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# Frenectomy in Aberrant Frenulum Labialis – Literature Review

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**Abstract**

A smile is a human facial feature that is attractive and one of the forms of human communication and expression. An esthetic smile is determined by several factors such as the shape, position, and color of the teeth, as well as the condition of the frenulum labialis. Aberrant frenulum labialis can be treated by performing a frenectomy. Properly diagnosing and planning the management of aberrant frenulum must be done to achieve satisfactory results both in healing and aesthetics. This literature review is a compilation of an overview of the frenulum and its classification of attachments, indications and contraindications for frenectomy, and various techniques of frenectomy.
**Keywords**: Diastema; esthetic smile; frenectomy; labialis frenulum; recession

## Introduction

A smile is an appealing human facial feature and a key form of communication and expression. Attention to appearance and smile in both adults and children is one of the main reasons patients seek dental treatment. An aesthetic smile depends on various factors, including the shape, position, and color of the teeth, as well as the condition of the frenulum labialis.[1-3]

The frenulum labialis is a fold of mucous membrane with enclosed muscle fibers that attaches the lips to the alveolar mucosa or gingiva and its underlying periosteum.[4,5] The frenulum labialis is classified based on its attachment location. An aberrant or high frenulum labialis is located too close to the gingival margin or on the interdental papilla.[5,6] An aberrant frenulum labialis can lead to aesthetic and periodontal problems, such as a diastema of the central incisors, and can hinder the cleansing process of the teeth.[2]

The management of an aberrant frenulum labialis is by doing Frenectomy procedures. Frenectomy is the complete removal including its extension to the underlying bone.[1] Frenectomy can be accomplished with various techniques, either conventionally with

a scalpel, electrocautery, or lasers.[6] Dental practitioners must be skilled in identifying and diagnosing aberrant frenulum to develop appropriate treatment plans that ensure satisfactory results in both healing and aesthetics. This article is a literature review compiled from various sources, providing an overview of the frenulum and its classification, indications and contraindications for frenectomy, and different frenectomy techniques.

**Frenulum**

The Frenulum is a fold of mucous membrane with enclosed muscle fibers that attaches the lips to the alveolar mucosa or gingiva and its underlying periosteum. frenulum labialis. There are two types of frenulum labialis, superior and inferior frenulum labialis.[5] A previous study found that, histologically, the frenulum consists of elastic and muscle fibers. However, another study contradicted this, finding a high density of collagenous tissue and elastic fibers, but no muscle fibers.[7]

**Diagnosis**

An aberrant frenulum is diagnosed using a blanch test. This test involves applying tension to the frenulum and visually observing for ischemia in the region.[8] If the gingival margin moves or blanching occurs due to ischemia, the test is positive, indicating an aberrant frenulum. Miller has recommended that the frenulum be considered pathogenic if it is unusually wide, if there is no zone of attached gingiva along the midline, or if the interdental papilla shifts when the frenulum is extended.[9]

**Classification of frenulum attachments**

Based on the morphotypes, Sewerin classified frenulum as normal frenulum, simple frenulum, simple frenulum with anodul, simple frenulum with appendix, simple frenulum with nichum, bifid frenulum, and double frenulum.[3,7] Another classification is by Placek, that classified frenulum based on the location of its attachments. Mucosal frenulum is attached up to the mucogingival junction, gingival frenulum is inserted within the attached gingiva, papillary frenulum is extended into the interdental papilla, and papilla penetrating is crossed the alveolar process and extended up to the palatine papilla.[3,7]

Papillary and papilla penetrating frenulum were generally considered to be aberrant or pathogenic because clinically associated with gingival recession, diastema of central incisors , and difficulty in brushing the teeth. Gingival frenulum attachment could also lead to the accumulation of plaque in gingival sulcus then lead to the gingival recession and periodontal diseases.[7]

**Frenectomy**

A frenectomy involves the complete removal of the frenulum and its attachment to the bone.[11] There are several indications and contraindications for this procedure. Frenectomy is indicated when an aberrant frenulum causes a midline diastema, is closely attached to the gingival margin causing gingival recession and hindering oral hygiene maintenance, exhibits inadequate attached gingiva and a shallow vestibule, appears as an unpleasing and visible pendulous piece in the midline of the upper lip, disrupts oral hygiene, or causes speech disturbances.[7]

Frenectomy should not be performed on children in the "ugly duckling" stage, where the space is a normal growth characteristic during the primary and mixed dentition phases and will generally close by the time the maxillary canines erupt. In young children, the frenulum is typically wide and thick but becomes thinner and smaller with growth.[3]

**Techniques for frenectomy**

1. Conventional Techniques

   These techniques uses excision with a scalpel. Conventional techniques consist of Classic Technique, Z-Plasty, V-Y Plasty, and Miller's Technique. Classic technique was introduced by Archer and Kruger, in which the frenulum is excised using a scalpel. The frenulum, interdental tissues, and palatine papilla are removed. This technique is used in cases with midline diastema. After the frenulum was anesthetized, the frenulum was engaged with a hemostat to the depth of the vestibule. Incisions were placed on both the upper and bottom surface of the hemostat then remove the triangular-shape frenulum tissue. A Horizontal incision is given to separate and dissect the tissue from the bone. The diamond-shaped wound was then sutured. This

technique is easy to perform but also has a high risk of relapse and scar tissue formation.[3,7]

Z-Plasty is indicated for cases of hypertrophy with low insertion frenulum that is associated with incisors diastema and also in cases with short vestibule. After the administration of anesthetics to the frenulum, the length of the frenulum is incised with releases parallel to 60° obliquely to resemble the letter "Z", on each of the end of incisions. By using tissue forceps two pointed flaps are then gently undermined and rotated to close the initial vertical incision horizontally. The use of this technique could provide both the removal of the frenulum and the lengthening of the vestibule.[3,7,10]

V-Y Plasty can be used for papillary type frenulum or to lengthen a localized area like a broad frenulum in the premolar-molar region. After the frenulum is anesthetized, the frenulum is engaged with a hemostat and then made an incision in the form of the letter "V" on the under-surface of the frenulum. The frenulum then relocated at the apical position therefore converting The V-shaped incision to a Y-shaped while it is sutured.[3,7]

Miller's Technique was introduced by Miller and is usually used in cases of post-orthodontic diastema. The ideal time to perform this surgery is after the orthodontic movement is completed and about six weeks before the removable of orthodontic appliances. This is done to allow healing and maturation of the tissue and to also permit the use of orthodontic appliances as a retention for the periodontal dressing.[7]

After the frenulum is anesthetized, separate the frenulum from the interdental papilla with a horizontal incision. The incision then extended apically up to the vestibular depth to completely separate the frenulum from The alveolar mucosa. Afterwards, dissect out all of the frenulum including the freely movable connective tissue to completely separate the frenulum. Make a vertical parallel incision on the mesial side of the lateral incisor. The gingiva and alveolar mucosa in between these two incisions were undermined by partial dissection to raise the flap. 1-2 mm apical to gingival sulcus in the attached gingiva a horizontal incision was made, connecting

the coronal ends of the two vertical incisions. The Flap was raised and mobilized to the mesial and sutured across the midline.[7,9] The technique given by Miller is combined with a laterally positioned graft. This technique can achieved complete closure across the midline due to laterally positioned gingiva. Therefore this technique obtained not only healing but also aesthetic results.[9]

The use of a scalpel in the conventional technique carries typical surgical risks such as bleeding and discomfort, and not every patient will comply.In contrast, medical lasers offer excellent hemostasis, cause less injury to the surrounding tissue, and result in minimal scarring. They also reduce pain and edema, leading to greater postoperative comfort due to their ability to selectively and precisely interact with injured tissue.[10]

2. Frenectomy with Lasers[7,11,12]

Laser frenectomy is ideal for cases requiring minimal bleeding due to the advantages lasers offer, such as increased coagulation and hemostasis, resulting in a dry surgical area and significantly reducing the need for suturing. Lasers used for frenectomy include Carbon Dioxide (CO2) Lasers, Cr: YSGG Lasers, Diode Lasers, Erbium (Er) Lasers, and Neodymium-doped Yttrium Aluminum Garnet (Nd: YAG) Lasers.

After the frenulum is anesthetized and clamped with a hemostat, the laser beam is used to excise the tissue. The laser tip is applied to the tissue, following the vertical axis of the frenulum until the wound is linear in shape. The laser is then applied transversely until the wound takes on a rhomboidal shape. The ablated tissue is continuously mopped using a wet gauze piece to remove charred tissue and prevent excessive thermal damage to the underlying soft tissue. Suturing is not necessary with this bloodless technique, which also reduces the risk of post-operative pain and swelling.

3. Frenectomy with Electrocautery

Electrocautery or electrosurgery can be used in cases of patients with bleeding disorders or patients with a higher risk that is associated with problems in achieving hemostasis.[7] This technique utilizes the use of electrosurgery-cauter to excise the frenulum. The electrode tip of the cauter has a high electrical current, this high-frequency electrical current leads to the evaporation and shrinkage of the tissue which results in minimal bleeding.[6,8] Electrosurgery offers the advantage of minimal bleeding and requires no need to suture the wound. This technique also provided good visibility during the procedures.[7]

## Discussion

frenectomy, with various modifications available. Each method has its own advantages and disadvantages. The classic technique, while easy to perform, carries a high risk of relapse and scarring. Z-Plasty is ideal for a thick and hypertrophic frenulum with a low insertion and for patients with a short vestibule. Miller's technique can achieve both effective healing and aesthetic results. The use of a scalpel in the conventional technique carries typical surgical risks such as bleeding and discomfort, and not every patient will comply.

To address the shortcomings of traditional methods, other techniques such as lasers and electrosurgery have been proposed. These methods offer minimal to no bleeding and thus require no suturing, making them ideal for patients who need a minimally invasive procedure. They also result in satisfactory healing and aesthetic outcomes. Even though compliance and pain evaluation may vary widely, pediatric dentists should consider using lasers for frenectomy in pediatric patients.

## Conclusion

An aberrant frenulum could cause midline diastema and hinders the patient’s aesthetics and appearance. This aberrant frenulum can be diagnosed with a blanch test and managed with frenectomy. A frenectomy can be done by several techniques based on

previous literatures. Satisfactory and successful results can be achieved by choosing the appropriate technique based on frenulum attachments.

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