Case Report

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Frenectomy with Laterally Displaced Flap: An Aesthetic Approach

Abstract:
Frenum is a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, gingiva, and the underlying periosteum. The frena may endanger the gingival health when they are attached closely to the gingival margin. An aberrant frenum is presupposed to create functional and aesthetic problems. 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 aftermath delayed healing, loss of interdental papilla, and unusual scar led toward the traditional approaches such as Edward's frenectomy, frenum relocation by Z-plasty, and free gingival graft, with their practical and esthetic restriction. A superior approach to make a primary closure in midline and to bypass anaesthetic scar by creating a zone of attached gingiva, frenectomy is associated with lateral pedicle graft. Miller, in his study on 27 subjects, proposed that newly created zone of attached gingiva may have bracing effect inhibiting reopening of diastema. A case report of this approach with its well defined benefits is presented.

Key-words: Aberrant frenum, Frenectomy, Lateral pedicle graft

Introduction:

Labial frenal attachments are thin folds of the mucous membrane with enclosed muscle fibers originating from the orbicularis oris muscle of the upper lip that attaches the lips to the alveolar mucosa and underlying periosteum. Depending on the extension of the attachment, frena have been classified 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 to be pathological and have been found to be associated with papilla loss, recession, diastema and difficulty brushing [1,2].

Abnormal or aberrant frena are detected visually by applying tension to see if there is movement of the papillary tip or blanching due to ischemia in the region (blanch test). A positive blanch test result indicates a narrow or no apparent zone of attached gingiva along the midline, so it is necessary to perform a frenectomy for functional and aesthetic reasons [3].

There are numerous surgical techniques available for the removal of the labial frenum. In the "classical frenectomy" procedure by Archer and Kruger, the frenum, interdental tissue and palatine papilla are completely excised, leading to exposure of the underlying alveolar bone, and thus, scarring. Although this technique results in an unaesthetic scar, it has

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been advocated to ensure the removal of the muscle fibres to prevent a midline diastema relapse [3, 4].

Miller's technique was introduced in 1985 which was a surgical technique combining the frenectomy with a laterally positioned pedicle graft. If the frena is enlarged, a gingivoplasty is performed to reduce it to an appropriate size. Closure across the midline by laterally positioning the gingiva and healing by primary intention result in attached gingiva across the midline. The interdental papilla remains undisturbed because no attempt was made to dissect the trans-septal fibres[3,5]. Since aesthetically and functionally better results have been obtained, Miller's technique was used in this case, and the result is presented in the following case report.

Case and Management:

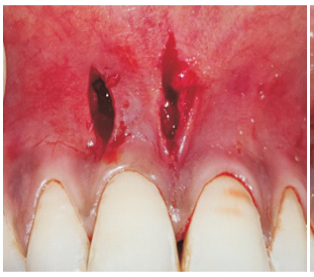
A 34-year old female was referred by her orthodontist to undergo an upper labial frenectomy during orthodontic treatment. The patient's medical history was non-contributory, and her clinical examination revealed a papillary penetrating type of frenal attachment. The blanch test was positive. Full complements of teeth were present with adequate buccal vestibular depth. The patient's oral hygiene was good, and there were no clinical signs of gingival inflammation.

The maxillary anterior region was anaesthetized via local infiltration on the buccal and palatal aspects. Then, a horizontal incision using a no. 15 Bard-Parker knife was used to separate the frenum from the base of the interdental papilla. This incision was extended apically up to the vestibular depth to entirely separate the frenum from the alveolar mucosa. Any frenal tissue remnants in the midline or on the under surface of the lip were excised. Two oblique partial-thickness incisions were then placed in the adjacent attached gingiva, beginning 2–3 mm apical to the marginal gingiva, up to the vestibular depth. In order to mobilize the flap, the gingival and alveolar mucosa between these two incisions was undermined by sharp dissection. The flaps were mobilized mesially and sutured to each other on the medial side and laterally to the adjacent intact periosteum of the donor site using 4-0 silk suture, completely covering the underlying defect created by the initial frenal excision. There was no attempt made to dissect the trans-septal fibres between the approximating central incisors.

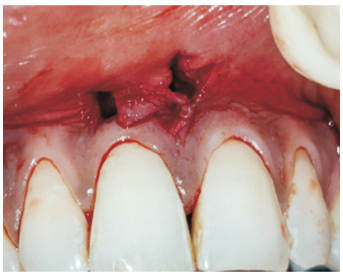
Postoperative instructions were provided, and analgesics and antiseptic mouthwash were prescribed for five days during the post-operative period. The sutures were removed on the 10th day and the patient was scheduled for follow-up visits.

1a. Pre-operative with thick frenum

1b. Resected frenum site and loss of interdental papilla



1c. Vertical incision mesial to lateral



1d. Displacement of pedicle incisor and undermining the pedicle

1e. Suturing of pedicle at midline **1f.** Coe-pak

1g. post-operative at one week1h.post-operative at 3 months follow-up

Discussion:

The concept of management of abnormal frenal attachment started from classical frenectomy technique by Archer [6] to modern concepts by Edwards. To evade the formation of scar and to facilitate healing, application of laser and soft-tissue grafts helped in evolving the newer frenectomy procedures.
Anubh et al. [7] 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 colour match.

Chaubey et al. [3] 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. [8] and Devishree[9] et al. 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.[10] 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.

Miller presented a surgical technique combining frenectomy with a laterally positioned pedicle graft. The closure across the midline via the laterally positioned gingiva and healing by primary intention resulted in aesthetically acceptable attached gingiva across the midline. No attempt was made to dissect the transseptal fibres; therefore, the interdental papilla remained undisturbed. Furthermore, there was no need for a second surgical donor site, thus reducing the patient's morbidity [3].

If the wound produced after a frenectomy is large due to a thick, broad or hypertrophic frenum, a lateral pedicle graft might not provide complete wound coverage. Therefore, a modification was made by using bilateral pedicles. These pedicles maintain the width of the attached gingiva without compromising the colour match because of the resulting scar formation. Moreover, covering the V-shaped defect with the pedicles not only helps to attain healing by primary intention, it also avoids the formation of an unaesthetic scar. The patient's discomfort is also minimized when compared to conventional frenectomy procedures in which the defects are left substantially open. In addition, it preserves and enhances the attached gingiva at the site previously occupied by the labial fraenum, helping to maintain the periodontal health of the involved teeth postoperatively [11, 12].

In this case, although the diastema was absent, the muscle pull of the thick labial frenum could cause a relapse of the orthodontic treatment. As a preventive tactic to avoid relapse and scar formation, a bilateral pedicle approach frenectomy was carried out. As a result, the newly formed attached gingiva along the midline, which contains collagenous fibres, may have a bracing effect and prevent the reopening of the diastema [11, 13].

Edward et al. [14] 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 bilateral pedicle approach frenectomy performed in this case report has certain distinct advantages when compared to the other approaches. For example, the healing takes place via primary intention, thus avoiding the formation of an unaesthetic scar. In addition, the attached gingiva matches the adjacent tissue in the midline, which is pleasing to the individual. Moreover, there is no recession of the interdental papilla because the trans-septal fibres are not severed. Finally, the attached gingiva in the midline may have a bracing effect, which helps to prevent orthodontic relapse.

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