

RECTIFICATION OF ABERRANT FRENAL ATTACHMENT EMPLOYING MODIFICATION OF CONVENTIONAL FRENECTOMY METHOD: Z-PLASTY TECHNIQUE-A CASE REPORT

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ABSTRACT

Aberrant attachment of the frenum imposes esthetic difficulty along with the constant muscle pull while mastication or speech movement leading to gingival recession in the maxillary central incisors added with the prevalence of midline diastema formation. It also obstructs adequate plaque control measures implementation and thus hampering overall oral health of an individual. Persistence of diastema can be attributed to the existence of higher frenal connection. Treatment of this type of abnormal frenal attachment is accompanied by the method of frenum excision/frenectomy or frenotomy. This case report describes the eradication of the abnormally attached frenum via modified conventional method i.e. z-plasty technique.

KEYWORDS: frenectomy, aberrant frenum attachment, z-plasty, miller's technique, v-y plasty, frenum excision, frenulum.

INTRODUCTION

A frenum is a mucosal membranous fold which connects the lip and cheek area to the mucosal layer overlying the alveolar bone, the coral pink gingival tissue as well as the underneath periosteum. The term frenum is obtained from Latin vocable called as "fraenum". Its main function in the maxillary area is furnishing stability to the upper-lip. It might hamper gingival health due to its attachment within the close proximity to margin of free gingiva, because of obstruction in plaque-control or continuous muscular pull movement leading to gingival recession as well as increase in the depth of the sulcus. This situation is more conductively suitable for plaque adhesion which is the root causative factor for all associated periodontal problems. Esthetic appeal due to the pull causing midline diastema has to be taken into consideration as well. In today's scenario esthetics have become a crucial factor for pursuing therapeutics.

There are mainly 3 varieties of frenum in the oral cavity, namely maxillary labial-frenum, mandibular labial-frenum and lingual frenum. Hyperplastic frenum appears in cases of thicker fibrous band association in-between maxillary central incisors and is generally noted with the presence of midline-diastema. Abnormal frenum is subject to visual inspection by application of tension over the frenal attachment to visualize the tip motion of the papilla or blanching production within the area. It is considered pathologic in case of wider attachment or absence of adequate area of attached gingiva or if the interdental-papilla migrates on frenal extension. It is classified into 4 types, namely mucosal, gingival, papillary and papilla penetrating in relation to their level of attachment [1]. Frenectomy is the absolute eradication of frenum along with the attachment with underneath alveolar bone. This procedure is carried out by conventional frenum excision method or different modifications of the traditional technique encompassing Miller's procedure, v-y plasty methodology as well as the z-plasty technique. Z-plasty is a periodontal plastic/esthetic surgical procedure implied to enhance the cosmetic aspect of associated scar as well as improvement in the overall functionality. It encompasses a centralised incision placement along with two other incisions on the extremities, thus formation of 2 triangle-shaped flaps of identical proportion/configuration which can be interchanged/transposed [2,3].

Frenectomy is often indicated in the presence of abnormal frenum connection leading to diastema production, flat-type interdental papilla associated with frenulum nearly joint to the margin of free gingiva leading to tissue recession as well as obstructing maintenance of adequate oral hygiene, or the frenum presents with insufficient attached gingiva and shallow vestibular zone. The anomalous frenum is corrected by two methods, namely frenotomy or frenectomy. Frenectomy technique demonstrates the overall eradication of the frenulum along with its connection to the underneath alveolar bone, whereas frenotomy depicts the incision placement and shifting/relocation of the frenum attachment.

All these procedures can be carried out either by scalpel method, electrocautery or by laser technique. Laser and electrosurgical unit provides the advantages of mild or no haemorrhage, decreased pain, reduced post operative swelling, generally no scar formation, no suture placement, blood-less operative field as well as decreased surgical time and

comparatively simpler methodology than scalpel surgery. The associated disadvantages have to be kept in mind while selection of the methodology like electrosurgical burns, explosion risk factors, hindrance with pacemakers as well as production of unpleasant burning smoke. Laser methods have shown delayed wound healing, unintentional heat tissue damage induced by laser and decreased operating accuracy.

Surgical case:

A 21yr male patient, reported to the Department of Periodontics & Oral Implantology, presented with abnormal frenum attachment along with midline diastema in-between maxillary centrals was selected for the modified frenectomy procedure namely z-plasty method. Clinical examination was carried out thoroughly along with radiographic evaluation. Blood investigations were done prior to surgical intervention. Radiograph (IOPAR) reveals the absence of unerupted mesiodens and thus was ruled out completely, confirming the diastema being evoked because of wide aberrant frenum attachment. The patient was informed about the technique to be performed in details priorly and a written consent was procured before commencement of the procedure.

A papillary-type frenulum attachment is selected for corrective therapy. Firstly local anesthetic administration was done using lignocaine with adrenaline. Infiltration was provided on both the labial side and palatal-aspect of the basal point of interdental papilla between 2 maxillary central incisor teeth. The initial incision was placed along the frenal bottom/base at its conjunction to incisive-papillae. The dismemberment was executed downwards upto periosteum, followed by the incisional extension on either edges of mucosal fold to its connection on labially placed mucosa. Detachment of the deeply located fibers from the underneath periosteum is done via scalpel in a criss cross fashion. Periosteal scoring is performed to obstruct re-attachment of the underlying fibers. This produces a diamond-type incision after which the elimination of mucosal membrane and excessive fibrous tissue in-between dentition was performed alongside removal of soft-tissue barricade. Primarily single centralised incision is placed along with 2 laterally placed incisional margins leading to the creation of 2 triangle-patterned flaps of similar dimensions. Optimal undermining was carried out to obtain adequate tension-free flap mobility and minimal destruction of underneath tissue structures. Utmost caution has to be taken while handling the flaps to prevent any distortion of the flap apices. Both the flaps were gradually interchanged to the opposing aspect of apex of either of the two flaps. This allows redistribution of strain on the injury site and alters mid-limb orchestration. Suturing was done at the opposing side of base of the other triangular-flap and secured with proper approximation applying interrupted direct non-resorbable suture. The vertical incisional margin was also completely sutured for healing with primary intention. A periodontal dressing was placed for uninterrupted healing over the surgical site.



PRE OPERATIVE VIEW



20 DAYS POST OPERATIVE VIEW



1 MONTH POST OPERATIVE VIEW



INCISION



**INCISION IN SHAPE
OF A "Z"**



2 FLAPS



**REPOSITIONING OF
FLAPS**



**REPOSITIONED
FLAPS**



SUTURE



PERIODONTAL DRESSING

Post operative instructions were verbally explained as well as given in writing to the patient along with prescription of analgesics if necessary and antibiotic therapy. Patient is advised to follow a soft diet and maintain routine oral hygiene including twice daily toothbrushing except for the surgical site as well as mouthrinsing. Suture removal was done after 1 week duration and healing was noted to be uneventful. Those subjects with orthodontic therapeutic plan were released for the commencement of treatment. The post treatment frenum attachment is reassessed after 1 month duration. This technique has augmented benefit of minimal scar production along with showcasing a camouflage outcome with decreased tissue tension. The most striking feature of this technique is the absolute no relapsing chances of the frenulum, designating is as an extremely dependable and definitive therapeutic modality.

A curve-linear type of z-plasty, generally termed as s-plasty, can be applied when linear margins become more pronounced especially in the cheek areas. Labial frenal excision can be done prior to, post or when orthodontic therapy is going on for treatment of midline-diastrama.

DISCUSSION:

The treatment or correction of the abnormal frenum has voyaged an extensive expedition from the beginning of classical technical approach to the modifications along with electrosurgical procedure and the recently added laser technique. Classical method is applied worldwide but this modification has recently come into forefront because of its advantageous nature of omitting periodontal hindrances postoperatively as well as elimination of the chances of scar formation, therefore bringing the modification of z-plasty to spearhead prominence. The application of these modified methods with enhanced

conservative perspective and accurate incisional margins opens new window towards precise periodontal esthetic/plastic surgical approach. Diastema closure post frenum excision within 2months duration was reported [4] showing the beneficial impact of frenectomy technique on the outcome of ortho therapy with minimal chances of relapse. Similar methods were also employed by laser unit [5] with similar results but were expensive for routine application.

The z-plasty modification method was noted to be perfect treatment epitome for a broader, thicker hypertrophic frenal attachment using lower-type incisional margin placement that was related with inter incisor teeth diastema as well as with a shorter vestibular zone. It helped accomplish the eradication of fibrous band of tissue alongside vertical/length-wise lengthening of the vestibular area. It is relatively safer, cost-effective, permits tissue healing by primary-intension, enhanced recovery and decreased chances of tissue contractions [6]. The limitation associated with this method is the associated method sensitivity [7,8]. Other relatively rare complications that can be encountered are flap dehiscence/necrosis, hematoma production, post operative infected wound site, tissue shedding/sloughing because of elevated wound-tension and the trap-door phenomenon that occurs due to the upgradation of the centralised tissue causing downside contracture of the circumambient scar. This phenomenon can be prevented by accomplishing adequate tissue undermining within the neighbouring zone. This method helps relocate a scar to preferable alignment with an associated normal skin-fold or linear edges of slightest tissue strain [9]. The fundamental z-plasty is performed using 60 degrees angulation on either sides. 2 points that determine the efficacy and tissue-lengthening of this technique are the angulation size and diameter/dimension of central linear margin of 'Z' known as common-diagonal (also called as common-limb or common-member). The angulation is directly proportional to the elongation degree of tissue. Classical 60-degree z-plasty elongates scar by almost 75 %, whereas 40 and 30-degrees elongates it via 50% and 25% respectively [10]. 60-degree pattern is the best for easy reposition/transposition of the two triangle-shaped flaps with minimal associated tension to the adjoining tissue. Pronounced angulation greater than 60-degrees should generally be avoided to prevent excessive strain/tension generation while transpositioning or suturing the 2 flaps in their post operative positions.

CONCLUSION:

For the proper functionality without hindrance and optimal esthetic end result of the therapy encompassing conventional or the modified frenotomy/frenectomy technique alongside application of electrocautery and laser, necessitates the precise and accurate case selection as well as rendering the best treatment possible with optimal healing and relatively limited scar formation. The type of frenal attachment governs the technique to be rendered for its correction with exceptionally brilliant outcome. Over the past decades, z-plasty has been proved to be an efficacious treatment modality with added benefits of minimal scar production, diminished chances of relapse, better color coordination with the surrounding tissues, safe, cost-effective as well as healing is prompted by primary-intention.

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