



Case Report

Expanding the frenectomy: Modifications of the conventional technique- Case report

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Abstract

Frenectomy, the removal of aberrant frenum, can be performed using various techniques to address issues like midline diastema, aesthetic and speech problems. Frenectomy techniques have undergone significant advancements, moving beyond conventional limitations to enhance precision, reduce complications, and improve patient outcomes. Modern approaches integrate laser technology, refined surgical methods, and evidence-based practices to address functional and aesthetic challenges more effectively. This case report demonstrates modifications of conventional scalpel methods such as Miller's technique, V-Y plasty and Z plasty. Multiple surgical approaches are available, each with unique merits and limitations. The conventional scalpel method is a traditional approach with potential for postoperative pain, scarring, and periodontal issues. Miller's Technique offers better aesthetics but limited applicability. V-Y Plasty and Z Plasty is complex, with variable aesthetic results, especially for thick frenum. Frenum can be excised through various modalities and techniques. appropriate selection of techniques based on clinical scenarios will provide functionally and aesthetically superior outcomes and patient satisfaction.

Keywords: V-Y Plasty, Z Plasty, Millers, Frenectomy

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1. Introduction

A frenum is a fold of mucous membrane that can lead to excessive tension, limit freedom of motion, or lead to gingival recession, midline diastema, or instability in a dental prosthesis. These complications highlight the clinical need for accurate diagnosis and timely management. Histologic sections of excised frenum typically reveal dense fibrous connective tissue, sometimes with muscle fibers or elastic components, and occasional vascularity. Clinical indicators include blanching of the interdental papilla on lip traction, inability to maintain adequate oral hygiene due to frenum pull, persistent midline diastema after eruption of permanent canines, shallow vestibular depth, speech difficulties, and breastfeeding problems in infants with lingual ties. Aberrant frenum may arise from developmental malposition of tooth buds, trauma during eruption, or persistence of embryological remnants such as the tectolabial band. Genetic

and environmental factors may further influence their occurrence.

Procedures called frenectomy or frenotomy are used to treat these abnormal frenum. While a frenotomy involves moving the frenal attachment to a more advantageous anatomical location, a frenectomy involves completely excising the frenum and its bony connection.¹ The frenum, including its attachment to the underlying periosteum, is completely removed in the traditional frenectomy approach, which was initially explained by Archer in 1961. Despite its effectiveness, the conventional method frequently has demerits such higher surgical trauma, discomfort following surgery, delayed wound healing, and the development of unsightly scars. No pathognomonic features exist, but histology confirms complete excision. In order to get around these restrictions, a number of changes to the traditional frenectomy have been made with the goal of reducing morbidity and enhancing functional and cosmetic results. Some of the often-used changes are Miller's method, Z-

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plasty, V-Y plasty, frenectomy with orthodontic closure, and the use of lasers and electrosurgery. These methods are more appropriate for modern periodontal and orthodontic practice since they place an emphasis on decreased bleeding, quicker healing, less scarring, and improved patient comfort.

1.1 Classification

Frenum are classified based on their attachment as mucosal, gingival, papillary, and papilla-penetrating types (Placek et al., 1974).²

1. Mucosal: when the Fibers are attached up to the mucogingival junction
2. Gingival: when the Fibers are inserted within the attached gingiva
3. Papillary: when the Fibers extend into the interdental papilla.

Papilla penetrating: when the Fibers cross the alveolar process and extend up to the palatine papilla.

2. Case Presentation

2.1 Miller's technique

20-year-old female patient was referred from department of orthodontics where currently wearing removable appliance of long labial bow with finger spring for diastema closure. No relevant medical history present. An intraoral examination reveals a midline diastema between the maxillary central incisors and frenum is papillary-attached. Procedure started after getting informed consent and haematological lab investigations. The technique for frenum removal is advocated in this case was miller's technique. It will provide orthodontic stability and preservation of interdental papilla. After intraoral examination, local infiltration of 2% lignocaine with 1:80,000 adrenaline was used to anesthetize the frenum region and the maxillary right lateral incisor region. A hemostat (Artery forceps) was used to engage the middle of the frenum. After that using no.15C BP blade horizontal incisions are made above and below the hemostat to detach the frenum from the papilla and the alveolar mucosa. A vertical parallel incision was made on the mesial side of the right lateral incisor that was 2-3 mm apical to the marginal gingiva up to vestibular depth. To elevate the flap, the gingiva and alveolar mucosa between these two incisions were partially dissected. A horizontal incision was created between the coronal ends of the two vertical incisions, 1-2 mm apical to the attached gingiva of right central incisor region. Primary closure across the midline was achieved by raising, mesially mobilizing the flap, and putting simple interrupted sutures using 5-0 silk suture. Periodontal pack (Coe pack) was placed over the operated area.

2.1.1 Post-operative care and follow up period

Post-operative instructions were given to patient. Patient was on antibiotic medication cap. Amoxicillin 500mg TDS, analgesic tab. paracetamol TDS for 3 days. Patient recalled

on 14th day and removed the sutures and pack. The healing was uneventful.

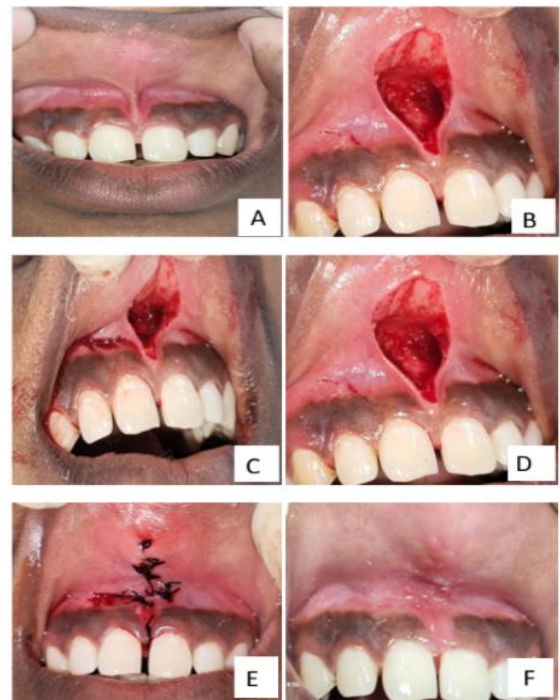


Figure 1: Millers technique; **A):** Pre-operative view; **B):** Vertical incision placed mesial to lateral incisor; **C):** Horizontal incision placed in the coronal end of vertical incision; **D):** lateral pedicle graft obtained **E):** Suturing done; **F):** Post-operative view.

2.2 V-Y Plasty

A 22-year-old female patient was referred from the department of orthodontics for correction of frenum after removing fixed orthodontic treatment. The chief complaints of patient were spacing between teeth. Intraoral examination showed thick labial papillary attached frenum. Procedure started after getting informed consent and haematological lab investigations. The frenum removal is advocated in this case is v-y plasty using scalpel. It moves the frenum and lengthens the vestibule. A transformation where a Y is formed after a V-shaped incision is created. Effective for vestibular deepening but requires surgical expertise.³ With local infiltration, 2% lignocaine with 1:80,000 adrenaline was used to anesthetize the frenum region. Following anaesthesia, the frenum was secured with the haemostat, and V shaped incision is made using no.15C BP blade, under the hemostat near to the base of the frenum. Undermining the peripheral tissue and muscle fibres done. After that, the frenum was moved to the apical position, the V-shaped incision was changed to a Y, and simple interrupted sutures placed using 4-0 silk suture material to close the surgical area. There was a periodontal pack (Coe pack) inserted.

2.2.1 Post-operative care and follow up period

Post-operative instructions were given to patient. Patient was on antibiotic medication cap. Amoxicillin 500mg TDS, analgesic tab. paracetamol TDS for 3 days. Patient recalled on 14th day and removed the sutures and pack. The healing was uneventful.

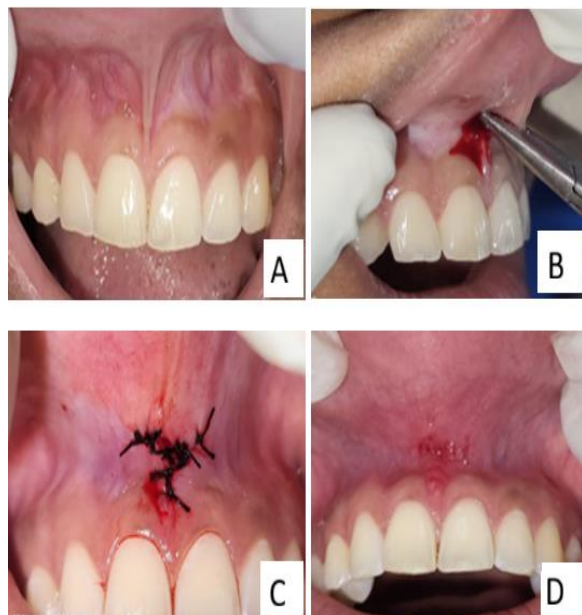


Figure 2: v-y plasty; **A):** Pre operative view; **B):** V shape incision given under hemostat; **C):** Post operative view; **D):** Suturing done.

2.3 Z-Plasty

21-year-old female patient was referred from department of orthodontics where currently wearing removable appliance. Chief complaints of spacing between teeth. No systemic medical history present. On intraoral examination shows hypertrophic thick papilla penetrating frenum. Procedure started after getting informed consent and haematological lab investigations. Z plasty technique using scalpel surgery is performed. A plastic surgical technique where two oblique incisions create triangular flaps, which are transposed to lengthen and redirect tension lines. It provides excellent esthetic outcomes but is technique-sensitive.³ The surgical site is anesthetized with 2% lignocaine with 1:80,000 adrenaline. First incision was the vertical incision. It was made along the centre of the frenum from base to the apex of the frenal attachment, Using no.15C BP blade. The z shaped incision was made by making two lateral horizontal incisions at the base and apex at 60-degree angulations on either end. Results of these incisions given at both end of frenum two triangular flaps are formed. Appropriate undermining of peripheral tissues was performed. Two flaps were transposed to the side opposite each flap's apex and simple interrupted suture placed in the form of Z shape incision line with 5-0 silk suture. Periodontal pack (Coe pack) is placed over the operated area.

2.3.1 Post-operative care and follow up period

Post-operative instructions were given to patient. Patient was on antibiotic medication cap. Amoxicillin 500mg TDS, analgesic tab. paracetamol TDS for 3 days. Patient recalled on 14th day and removed the sutures and pack. The healing was uneventful.

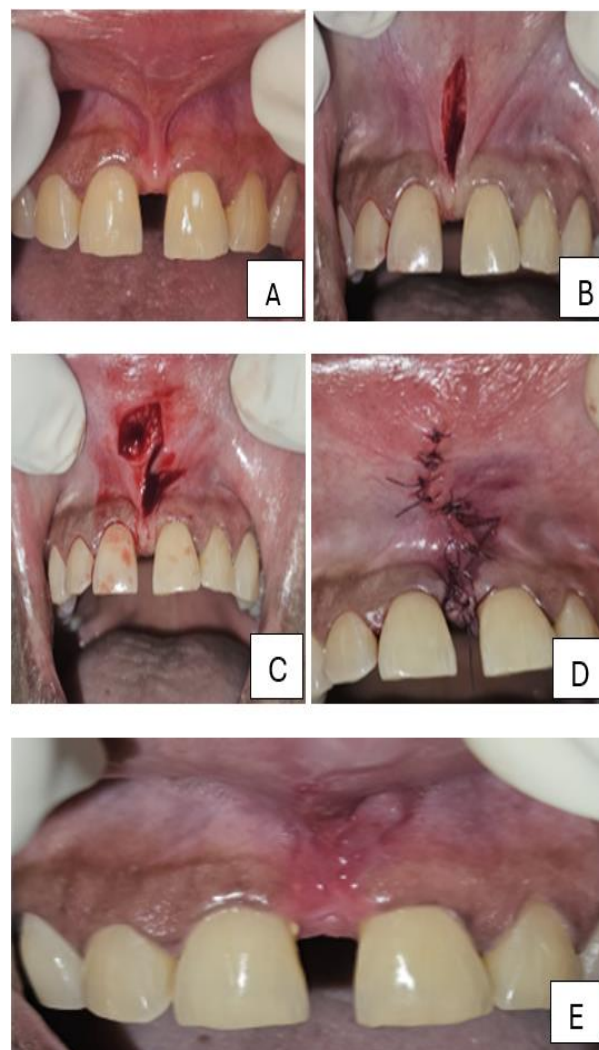


Figure 3: z plasty; **A):** Pre-operative view; **B):** Vertical incision in the middle of the frenum; **C):** 60 degree angulated incision on either end; **D):** Sutures done; **E):** Post operative view

3. Discussion

Frenum abnormalities can compromise oral function, aesthetics, and periodontal health, requiring surgical intervention through frenectomy or frenotomy. Several techniques, ranging from conventional scalpel excision to modern laser-assisted procedures, have been developed to address these conditions. A comprehensive comparison of these methods provides insight into their clinical application, outcomes, and limitations.

The oldest and most widely practiced approach involves complete excision of the frenum with scissors or scalpel. It is reliable, inexpensive, and provides tissue for histological analysis. A haemostat was used to engage the frenum; it was entered into the vestibule's depth, and incisions were made on both its upper and lower surfaces until the tissues were released. The frenum's triangularly resected portion containing the haemostat was taken out. Muscle fibres were carefully dissected to release the connection. 3-0 black silk with interrupted sutures was used to undercut and suture the diamond-shaped wound's edges. However, it is associated with more intraoperative bleeding, postoperative discomfort, and visible scarring.³ Although conventional frenectomy is an effective way of removing aberrant frenum, it has been criticized for its limitations, which have led to numerous methodological modifications, including surgical stress, papillary loss, and visible scarring. Although Archer and Kruger's description of classical scalpel excision is still efficient, it may jeopardize interdental papilla and aesthetics, especially in high papillary or papilla-penetrating attachments.³

Modifications focused on periodontal plastic surgery seek to preserve (or increase) keratinized tissue while lowering morbidity. Miller's method, which consists of frenectomy and a laterally placed pedicle graft, repositions tissue to restore a sufficient band of connected gingiva. It usually heals by primary intention with little scarring, which makes it appealing in esthetic zones and in cases when the phenotypic is thin. Timing in relation to orthodontic therapy and phenotype-based planning are crucial for all adjustments. In order to reduce scar-related recurrence and maintain papillary shape, many authors recommend space closure before to definitive frenectomy for diastema associated with a high papillary frenum; Miller's approach specifically follows this order.⁴ According to recent studies, it is used to promote dressing retention and allow maturation following orthodontic space closure, which occurs roughly six weeks prior to appliance removal.⁵ The main advantages of the aforementioned approach are acknowledged to be the formation of a thick zone of connected gingiva, color compatibility with surrounding tissue, healing by primary intention, and scar-free outcomes.⁶

Despite the exact origins of the Z-plasty concept and technique are unknown, they most likely go back several

centuries. Originally created by Denon Villiers in 1856 to treat eyelid scars, Z-plasty is now used in all.⁷ Hove et al Z-plasty could produce a very good aesthetic result. By using this technique, a scar can be moved to better fit a natural skin fold or the lines of the skin's most minimal tension⁸. The Z-plasty design's structure is provided by the 60-degree angles on either side; the larger the angle, the larger the extension. It will help deepen the vestibule and reduce the creation of scars because it lengthens and redirects the tissue incision, which is not feasible with other techniques. Excessive wound tension following a Z-plasty frenectomy may cause flap necrosis, haemorrhage, infection, and flap sloughing. However, these challenges can be avoided with a methodical and careful approach.⁹

V-Y plasty is a strategically minimal invasive approach to aberrant frenum management. It treats aberrant high maxillary frenal attachments with minimum scarring and gives aesthetic benefits to the patient. It allows for the easy manipulation of fibrous tissue essential for addressing aberrant frenal attachment problems. The papillary frenal attachment demonstrated satisfactory results with proper postoperative healing and satisfactory results to the patient. It is a reliable and helpful method for covering the defects caused by frenectomy and elongating the structures with better clinical outcomes.¹⁰ Using a scalpel and the V-Y plasty technique, the abnormal frenal attachment was treated. After a month, it was evident that the frenal attachment had been shifted to an apical location, where scar tissue formation was minimal and the healing process was uneventful. Because the V-Y plasty approach produces less scar tissue than the traditional technique, it can always be used to treat cases with aberrant frenal attachment while leaving an aesthetically pleasing look.¹¹

Different approaches have different risk-benefit calculations. Although classical excision is straightforward and frequently taught, there is a greater chance of papillary flattening and noticeable scarring. Miller's method offers attached gingiva gain and aesthetic blending, but it requires greater surgical skill. Although Z-plasty and V-Y plasty are helpful for extending the lips and rerouting tension, they require precise flap design to prevent necrosis or dehiscence; these risks are reduced by cautious patient selection and atraumatic handling.¹²

Table 1: Comparative summary.

Technique	Key Features	Advantages	Disadvantages	Clinical Indications
Miller's Technique	Excision + pedicle graft	Preserves papilla; esthetic healing; minimizes scarring	Technique sensitive; needs keratinized tissue	Diastema with esthetic concern
V-Y Plasty	V incision → Y closure	Vestibular depth increase; functional	Technique sensitive	High frenum requiring vestibular extension
Z-Plasty	Two triangular flaps transposed	Lengthens vestibule; redirects scar	Technically demanding	Esthetic cases with vestibular deficiency

4. Conclusion

Frenectomy techniques continue to evolve, shifting from conventional excision to minimally invasive methods that enhance patient comfort, esthetics, and functional outcomes. Due to its convenience of use, the traditional scalpel approach is still frequently used, however it frequently causes excessive bleeding, discomfort after surgery, and noticeable scars. By maintaining papillary integrity and enhancing attached gingiva, Miller's approach offers both practical and aesthetic advantages, which makes it perfect for orthodontic situations and thin gingival biotypes. While V-Y plasty deepens the vestibule and reduces scar development, especially in broad or papilla-penetrating frenum, Z-plasty efficiently reorients tension lines and camouflages scars, providing superior esthetics in high papillary attachments. Technique selection should be individualized based on clinical indication, anatomical considerations, and patient-specific factors.

5. Clinical Significance

Understanding the full spectrum of frenectomy methods ensures optimal management of abnormal frenum, balancing functional rehabilitation with esthetic preservation.

6. Source of Funding

None.

7. Conflict of Interest

None.

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