 Vestibular depth measuring 3mm using Williams periodontal probe

Placement of Diode laser tip

Fig 3 Placement of laser diode tip

After Vestibular Deepening

Fig 4 after vestibular deepening

Post operative after 2 weeks

Fig 5Post operative care after 3 days

Post operative after 3 days

Fig 6 Post operative care after 2 weeks

Preoperative photograph

Fig 7 Pre operative photograph

Surgical incision using scalpal

Fig 8 surgical incision using scalpal

Vestibular Deepening using Scalpal

Fig 9 Vestibular deepening using scalpal

Suturing placed

Fig 10 sutures placed

Postoperative after 2 weeks

Fig 11 postoperative 2 weeks