

Frenectomy for supporting diastema closure correction in orthodontic patients

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Abstract

Introduction: The maxillary frenulum can cause aesthetic problems or jeopardize orthodontic results in cases of central diastema, causing relapse after treatment. One of the etiologic factors of central diastema persistence is an aberrant frenulum. The most common way to diagnose frenulum attachment is with the blanch test. One of the treatments for aberrant frenulum is frenectomy. Frenectomy can reduce the risk of relapse from central diastema closure. The purpose of this case report is to describe the stages of frenectomy in a case of maxillary central diastema.

Case report: A 24-year-old woman came to the Periodontics Specialist Clinic due to a referral from the Department of Orthodontic, Dental Hospital Universitas Airlangga with complaints of loose maxillary front teeth and planned to be treated using fixed orthodontic devices at Department Orthodontic. The blanching test examination showed that the labial frenulum was in the high frenulum category.

Case management: Frenectomy was performed using a scalpel. After extraoral and intraoral asepsis, infiltration anesthesia was performed on the labial and palatal sides of tooth 11,21. Clamp the maxillary labial frenulum using a hemostat and then incise the frenulum using blade no 15c in a V shape, then incise the frenulum attachment on the interdental to the palatal region with an elliptical incision. Interrupted suturing using Nylon thread size 4.0. The surgical area was closed using a periodontal pack. Sutures were removed on day 14. Follow-up at 19 months showed no diastema in the anterior maxilla, the patient wore a retainer in the maxilla and a fixed retainer in the mandible. There were no further complaints after the treatment.

Conclusion: Frenectomy before orthodontic treatment helps accelerate the treatment progress to correct the central diastema.

Keywords: Frenectomy; Central diastema; Blanching test; High frenulum; Orthodontics

1. Introduction

The maxillary frenulum can cause aesthetic problems or jeopardize orthodontic results in cases of central diastema, causing relapse after treatment¹. Central diastema is a common problem in adults affecting aesthetics. Central diastema is a space or gap greater than 0.5 mm between the mesial surfaces of the maxillary central incisors². One of the etiologic factors for the persistence of central diastema is an aberrant frenulum^{2,3}.

The frenulum is a fold of mucous membrane surrounded by muscle and connects the mucosa of the lips, cheeks, and tongue with the gingival tissue^{4,5,6}. The frenulum can become a problem if tension from lip movement pulls the gingival margin away from the teeth or if the tissue inhibits diastema closure during orthodontic treatment^{7,8,9}. The blanch test is the most commonly used method to diagnose high frenulum attachment. It is performed by applying tension to the frenulum by pulling it and visually detecting the movement of the papillae tips or the appearance of blanching^{10,11}.

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One of the treatments for aberrant frenulum is frenectomy^{3,12}. Frenectomy is the removal of the entire frenulum including its attachment to the underlying bone to correct the abnormal distema between the maxillary central incisors¹³. Frenectomy can reduce the risk of relapse from central diastema closure¹⁴.

Frenectomy can be performed with conventional techniques, electrosurgery, or soft tissue lasers^{2,15,16}. Some orthodontists argue for early frenectomy to prevent obstacles in completing diastema closure which aims to eliminate predisposing factors for periodontal disease and correct the central diastema together with orthodontic treatment⁹. Diastema closure can be performed with simple removable appliances incorporating finger springs, split labial bow, or fixed orthodontic appliances².

2. Case Report

A 24-year-old woman came to Periodontics Specialist Clinic due to a referral from the Department of Orthodontic, Dental Hospital Universitas Airlangga with complaints of maxillary front teeth being loose and planned for treatment using fixed orthodontic devices at SMF Orthodontia (Figure 1). From the clinical examination, there was plaque, calculus, Bleeding on Probing, and the blanching test examination showed that the labial frenulum was included in the high frenulum category (Figure 2). The diagnosis for this case was Aberrant Frenum at region 11, 21. The patient wanted to be treated.



Figure 1 Initial photograph. (a) clinical. (b) panoramic radiograph



Figure 2 (a,b) Blanching test

3. Case Management

The patient underwent supra and subgingival scaling and was evaluated 4 weeks later. The patient had good compliance with oral hygiene instructions. After scaling root planning and evaluation, frenectomy was planned (Figure 3).

Before the frenectomy treatment began, the patient was explained about the treatment that would be performed so that informed consent was obtained. The frenectomy in this case was performed manually using a scalpel. The first step was to perform extraoral asepsis followed by intraoral asepsis using povidone-iodine 10% in the 11, 21 tooth region. Perform infiltration anesthesia using Lidocaine HCL 2%, and adrenaline 1:100,000 on the working area (labial and palatal sides). Clamp the maxillary labial frenulum using a clamp haemostat. Incise the frenulum using blade no 15c in a V shape, then incise the frenulum attachment at the interdental to the palatal region with an elliptical incision. Irrigation using 0.9% NaCl saline solution. Suturing was done with Nylon thread size 4.0 with interrupted technique. The surgical area was closed using a periodontal pack. Give postoperative instructions (Figure 3a to 3j).



Figure 3 Maxillary labial frenectomy procedure. (a) extraoral aseptics with povidone iodine 10%. (b) extraoral aseptics with povidone iodine 10%. (c) infiltration anesthesia. (d) clamping the frenulum labialis with a clamp, starting the incision from the left side to the right. (e) incise the frenulum in a V shape. (f) incise the frenulum at the interdentary part. (g) frenulum incision from interdentary to palatal. (h) suturing using nylon 4.0 thread. (i) periodontal pack on the labial side. (j) periodontal pack on the palatal side.

The patient had control on day 7 and day 14. Suturing was removed on day 14. The patient had no complaints after surgery (Figure 4).



Figure 4 Control. (a) Day 7 control. (b) Control Day 14

After the control frenectomy, the patient was fitted with a fixed ortho device at SMF Orthodontics. After 19 months of follow-up, no relapse of the central diastema was seen (Figure 5).



Figure 5 Follow-up. (a) 6 months. (b) 16 months. (c) Removable retainer in RA and fixed retainer in RB. (d) 19 months (e) 19 months

Follow up at 19 months showed no diastema in the anterior maxilla, the patient wore a retainer in the maxilla and a fixed retainer in the mandible. There were no further complaints after the treatment.

4. Discussion

The maxillary central frenulum is an anatomical structure that connects the mucosa of the processus alveolaris to the upper lip. (8)(17)(18) An abnormal labial frenulum can cause central diastema, relapse of orthodontic treatment, gingival recession, impaired denture retention, and impaired gingival health due to poor plaque control^{3,8,19,20}. The maxillary labial frenulum is an embryonic structural eruption remnant of the ectolabial band that connects the tubercle of the upper lip to the palatine papilla^{3,13,21}.

Under normal conditions, as dentoalveolar growth occurs, the processus alveolaris will grow occlusally and the attachment area of the superior labial frenulum will be more apical or closer to the vestibule. If there is a failure to move the frenulum attachment apically, it will cause a central diastema¹². A V-shaped cleft between the two central incisors can usually interfere with the formation of transeptal fibers and cause abnormal frenulum attachment resulting in a diastema².

Placek M et al (1974) classified labial frenal attachment based on the attachment location, namely mucosal, gingival, papillary, and papilla penetrating. Mucosal attachment if the frenulum fibers are attached above the mucogingival junction. Gingival attachment if the frenulum fibers enter into the attached gingiva. Papillary attachment if the frenulum fibers extend to the interdental papilla. Papilla penetrating if the frenulum fibers extend beyond the alveolar bone and extend to the palatine^{3,8}.

Treatment of aberrant frenulum can be done with frenotomy or frenectomy³. Frenectomy is the procedure of removing the frenulum in its entirety including freeing the underlying muscle fibers, while frenotomy is the procedure of relocating the frenulum attachment^{4,5,15}. Central diastema cases that have undergone orthodontic treatment can relapse twice as often in patients with abnormal frenulum conditions compared to normal frenulum, and the risk of relapse decreases with frenectomy⁶.

Clinicians must understand the etiology, consequences, and extent of the diastema as not all diastemas can be managed in the same way with respect to timing or treatment modality²². Retrospective studies have reported that treatment outcomes are more predictable with concurrent frenectomy and orthodontic treatment, but only a small number of central diastema closure cases are successful with frenectomy alone¹¹. Orthodontic maintenance in cases of significant diastema closure will require a palatal bonded retainer regardless of whether a frenectomy is performed or not, as diastema closure is mostly unstable⁶.

5. Conclusion

Frenectomy before orthodontic treatment helps accelerate the treatment progress to correct the central diastema.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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