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RESEARCH ARTICLE

MAXILLARY LABIAL FRENECTOMY: DIFFERENT APPROACHES

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ABSTRACT

The frenum is a tissue fold which act as a bridge in the oral vestibule that connect the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum. The aberrant frenum may jeopardize the gingival health, either due to interference in the plaque control or due to a muscle pull. In addition to this, the maxillary frenum may present aesthetic problems or compromise the orthodontic result in the midline diastema cases and causing a recurrence after the treatment. The management of such an aberrant frenum is accomplished by performing a frenectomy. The present article is a compilation of a series of clinical cases of frenectomy which were approached by various frenectomy techniques.

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INTRODUCTION

Now a day's aesthetic is one of the prime most concerns for seeking dental treatment. Continuing the presence of midline diastema between maxillary central incisors considered as one of the esthetic problem among adults. Aberrant maxillary labial frena, one of the etiological factors for this, which led to management of these aberrant frena, become essential. The frena may also jeopardize the gingival health by causing a gingival recession when they are attached too closely to the gingival margin, either because of an interference with the proper placement of a toothbrush or through the opening of the gingival crevice because of a muscle pull (Jhaveri, 2006). A frenum is a mucous membrane fold which contains muscle and connective tissue fibers that attach the lip and the cheek to the alveolar mucosa, the gingiva and the underlying periosteum (Jhaveri, 2006). The maxillary labial frenum develops as a post-eruptive remnant of the ectolabial bands, which connect the tubercle of the upper lip to the palatine papilla. When the 2 central incisors erupt widely separated, no bone is deposited inferior to the frenum. A V-shaped bony cleft between the two central incisors and an abnormal frenum attachment results (Huang, 1995). The abnormal frena are detected visually by applying tension over the frenum to see the movement of the papillary tip or the blanch which is produced due to ischemia in the region. The labial frenal attachments have been classified by Placek et al. (1974):

- Mucosal – when the frenal fibers are attached up to the mucogingival junction.
- Gingival – when the fibers are inserted within the attached gingiva.
- Papillary – when the fibers are extending into the interdental papilla.
- Papilla penetrating – when the frenal fibers cross the alveolar process and extend up to the palatine papilla.

The frenum is characterized as pathogenic and is indicated for removal when the aberrant frenal attachment causes a midline diastema, gingival recession and difficulty in maintaining oral hygiene and inadequate attached gingiva with shallow vestibule.

The aberrant frena can be managed by *frenectomy* or by *frenotomy*. *Frenectomy* is the complete removal of the frenum including its attachment to the underlying bone, while *frenotomy* is the incision and the relocation of the frenal attachment (Dibart). Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery or by using lasers. The conventional technique involves excision of the frenum by using a scalpel. Since the conventional procedure of frenectomy was first proposed, a number of modifications (Kahnberg, 1977) of the various surgical techniques like the Miller's technique, V-Y plasty and Z-plasty have been developed to solve the problems which are caused by an abnormal labial frenum. This present article aims to outline the five different surgical approaches, which were employed for treating aberrant maxillary labial frenum.

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CASE REPORTS

Case-1

A 28 years old female patient referred to the Department of Periodontology with a chief complaint of midline diastema between maxillary central incisors. On examination aberrant maxillary labial frena with papilla penetrating type attachment found (Fig 1a). The classical frenectomy procedure was planned to remove frenum. Local infiltration is given to anesthetise the selected site by using 2% lignocaine with 1:80000 adrenaline. Frenum was engaged with a haemostat, which was inserted into the depth of the vestibule and incisions were placed on the upper and undersurface of the haemostat until the tissue became free (Fig 1b). The triangular resected portion of the frenum was removed along with the haemostat. The incision also made from the bottom of the frenal attachment on the labial surface to the palatine area to remove the fibrous attachment that crossing the interdental papilla. A blunt dissection was done to relieve the fibrous attachments (Fig 1c). Interrupted sutures were applied at the edges of diamond shaped wound with 4-0 black silk (Fig 1d). Sutures were removed 1 week post-operatively (Fig 1e). The post-operative sequelae at 1 month of follow-up included unaesthetic or labial tissue scarring (Fig 1f).

Case-2

A 15 years old female patient referred to the department from the department of Orthodontics. On examination aberrant maxillary labial freana with positive tension test was found. It was papillary type attachment causing the deflection of the interdental papilla leading to food accumulation & difficulty in oral hygiene maintenance (Fig 2a). The case treated with V-Y Pasty technique. The area was anaesthetized with a local infiltration by using 2% lignocaine with 1:80000 adrenaline. The frenum was held with the haemostat and an incision was made in the form of V on the undersurface of the frenal attachment (fig 2b). The frenum was relocated at an apical position and the V shaped incision was converted into a Y, while it was sutured with 4-0 silk sutures (Fig 2c). Sutures were removed one-week post operatively (Fig 2d). The one month follow up shows formation frenal attachment in the mucogingival junction (Fig 2e). Which satisfied esthetic and functional need.

Case -3

The 23 years old female patient referred from the Department of Orthodontics with a chief complaint of spacing between the maxillary central incisors. While revealing history, she completed her orthodontic treatment before 4 months for the above complaint. On examination orthodontic relapse occurred due to aberrant maxillary labial frenum. Tension test was positive with papilla type frenal attachment (Fig 3a). The case was operated with Miller's technique. Local anesthetic infiltrations are given locally around the frenulum by using 2% lignocaine with 1:80000 adrenaline. The frenum excised and exposure of the alveolar bone in the midline done as in the classical frenectomy. A vertical incision is given adjacent to area of interest to obtain a laterally positioned pedicle graft. Horizontal incision has been given along the mucogingival line to release the pedicle graft (Fig 3b,c,d). The graft was sutured across the midline using a 5-0 black silk (Fig 3e). Sutures were removed after 1week (Fig 3f).

At one-month follow up, interdental papilla was maintained and there is a continuous collagenous band of gingiva across the midline (Fig 3g).

Case-4

A 25 years old female patient reported with a chief complaint of midline diastema. On examination Hypertrophic Frenum with papilla penetrating type attachment (Fig 4a). Frenectomy by Z-pasty done in this case. Local infiltration is given to anesthetise the selected site by using 2% lignocaine with 1:80000 adrenaline. First the fibers crossing the interdental papilla removed as mentioned in the conventional technique. Scalpel incision was given along the whole length of the frenum (Fig 4b). Remove excessive tissue in the midline. At each end of the incision another two incisions of equal length was made with angulation between 60° and 90°. By using fine tissue forceps, with care not to damage the apices of the flaps, the submucosal tissues were dissected beyond the base of each flap, to obtain double rotational flaps (Fig 4c). These were mobilized and transposed through 90 degrees to close the vertical incisions horizontally. A 5-0 silk suture were placed, first through the apices of the flaps, to ensure the adequacy of the flap repositioning and then they were evenly placed along the edges of the flaps to close the wound along the cut edges (Fig 4d). Sutures were removed after 1week (Fig 4e). At one month follow up healing was excellent with no tension at the frenum area (Fig 4f).

Case-5

A 21 years old male patient with chief complaint of enlarged interdental papilla between the maxillary central incisors reported to the Department. Patient was a removable orthodontic appliance wearer (Fig 5a). On examination tension test was positive with gingival type frenal attachment. After scaling and polishing patient has been advised to discontinue the appliance. On the third week he reported with reduced papillary enlargement (only fibrotic components) and there was spacing between the maxillary central incisors (Fig 5b). The area was anaesthetized with a local infiltration by using 2% lignocaine with 1:80000 adrenaline. The aberrant frenum was treated with diode Laser (Fig 5c) and the fibrotic component in the interdental area excised with the help of scalpel. Post operatively patient had lesser pain and no swelling. But the healing was delayed compared to above techniques (Fig 5d). At one month healing was excellent with no scar tissue formation (Fig 5e).

DISCUSSION

Resection of aberrant frena was initially included under the term mucogingival surgery given by Friedman in 19577. Later it was included under the broad heading of periodontal plastic surgery. As mentioned earlier scalpel method, electrosurgery as well as LASERs may be used to treat these aberrant frena. The classical scalpel technique was introduced by Archer (1961) and Kruger (1964). After introduction of this technique various modifications were proposed, like Z-plasty, V-Y-plasty and Miller's technique. Till date the classical technique remains the most widely used method. But the classical technique may leave a longitudinal surgical scar which may lead to periodontal problems and an unaesthetic appearance. The Z-plasty technique was found to be ideal for broad, thick hypertrophic frenum associated with midline diastema and a short vestibule.

Fig 1a: Pre operative papilla penetrating type frenal attachment

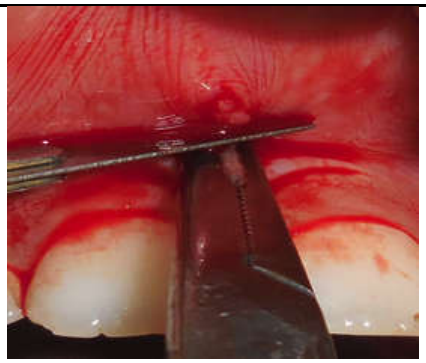

Fig 1b: Incising the frenum held with hemostat

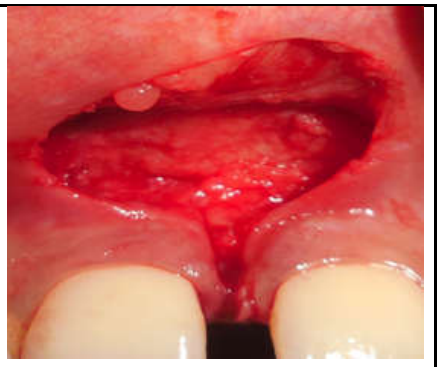

Fig 1c: Frenum excised

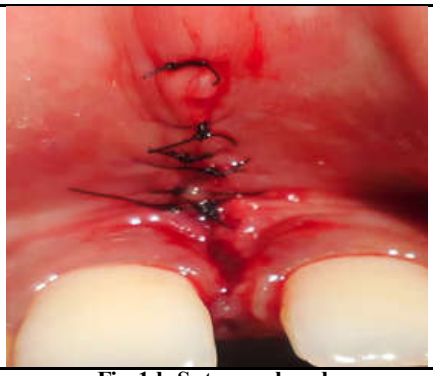

Fig 1d: Sutures placed

Fig 1e: 1week postoperative

Fig 1f: 1month post operative

Fig 2a: Pre operative papillary type frenal attachment

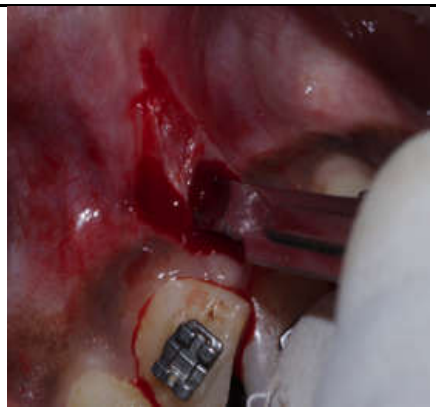

Fig 2b: Frenum incised

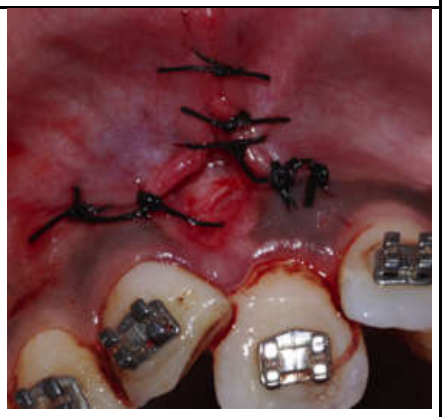

Fig 2c: Frenum sutured in Y shape

Fig 2d: 1week postoperative

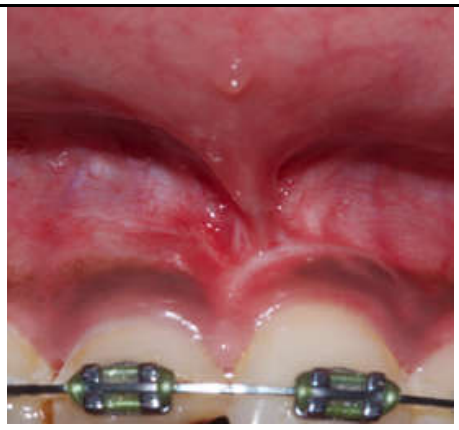

Fig 2e: 1month post operative

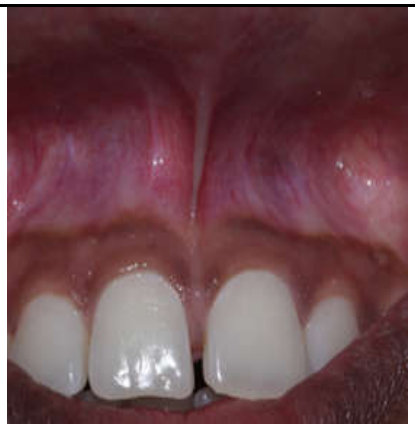

Fig 3a: pre operative papillary type frenal attachment

Fig 3b: Frenum excised & vertical releasing incision is placing

Fig 3c: Lateral pedicle graft obtained

Fig 3d: Graft displacing across midline

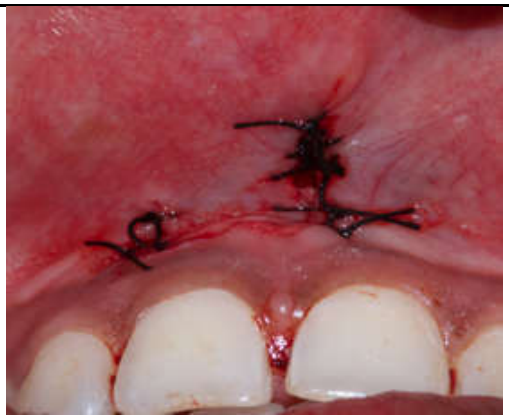

Fig 3e: Graft sutured

Fig 3f: 1week postoperative

Fig 3g: 1month post operative

Fig 4a: Pre operative papilla penetrating type frenal attachment

Fig 4b: Incision along the length of frenum

Fig 4c: Incision given at both ends of frenum, obtaining two triangular flaps

Fig 4d: Flaps transposed across the midline sutured in the form of Z

Fig 4e: 1week postoperative

Fig 4f: 1month post operative

Fig 5a: Gingival type frenal attachment with enlarged interdental papilla

Fig 5b: 3weeks after discontinuation of orthodontic appliance

Fig 5c: Frenum excised using LASER

Fig 5d: 1week postoperative

Fig 5e: 1month post operative

This procedure enables us to remove the brous band and also helps in vertical lengthening of the vestibule. Overall the Z-plasty procedure is considered to be safe. Cost effective and results in better functional and aesthetic appearance. This procedure allows for soft tissue healing by primary intentions; increasing recovery and reducing the risk of tissue contractures (Dusara, 2014). V-Y plasty can be used in case of broad frena in the premolar molar region. It allows the lengthening of that area. The main disadvantage of this technique is it fails to provide satisfactory aesthetic results in case of a thick hypertrophied frenum (Sharma, 2014). The Miller's technique was advocated by Miller PD in 1985.

This technique was proposed for the post-orthodontic diastema cases (Miller, 1985). The ideal time for performing this surgery is after the orthodontic movement is complete and about 6 months before the appliances are removed. The advantage of this technique are.

- Post operatively there is a continuous collagenous band of gingival across the midline. This gives bracing effect and chances of relapse is less.
- The transseptal fibers are not disrupted surgically and so there is no loss of interdental papilla.

- In this orthodontic stability is achieved without compromising aesthetics (Devishree, 2012).

Photothermal interaction with tissue is the basic concept of surgical laser. In this process, radiant light is absorbed by the tissue and transformed to heat energy changing tissue structure. Laser light within was converted to thermal energy on contact with the tissue, causing laser tissue interaction, that when appropriately applied, which on applying produce reaction ranging from incision, vaporization and coagulation (Catone, 1997). Diode laser allowing increased surgical precision and accuracy, there by reducing unnecessary damage to the underlying tissues, renders a blood less surgical field resulting in improving visualization and eliminating the need of post operative sutures. Patient treated with laser surgery have no functional complication since there was no damage to the adjacent healthy tissue, with less wound contraction during healing meaning less mucosal scar (Aldelaimi, 2014). It can't be applied on broad and papilla penetrating type frena. The main disadvantage of lasers, it will be time consuming and resulting in relatively large raw area leading to increased healing period and depth of penetration can't be controlled.

Conclusion

All the techniques mentioned here only go good with the indicated situations according to the type of aberrant frenum. Therefore, proper technique selection is the primary requisite for excellent functional & esthetic outcome. Even though the advanced techniques like electro surgery, lasers have merits, further improvements have to be attempt for replace the traditional scalpel methods.

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