

An Aesthetic Avenue to an Aberrant Labial Frenum : A Clinical Case Report



Medical Science

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ABSTRACT

An aberrant labial frenum creates certain functional and aesthetic problems. Usually, a papillary and papilla penetrating freni are considered pathological and require correction. A number of techniques are currently in practice for correction of an aberrant frenal attachment. The conventional technique has certain disadvantages due to which other techniques were developed. The lateral pedicle flap technique given by P. D. Miller in 1985, has certain advantages over the conventional technique. This technique results in primary closure along the midline. Thus, there is no scar formation in the midline. Thus, it is an effective technique for a thick, broad and hypertrophied frenum. This case report highlights the advantages of the Miller's lateral pedicle flap technique for frenectomy.

Introduction :

A frenum is an anatomic structure formed by a membranous fold of mucous membrane and connective tissue, sometimes muscle fibres. It originates as a post eruptive remnant of the tectolabial bands, which are embryonic structures appearing at about 3 months in utero and connecting the tubercle of the upper lip to the palatine papilla.¹

The superior labial frenum is triangular in shape and attaches the lip to the alveolar mucosa and/or the gingiva. In infants it extends over the alveolar process and forms a raphae that attaches to the palatine papilla. Normally, as the alveolar ridge develops vertically, the relocation of the attachment in an apical direction occurs. However, when the attached frenal fibres fail to migrate apically a residual band remains between the maxillary central incisors. This causes a persistent frenal attachment.¹

Depending upon the extension of attachment of the fibres, freni have been classified as :²

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

The papillary and the papilla penetrating freni are considered pathological and require to be removed.

Such pathological freni cause several mucogingival problems i.e. a midline diastema, recession of the interdental papilla or difficulty in brushing.^{3,4} Miller has recommend-

ed that the frenum should be characterised as pathogenic when :⁵

- it is unusually wide
- there is no apparent zone of attached gingiva along the midline
- when the interdental papilla shifts
- when the frenum is extended.

The abnormal frenum is detected visually by applying tension over the frenum to see the movement or blanching of the papillary tip, produced due to ischemia in the region.⁶

Such a pathological frenum should be excised surgically for aesthetic and functional reasons by the procedure of frenectomy.

Since the procedure of frenectomy was first proposed, a number of modifications were developed.

Conventional technique :

The 'classical frenectomy' technique was developed by Archer⁷ and Kruger⁸. The frenulum, interdental tissue and palatine papilla are completely excised. This approach was advocated to assure removal of muscle fibers supposedly connecting the obicularis oris with the palatine papilla. It was felt that if this was not done, the diastema would reopen. However, it frequently led to an unaesthetic scar.

Knox and Young⁹ histologically studied the frenulum, and they found both elastic and muscle fibers in their sections. In contradiction, several other researchers and current texts have concluded that no muscle fibers are present in the maxillary labial frenulum. Probably the most thorough study was accomplished by Henry et al. They found considerable dense collagenous tissue, loose connective tissue, and elastic fibers but no muscle fibers.

Thus, Edward¹⁰ in a definitive study evaluated 308 patients who had either a midline diastema or an abnormal frenum or a combination of both, advocated a 'conservative surgical approach'. The method consisted of 3 procedures :

1. Apically repositioning of the frenum (with denudation of alveolar bone),
2. Destruction of the trans-septal fibers between the approximating central incisors,
3. Gingivoplasty of any excess labial and/or palatal tissue in the interdental area.

An important feature was that the interdental papilla was aesthetically maintained. However, the disadvantage was that an unaesthetic midline scar remained.

Later, Coletton¹¹ and Lawrence¹² used a free gingival graft to prevent the formation of a midline scar, however it lead to a colour mismatch which was unaesthetic.

Frenectomy using unilateral single pedicle flap (Miller's technique):

This technique was advocated by PD Miller⁵ in 1985. Miller used a technique combining frenectomy with a laterally positioned pedicle graft. As a laterally positioned pedicle flap was used to cover the midline defect, there was no unaesthetic scar formation. Also the interdental papilla was left undisturbed. With this technique aesthetically and functionally better results were obtained.

Adequate local anaesthesia was administered. A horizontal incision was taken to separate the frenulum from the interdental papilla and to excise the papilla. Any remnant of the frenum tissue in the midline and on undersurface of the lip was excised. The labial alveolar bone is exposed in the midline. A vertical parallel incision upto the vestibular depth was made on the mesial side of the lateral incisor, 2-3 mm apical to marginal gingival. The gingiva and alveolar mucosa in between these two incisions were undermined by partial dissection. A horizontal incision was then given 1-2mm apical to gingival sulcus in the attached gingiva, connecting the coronal ends of the two vertical incisions. This undermined flap was then raised, mobilised mesially and sutured. Thus, primary closure was obtained in the midline. Dressing with a periodontal pack is given. The periodontal dressing and the sutures were removed 1 week postoperatively

The following cases were done with this technique, and the results are presented for the same. The Miller's surgical technique was undertaken at Bharati vidyapeeth deemed university dental college and hospital, Pune. The patients with a broad, papillary and papilla penetrating frenum were selected for this procedure. The results of the cases on follow-up are presented .

Case reports :

Case 1: A 34 year old female visited the department of periodontology with a chief complaint of increased spacing with the upper front teeth since 4-5 years.

On clinical examination, diastema with the maxillary central incisors was observed.

The tension test was positive and the patient had a papillary type of frenum. As the frenum was thick and broad, frenectomy with Miller's lateral pedicle flap technique was planned. The surgery was performed as per the above

mentioned procedure. The suturing was done with 5-0 surgical silk suture. The periodontal dressing and the sutures were removed 10 days post-operatively. Healing with formation of attached gingiva was seen. The patient was evaluated and follow-up after 10 days and 1 month was done for the patient.



Figure 1a: Pre-operative with thick frenum and loss of interdental papilla.



Figure 1b : Pre-operative lateral view



Figure 1c: Vertical incision mesial to lateral incisor and Undermined pedicle .



Figure 1d : Pedicle displaced and sutured at the midline



Figure 1e : Follow-up at 10 days.



Figure 1f : Follow-up at 1 month.

Case 2: A 40 year old male visited the department of periodontology with a chief complaint of spacing with upper front teeth which has been increasing since the past 10 years.

On clinical examination, it was observed that the patient had a diastema with the maxillary central incisors and recession with them. The tension test was positive and the patient had a papilla penetrating frenum. The frenum was thick and broad. Frenectomy with Miller's lateral pedicle flap technique was planned. The surgery was done with the above mentioned procedure. The suturing was done with 5-0 vicryl sutures.

Suture removal was done 10 days post-operatively. Healing with formation of attached gingiva was seen. Patient was evaluated and follow-up was done 10 days post-operatively and 1 month post-operatively.

Results :

The results of this technique were noted at 10 days and 1 month post-operatively. It was seen that the healing in both the cases was uneventful. Healing occurred with primary intention. The results were esthetic in both the cases. Adequate width of attached gingiva was seen at 1 month post-operatively and it was colour matched with the adjacent tissue. The interdental papilla was maintained in both the cases.

Discussion :

There are several techniques for performing a procedure of frenectomy. These include the conventional techniques of frenectomy, followed by the conservative approach of Edward's technique. The other techniques include the Z-plasty technique¹³. The recent techniques include the use of soft tissue grafts^{11,12} and the lasers¹⁴. Every method has certain advantages and disadvantages.

The technique of frenectomy with a lateral pedicle flap technique was given by PD Miller in 1985. The emphasis of this surgical technique is not on the removal of the frenum per se, but in obtaining stability without esthetic sacrifice. This technique offers two advantages. The first advantage is that after the healing there is a continuous collagenous band in the midline. Thus no unaesthetic scar tissue is formed. This collagenous tissue formed, provides a bracing effect and thus gives stability of the result and prevents relapse i.e. recurrence of the diastema following orthodontic treatment. The second advantage is that the transseptal fibres are not disrupted surgically. Thus, loss of papilla between the two central incisors is prevented which maintains the esthetics. Healing in this technique occurs by primary intention along the midline. The purpose of elevating a partial thickness of gingival tissue for lateral displacement is to achieve healing with primary intention, with minimal edema and no or minimal scar formation. Also as the pedicle is elevated from the adjacent tissue, there is excellent colour match. Sometimes in case of a thick, broad and hypertrophied frenum, a slight lateral shift of frenum from the midline could be seen. The ideal time for performing this surgery is after orthodontic movement is complete and about 6 weeks before appliances are removed.⁵

Conclusion :

The conventional technique is an easier technique. However, it fails to provide esthetic results in case of a thick, broad and hypertrophied frenum at the area of insertion of fibres. This scar is visible on smiling or when patient has a high smile line, as it is along the midline.

In such cases where the frenum is broad and thick and the width of attached gingiva is inadequate due to a papillary or papilla penetrating frenulum, Miller's technique is an effective surgical approach. Unilateral pedicle flap technique shows complete healing with zone of attached gingiva, no scar formation and colour of gingival tissue comparable to the adjacent tissue.⁵ Thus, the Miller's technique is an advantageous technique for frenectomy with minimal disadvantages, resulting in an aesthetic result.

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