Case Report

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Maxillary Labial Frenectomy By Using Conventional Technique and Laser-A case report

Abstract:
A thick or aberrant frenum can indeed be categorized as a mucogingival issue. This condition occurs when the frenum is positioned or developed in a way that interferes with oral health and aesthetics.A labial frenectomy is a complete removal of the frenum attachment, which typically attaches to the space between the upper two anterior teeth and the centre of the upper lip.Traditional scalpel methods, laser treatments, and electrocautery have demonstrated effective results of frenectomy , but each has its drawbacks."
This article presents two case reports of comparison of maxillary labial frenectomy by using conventional technique and Laser.

Key-words: Periodontology, Frenectomy, Lasers, Scalpal,Frenectomy Techniques

Introduction:

The frenum is an anatomical structure derived from the Latin word "fraenum." It consists of a membranous fold made up of mucous membrane, connective tissue, and occasionally muscle fibers. Various frena are found in the oral cavity, with the most commonly noted being the maxillary labial frenum, the mandibular labial frenum, and the lingual frenum. These structures play important roles in oral function and can impact both health and aesthetics.[1]

An aberrant frenum can contribute to gingival recession when it is overly attached to the gingival margin. This can occur due to muscle pull, which opens the gingival crevice, or as a result of improper toothbrush placement that irritates the gums. Both factors can compromise gum health and lead to further complications if not addressed[2].

Frenum has been classified by Placek et al (1974) depending upon the extension of the attachment fibers as: [3]

1. Mucosal :

Here the frenal fibers are attached to the mucogingival junction

2. Gingival:

Here the fibers are inserted within the attached gingiva

3. Papillary:

Hhere the fibers are extending into the interdental papilla

4. Papilla penetrating :

Here the frenal fibers cross the alveolar process and extend up to the palatine papilla.

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Papillary and papilla-penetrating frena are classified as pathological conditions and have been linked to various issues, including: Gingival Recession, Loss of Papilla, Midline Diastema, Malalignment of Teeth, Denture Fit and Retention Issues.[4,5]

Abnormal frena can be diagnosed visually using the Blanching test, also known as the Tension test. This involves moving the upper lip outward and downward, and the lower lip outward and upward. If the gingival margin exhibits movement or blanching occurs due to ischemia, the test is considered positive, indicating that the frenum is aberrant.[6]

According to Olivi et al, clinical indications for frenum removal include:[7]

1. Abnormal frenum with inflamed gingiva due to poor oral hygiene .
2. Abnormal frenum associated with inflamed gingival recession .
3. Maxillary frenum associated with Diastema after complete eruption of permanent canines.
4. Abnormal maxillary frenum (Class III or IV), resulting in the presence of a diastema during mixed dentition.
5. Abnormal mandibular frenum with high insertion leads to the onset of gingival recession,

The treatment of aberrant frena can be accomplished through either frenectomy or frenotomy procedures:[8]

- **Frenectomy**: This procedure involves the complete removal of the frenum, including its attachment to the underlying bone. It is often indicated when the frenum significantly impacts oral health or aesthetics.
- **Frenotomy**: In contrast, frenotomy involves the relocation of the frenal attachment, rather than complete removal. This approach may be used to improve function while minimizing trauma to the surrounding tissues.

There are various surgical techniques of frenectomy which include Classical frenectomy by Archer and Kruger, Millers technique (unilateral single pedicle flap), Schuchardt Z-plasty, V-Y Plasty, Frenectomy using electrocautery, Laser – Diode,CO2, Nd:YAG, Er:YAG and other soft tissue lasers.[9]

The conventional technique involves using a scalpel to excised the frenum. In fact, it holds the routine risks of surgery such as bleeding and patient compliance.

Frenectomy by using lasers is beneficial it provides excellent haemostasis with the decreased precondition for sutures.[10]

The present case report shows the comparison of frenectomy by conventional technique and by lasers.

Case Report 1:

A 24 year old male patient presented with the chief complaint of spacing between the upper anterior teeth and the patient was referred from the department of orthodontics for frenectomy.

Patient's medical history was not significant. Intraoral examination showed papillary type hypertrophic labial frenum between maxillary central incisors. After taking patient's consent it was decided to do frenectomy with classical technique by Archer (1961) and Kruger (1964).

Armamentarium :

Scalpel blade no.15, Gauze pieces, Tissue forceps, Silk sutures, Hemostat, Scissors.

Fig.1:Maxillary labial frenum (Papillary type) between maxillary central

Technique:

Step 1: The frenum was engaged with a haemostat which was inserted into the depth of the vestibule and the incision with the 15 no scalpel blade was placed on the upper and the lower surface of the haemostat until the haemostat was free. The triangular resected portion of the frenum with the haemostat was removed, which leaves a rhomboid area exposing the deeper connective tissue fibers. (Fig. 2)

Fig. 2

Step 2: Dissection of muscle fibers was done on the bone.

Fig. 3

Step 3: The edges of the diamond shaped wound were sutured by using 3-0 black silk with simple interrupted sutures. (Fig.4)

Fig.4

Fig..5 and 5b shows post operative healing after 1 week.

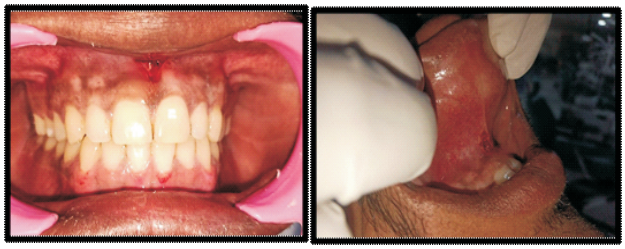

Fig.5A **Fig.5B**

Case Report:

A 14 year old female patient presents with chief complaint of mild spacing between the upper front teeth and the patient was referred from the department of orthodontics for frenectomy.

No significant medical history reported The clinical examination revealed the presence of papilla penetrating type hypertrophic labial frenum and midline diastema between the central maxillary incisors (Fig. 6a and b)

The treatment of choice was to perform laser frenectomy after complete evaluation and detailed history. Informed consent was obtained from the patient to perform frenectomy after explaining the intra and postoperative aspects. The frenectomy performed with a wavelength of 980 nm with photon plus diode laser.

The laser was operated at a power of 3.0 watt in continuous wave mode with 400 µm optical fiber.

Fig.5A **Fig.5B**

Local anesthesia was administered and laser fiber was applied vertically and laterally to the frenum, which initially disrupted the continuity of the mucosa. (Fig. 7)

This made it easy to access in performing a deeper cut of the frenum in a horizontal dimension. (Fig. 8)

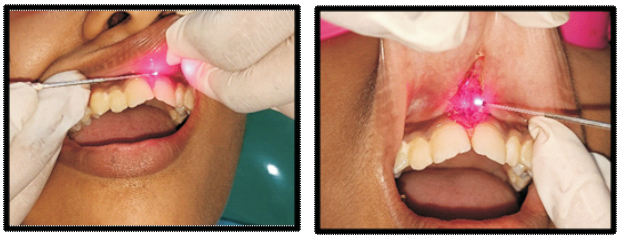

Fig.7 **Fig.8**

Wave length Specific goggles were worn by the patient and all the staffs throughout the procedure and high speed evacuation was used to reduce the slight charred odor and to remove the laser plume.

Fig. 9a **Fig.9**

Hemostasis was achieved without suturing .According to the report of the patient there was no post-operative complications (Fig.9a and b)

Fig. 10a and b Showed postoperative view after one week. Also improved oral hygiene with easy access to the cervical region was claimed by the patient.

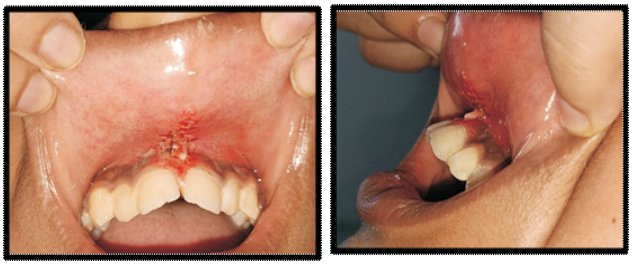

Fig.10a **Fig.10b**

Discussion:

Frenal anomalies can indeed have significant effects on both periodontal health and aesthetic outcomes. They can lead to issues such as gum recession or inflammation, which compromise the health of surrounding tissues. Furthermore, these anomalies can complicate orthodontic treatments by affecting tooth positioning and alignment. In the case of dentures, they can impact retention, leading to discomfort and potential difficulty in maintaining the prosthetic.[11]

The commonly practiced classical frenectomy technique was popularized by Archer (1961) and Kruger (1964).[12]

Various surgical approaches have been developed to address high frenal attachments, each with specific benefits.[13,14]

1. **Miller's Technique**: This method involves excising the frenulum and repositioning the mucosal flaps to promote healing and reduce tension on the attached tissue.

2. **V-Y Plasty**: This technique involves creating a "V" shaped incision and then suturing it into a "Y" shape, which allows for greater flexibility and tension relief in the mucosa.

3. **Z-Plasty**: This approach uses a Z-shaped incision to rearrange tissue, which helps to lengthen the frenulum while also improving the aesthetic appearance of the area.

4. **Paralleling Technique**: This technique involves cutting parallel incisions to minimize scar formation and maintain the natural contour of the mucosa.

Each of these methods aims to improve functional and aesthetic outcomes while addressing the challenges posed by high frenal attachments. The choice of technique often depends on the specific clinical situation and the practitioner's preference.

In the classical frenectomy technique involves the complete removal of the frenulum along with some interdental tissues and palatine papilla. While it effectively addresses high frenal attachments, this method can lead to several drawbacks like-long Incision,widens the wound causing pain and excessive bleeding, and scars the area leading to an unpleasant appearance.[15]

Lasers have emerged as a valuable alternative to conventional techniques for various intraoral soft tissue surgical procedures. With wavelengths ranging from 488 nm to 10,600 nm, these non-ionizing radiations minimize the risk of cellular DNA mutations associated with ionizing radiation.[16]

Advantages of Using Diode Lasers:Selective Tissue Interaction,educed Bacterial Load,Excellent Hemostasis,Minimized Discomfort,Faster Healing.[16]

In contrast to conventional surgery, the claimed benefits of lasers include -1. Increased coagulation yielding a dry surgical field and improved visualization .[17]

2. The ability to negotiate curvatures and folds within tissue contours.
3. Tissue surface disinfection and consequently, decrease in bacteraemia.
4. Reduced distension, edema, and scarring.
5. Decreased pain6. Faster healing response.
7. Increased patient appreciation.

Once laser cutting begins, the heat generated effectively seals small blood and lymphatic vessels, significantly reducing or even eliminating blood flow and edema. The laser action denatures proteins in the tissue and plasma, creating a "coagulum" layer that protects the wound from bacterial contamination and friction.[18]

The superiority of laser over conventional scalpel method has been suggested in many studies, including hemostasis effect, excellent visualization of the operating field, reduce2d operating time, less need for local anesthesia, sterilization of wound site, elimination of suturing, reduction of post-operative edema, pain and minimum scarring.[19]

A 2008 article by Kara compared an Nd: YAG laser to conventional scalpel surgery and reported that laser-treated patients reported greater rates of satisfaction, less postoperative pain, and fewer functional problems that impacted chewing or speech.[20]

Haytac and Ozcelik compared 20 frenectomy procedures conducted with a CO2 laser to 20 with standard scalpel surgery and reported less pain after one day and seven days in patients treated with the laser. [16]

Awooda et al. performed frenectomy in eight patients with diode laser and showed dry and bloodless field during surgery, no post-operative swelling, no pain or discomfort, with normal healing process. Due to its time saving, patient convenience and simple manipulation, the authors recommend the use of laser for soft tissue surgery.[16]

Indeed, while all laser wavelengths can be utilized for performing a frenectomy, the choice of laser impacts penetration depth significantly.[16]

1. **Diode and NdLasers:**

- **Penetration Depth:** Approximately 500 µm.
- **Benefits:** Their deeper penetration allows for effective treatment of thicker tissues but necessitates careful monitoring of settings to avoid thermal damage to the underlying periosteum and bone.

2. **Erbium and CO2 Lasers:**

- **Penetration Depth:** Ranges from 5 to 40 µm.
- **Benefits:** These lasers are better suited for superficial procedures, offering more precise tissue removal with minimal thermal spread, which helps protect deeper structures.

With use of the right parameters (spot size, power, hand speed), one pass of the laser should be sufficient to severe all of the fibers. If multiple passes are needed, care must be taken to prevent excessive lateral thermal necrosis from re-exposure of the already treated tissue. The laser incision is continued to undermine the muscle attachment until the periosteum is reached. All lasers are effective for a frenectomy with settings that the manufacturer suggests. Care should be taken not to char the tissue, with consequent thermal tissue damage.[12]

There are following drawbacks of Laser frenectomy-

1. **Cost:** Diode lasers are often expensive, which can be a barrier for some dental practices.
2. **Special Equipment:** They require specific equipment that may not be available in all dental offices.
3. **Additional Skills Needed**: Operating a diode laser demands specialized training and skills, limiting its use to practitioners who have undergone this training.
4. **Fume Production:** The vaporization of epithelial tissue during the procedure can release fumes with a burning smell, potentially causing discomfort or stress for the patient. Using a powerful air evacuator can help mitigate this issue.
5. **Longer Procedure Time:** The time required for frenectomy with a diode laser may be longer compared to traditional techniques, which can affect workflow.
6. **Incomplete Dissection:** Diode lasers may not allow for complete dissection of muscle fibers from the periosteum, increasing the risk of reattachment of the frenum. In contrast, conventional scalpel techniques provide more thorough access to muscle fibers, reducing this risk.

Conclusion:

Frenectomy involves the removal of the frenum and should be carefully considered due to potential complications. Conventional techniques and laser procedures each have their advantages and disadvantages. For example, conventional methods may offer better control in certain cases, while lasers can reduce bleeding and promote faster healing. Additionally, cost-effectiveness is an important factor in treatment planning, as it can influence the choice of technique. Overall, a thorough assessment of the patient's specific needs and circumstances is essential for selecting the most appropriate approach

References:

1. MPriyanka Pamela Emmadi N Ambalavanan R Sruthi T Ramakrishnan An overview of frenal attachmentsJ Indian Soc Periodontol
2. SM Mintz MA Siegel PJ Seider An overview of oral frena and their association with multiple syndromic and nonsyndromic conditionsOral Surg Oral Med Oral Pathol Oral RadiolEndod.
3. Mirko P, Miroslav S, Lubor M. Significance of the labial frenum attachment in periodontal disease in man. Part I. Classification and epidemiology of the labial frenum attachment. J Periodontol1974;45:891-4
4. B F Dewel The labial frenum, midline diastema and palatine papilla: A clinical analysisDent Clin North Am196617584.
5. M E Diaz-Pizan M O Lagravere R Villena Midline diastema and frenum morphology in the primary dentitionJ Dent Child (Chic)200626114
6. P D Miller The frenectomy combined with a laterally Positioned pedicle graft; functional and aesthetic considerationJ Periodontol1985561026
7. G Olvi G Chaumanet M D Genovese C Beneduce Andreana S The Er Cr:YSGG Laser labial frenectomy : a clinical retrospective evaluation of 156 consecutive casesGen Dent20105812633
8. Miller PD. Reconstructive periodontal plastic surgery mucogingival surgery). J Tenn Dent Assoc. 1991;71:14–8
9. K K Chaubey V K Arora R Thakur IS Narula Perio-esthetic surgery: Using LPF with frenectomy for prevention of scar J Indian Soc Periodontol2011153265
10. Kafas P, Stavrianos C, Jerjes W, Upile T, Vourvachis M,

Theodoridis M et al, Upper-lip laser frenectomy without infiltrated anaesthesia in a paediatric patient: a case report. Cases J 2009;2:7138. 1-3

11. Devishree, Gujjari SK, Shubhashini PV. Frenectomy: a review with the reports of surgical techniques. J Clin Diagn Res. 2012 Nov;6(9):1587-92.
12. Neetu, Sakshis Mehta, Neena Vats, Shobna Thind, Sourabh Jindal. An overview of frenectomy: A review. International Journal of Medical and Health Research.2021; 7(4): 13-15
13. Sæthre T, Berg E, Bunæs DF, Leknes KN. Complication following frenectomy: A case report. Clin Case Rep. 2021 Oct 4;9(10):e04888.
14. Devishree, Frenectomy: A Review of the Reports of Surgical Techniques. J Clin Diagn Res 2012;6(9):1587-92.
15. Archana N.V* , Paul J, D'Lima JP, parackal ST, Thomas D, Akhil S. Maxillary labial frenectomy by using conventional technique and laser – Report of two cases. Int Dent J Student Res 2020;8(1):27-32.
16. Haytac MC, Ozcelik O. Evaluation of patient perceptions after frenectomy operations: A comparison of carbon die oxide laser and scalpel techniques. J Periodontol 2006;77(11):1815-19.
17. Mangalekar SB, Kaushal L, Johnson L, Soni A, Thakur P. Maxillary labial frenectomy using diode laser and classical technique: A case report. Int J Oral Health Med Res 2015;2:48-50
18. Kotlow L. Diagnosis and treatment of ankyloglossia and tied maxillary frenum in infants using Er.YAG and 1064 diode lasers. Eur Arch Paediatr Dent 2011;12:106-12.
19. Kara C. Evaluation of patient perceptions of frenectomy: A comparison of Nd: YAG laser and conventional techniques. Photomed Laser Surg 2008:26(2):147-52.
20. AwoodaEM,OsmanB,Nadia A Yahia.Use of Diode Laser (810)nm in frenectomy. Sudan JMS 2007:2(1)