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Case Report

Surgical management of aberrant labial frenum for controlling gingival tissue damage: A case series

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Abstract

The frenum is a normal anatomical landmark in the oral cavity which attaches the lip and the cheek to the alveolar mucosa, gingiva and the underlying periosteum. At times, frenal attachment may pose problems to the health of the gingiva either due to interference in the plaque control or due to a muscle pull and needs to be managed. This case series demonstrates the surgical removal of aberrant frenum using conventional technique of frenectomy.

Keywords: aberrant frenum, frenectomy, labial frenum, diastema

1. Introduction

The frenum is a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum[1]. There are several frena that are usually present in a normal oral cavity, most notably the maxillary labial frenum, the mandibular labial frenum, and the lingual frenum[2]. Labial frenal attachments are thin folds of mucous membrane with enclosed muscle fibres originating from orbicularis oris muscle of upper lip that attach at the lips to the alveolar mucosa and underlying periosteum[3]. The primary function of frena is to provide stability to the upper and lower lips and the tongue[4]. The exact role and extent of their involvement in mastication is controversial[1].

Depending upon the extension of attachment of fibres, frena have been classified as[5]:
Mucosal –when the frenal fibres are attached upto mucogingival junction
Gingival – when fibres are inserted within attached gingiva
Papillary – when fibres are extending into interdental papilla
Papilla penetrating – when the frenal fibres cross the alveolar process and extend up to palatine papilla

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[6]. Clinically, papillary and papilla penetrating frena are considered pathological and have been found to be associated with loss of papilla, recession, diastema, difficulty in brushing, malalignment of teeth and psychological disturbances to the individual[7].

A frenum can become a significant problem if tension from lip movement pulls the gingival margin away from the tooth, or if the tissue inhibits the closure of a diastema during orthodontic treatment. Frenal attachments that encroach on the marginal gingiva distend the gingival sulcus, fostering plaque accumulation, increasing the rate of progression of gingival

recession and thereby leading to recurrence after treatment[2].

The management of an aberrant frenum can be accomplished by frenectomy or frenotomy procedures. The terms frenectomy and frenotomy signify operations that differ in degree of surgical approach. Frenectomy is a complete removal of the frenum, including its attachment to the underlying bone whereas frenotomy involves relocation of the frenal attachment[8].

According to Olivi *et al*[9], clinical indications for frenum removal include:

i. Anomalous frenum associated with inflamed gingiva, resulting from poor oral hygiene

ii. Anomalous frenum associated with gingival recession

iii. Maxillary frenum associated with a diastema after complete eruption of the permanent canines

iv. Abnormal and/or anomalous maxillary frenum (Class III or IV), resulting in the presence of a diastema during mixed dentition

v. Anomalous mandibular frenum with high insertion, causing the onset of gingival recession

The surgical techniques of frenectomy mainly include:

Classical/conventional technique

Z-plasty (Schuchardt)

V-Y plasty

2. Frenectomy by Conventional Technique[8, 10, 11]

The area was anaesthetized with a local infiltration by using 2% lignocaine with 1:80000 adrenaline. The frenum was held with a haemostat upto the depth of the vestibule. With the No. 15 blade mounted on a Bard-Parker handle, an incision was made along the upper surface of the haemostat till the entire depth of the frenum extending into the vestibule. A similar incision was repeated on the under-surface of the haemostat so that the haemostat gets detached along with the resected portion of frenal tissue within its beaks. Once this was achieved, a rhomboid area exposing the fibrous attachment to the bone became visible. A blunt dissection was done with a horizontal incision to detach the deeper fibres from the underlying periosteum. The labial mucosa was undermined so as to permit the approximation of the edges. The bleeding was controlled by applying pressure packs. The approximated edges were sutured by using 4-0 black silk with interrupted sutures. A periodontal dressing was placed over the surgical area. The periodontal dressing and the sutures were removed after a period of one week.

A series of three cases (two maxillary and one mandibular) demonstrating the surgical removal of aberrant frenum using conventional technique of frenectomy has been presented (Fig. 1 to 13).

Fig. 1: Pre-operative view (Case I)

Fig. 2: Excision of frenum (Case I)

Fig. 3: Sutures placed (Case I)

Fig. 4: Post-operative view at 2 weeks (Case I)

Fig. 5: Pre-operative view (Case II)

Fig. 6: Frenum excised (Case II)

Fig. 7: Sutures placed (Case II)

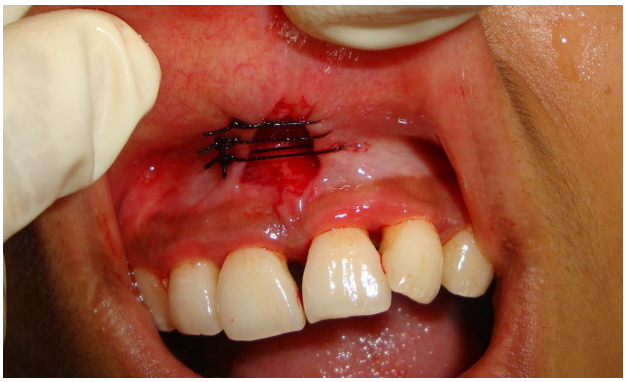

Fig. 8: Post-operative view at 2 weeks (Case II)

Fig. 9: Fig. 10: Pre-operative view (Case III)

Fig. 11: Removal of frenum (Case III)

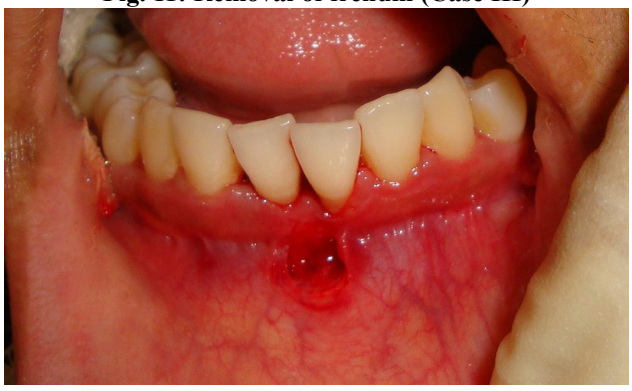

Fig. 12: Sutures placed (Case III)

Fig. 13: Post-operative view at 2 weeks (Case III)

3. Discussion

The conventional technique, introduced by Archer (1961)[10] and Kruger (1964)[11], is an excision type frenectomy which includes the interdental tissues and the palatine papilla along with the frenum leading to exposure of underlying alveolar bone[1]. Knox and Young histologically studied the frenum and have reported both elastic and muscle fibres (orbicularis oris)[12]. Presence of muscle fibres in frenum could play a co-destructive role by exerting forces alongwith elastic and collagenous components on the gingiva. Excisional surgery of abberrant labial frenum with conventional technique ensures removal of the muscle fibres which were supposedly connecting the orbicularis oris with the palatine papilla alongwith dense connective tissue upto the level of the alveolar bone inorder to prevent its recurrence and eventual pathological sequelae. Also, it is typically a safe surgical procedure with no notable complications[1,11].

Since the conventional procedure of frenectomy was first proposed, a number of modifications of the various surgical techniques including Miller's technique, V-Y plasty and Z-plasty have been developed to manage problems associated with an aberrant labial frenum. The main advantage of the Z-plasty method over the conventional technique is minimal scar tissue formation. The disadvantage of this technique includes requirement of a skilled operator as it is tedious to perform[1,13].

The use of electrosurgery has also been proposed for frenectomy due to the safety of the procedure, minimal time consumption, mild bleeding and the absence of postoperative complications. However, it is associated with certain complications which include burns, the risk of an explosion if combustible gases are used, interference with pacemakers and the production of surgical smoke[14].

Recently, lasers such as diode, carbon dioxide, Nd:YAG, Er:YAG and Er,Cr:YSGG have been employed to perform frenectomy procedure[15-19]. Haytac *et al*[18] and Kara[19], using CO_2 laser and Nd:YAG laser respectively have observed that frenectomy by lasers provides better patient perceptions in terms of postoperative pain and function than that obtained by the scalpel technique. However, the main disadvantage is that the procedure is expensive and needs sophisticated equipment. Furthermore, a delayed healing as compared to that in the conventional scalpel techniques, a reduced surgical precision resulting in an inadvertent laser-induced thermal necrosis and/or a photo acoustic injury, are some of the complications which are associated with lasers[15, 17].

In the present case series, healing was uneventful in all the three cases reported. No post-operative complications were observed in any of the cases. Periodontal dressing and suture removal were done after 7 days. All the cases were recalled for regular follow up.

4. Conclusion

The presence of an aberrant frenum poses a risk of gingival tissue damage. Such a frenum can be surgically managed by frenectomy involving the correction of the attachment site and length of the frenum. All the three cases of frenectomy presented in the case series demonstrated a successful outcome, thus indicating that the conventional technique of frenectomy is relatively safe, reliable and inexpensive, as compared to other approaches, and can be performed on a routine basis without the need for any sophisticated equipment.

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