Frenectomy with Laterally Displaced Flap: A Case Series

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Abstract

The frenum may be a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum. The frena may jeopardize the gingival health when they are attached too closely to the gingival margin, either due to an interference in the plaque control or due to a muscle pull. In addition to this, the maxillary frenum may present esthetic problems or compromise the orthodontic result in the midline diastema cases, thus causing a recurrence after the treatment. Archer’s “classical frenectomy” is an extensive procedure including the excision of fibers, interdental papilla, and exposure of the alveolar bone up to the palatine papilla. The resultant delayed healing, loss of the interdental papilla, and abnormal scar led toward the conservative approaches such as Edward’s frenectomy, frenum relocation by Z-plasty, and free gingival graft, with their technical and esthetic limitations. A better approach in frenectomy to make a primary closure in the midline and to avoid an unesthetic scar by creating a zone of the attached gingiva is assisted with a lateral pedicle graft. A case series of this technique with its distinct advantages is presented.

Keywords: Aberrant frenum, attached gingiva, frenectomy, lateral pedicle graft

INTRODUCTION

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.[3] Knox and Young histologically studied the frenulum, and they have reported both elastic and muscle fibers (orbicularis oris-horizontal bands and oblique fibers). However, Henry, Levin, and Tsaknis have found considerable dense collagenous tissue and elastic fibers, but no muscle fibers in the frenulum.[1]

Mirko et al.[2] in 1974 have classified the labial frenum attachments as:
1. Mucosal – fibers attached up to the mucogingival junction
2. Gingival – fibers inserted within the attached gingiva
3. Papillary – fibers extending into the interdental papilla
4. Papilla penetrating – the frenal fibers cross the alveolar process and extend up to the palatine papilla.

Clinically, papillary and papilla penetrating frena are considered as pathological and have been found to be associated with loss of papilla, recession, diastema, and plaque accumulation.[3,4] Abnormal or aberrant frena are detected visually, by applying tension over it to see the movement of papillary tip or blanching produced due to ischemia of the region.[3] Miller has recommended that the frenum should be characterized as pathogenic when it is unusually wide, or there is no apparent zone of the attached gingiva along the midline or the interdental papilla shifts when the frenum is extended.[6] In such cases, it is necessary to perform a frenectomy for esthetic, psychological, and functional reasons.

In the “classical frenectomy” by Archer[7] and Kruger,[8] the frenum, interdental tissue, and palatine papilla are completely excised leading to exposure of the underlying alveolar bone and thus leading to scarring. This technique resulted in an unesthetic scar, but this approach was advocated to assure the removal of muscle fibers, connecting the orbicularis oris with the palatine papilla. It was thought that if this was not done, the diastema would reopen.

Coleton et al.[9] and Breault et al.[10] have used free gingival graft combined with frenectomy. This procedure avoids the scar, but a mismatched gingival color in the midline and need...
of a second surgical site to achieve donor tissue complicate the technique. Laser has been used by various clinicians, which has its relative advantages and disadvantages.

In many cases, it is necessary to perform a frenectomy to prevent reopening of a midline diastema following closure by orthodontic therapy. Often, the loss of the interdental papilla between the maxillary incisors during the classic frenectomy creates an unacceptable esthetic result. A better approach in frenectomy to make a primary closure in the midline and to avoid an unesthetic scar by creating a zone of the attached gingiva is assisted with a lateral pedicle graft.

Miller in 1985 presented a surgical technique combining the frenectomy with a laterally positioned pedicle graft. Esthetically acceptable attached gingiva across the midline was attained by laterally positioned gingiva and healing by primary intention. No attempt was made to dissect the transseptal fibers, and hence, the interdental papilla remained undisturbed. Esthetically and functionally better results were obtained. Hence, in the following case series, this technique has been attempted and results are presented.

Case Series
The present surgical technique was undertaken at Rajah Muthiah Dental College and Hospital, Tamil Nadu. The patients underwent frenectomy for functional, esthetic, periodontal, or orthodontic reasons. A frenum was judged abnormal if it was unusually broad, and there was no apparently attached gingiva in the midline and the interdental papilla could be stretched by the frenum.

Case Reports
Case 1
A 16-year-old female patient was referred from the department of orthodontics for frenectomy. On clinical examination, a gingival upper mid-frenum was found. After local anesthesia, a horizontal incision was taken to separate the frenum from the base of the interdental papilla. This incision was extended apically up to the vestibular depth to completely separate the frenum from the alveolar mucosa. Any remnant of frenal tissue in the midline and on the under surface of the lip was excised. A vertical parallel incision was taken on the mesial side of the lateral incisor, 2–3-mm apical to marginal gingiva, up to vestibular depth. The gingiva and alveolar mucosa in between these two incisions were undermined by partial dissection to raise the flap. A horizontal incision was then given 1–2-mm apical to gingival sulcus in the attached gingiva connecting the coronal ends of the two vertical incisions. Flap was raised, mobilized mesially, and sutured to obtain primary closure across the midline.

No attempt was made to dissect transseptal fibers between approximating central incisors. Gingivoplasty of any excess labial and/or palatal tissue in the interdental area was done, preserving the integrity of the interdental papilla. The surgical area was dressed with zinc oxide eugenol pack. Dressing and sutures were removed 1 week later. A healing zone of the attached gingiva was clearly visible with no loss of the interdental papilla.

Case 2
An 18-year-old male patient was referred from the department of orthodontics for frenectomy. On examination, there was a papillary penetrating frenum attachment. The case was treated surgically by lateral pedicle graft method. One-month postoperative view is shown in Figure 2f.

Case 3
A 21-year-old male patient was referred from the department of orthodontics for frenectomy. On examination, there was a papillary penetrating frenum attachment. The case was treated surgically by lateral pedicle graft method. One-month postoperative view is shown in Figure 3g.
Anubh et al.[11] performed frenectomy using laterally displaced pedicle graft and achieved esthetically pleasing result without scar formation in the midline, and there was no loss of the interdental papilla. In this case also, we could achieve the same with good color match.

Chaubey et al.[12] also evaluated that the frenectomy procedure using lateral pedicle graft showing the same result with a scar-free esthetic zone without loss of the interdental papilla was similar to the present study.

Mani et al.[13] and Devishree et al.[14] in their studies using lateral pedicle frenectomy also observed that healing by primary intention did not cause scarring after healing in the midline.

Hungund et al.[15] in their study compared the classic frenectomy procedure with unilateral and bilateral displaced flap and concluded that the classic frenectomy failed to provide pleasing esthetic result, whereas laterally displaced pedicle flap achieved esthetics with no scar formation and without loss of the interdental papilla.

In Miller’s technique during healing, there is a continuous band of the gingiva across the midline rather than unesthetic scar,
and transseptal fibers are not disrupted surgically. This avoids trauma to the interdental papilla. However, Miller suggested that frenectomy with laterally positioned pedicle flap was to be performed after the closure of the diastema.[6]

Edward et al.[16] suggested that the frenectomy procedure has to be carried out before the orthodontic closure since the convoluted and compressed fibers hinder the closure of the diastema.

**Conclusion**

The present case report combining frenectomy with a lateral pedicle graft has certain distinct advantages.

1. Healing takes place by primary intention
2. A zone of the attached gingiva, matching with adjacent tissue, forms in the midline which is pleasing to the individual
3. No unesthetic scar formation
4. No recession of the interdental papilla occurs because the transseptal fibers are not severed out.

Hence, the above technique can be used as an effective means to eliminate the pathological frenum and also maintain an esthetic outcome.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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