

## Surgical Intervention Of Z-Plasty Frenulum Technique In The Fixed Orthodontic Treatment Of Patients With Oligodontia

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Frenulum, fixed orthodontics, oligodontia, Z-plasty

### ABSTRACT

**Background:** Oligodontia is a genetic disorder in which the individual does not have more than six teeth either permanent, deciduous, or both teeth. This condition causes multiple diastemas and requires orthodontic treatment. Abnormal attachment of the superior labial frenulum also causes midline diastema, and recurrence of diastema after orthodontic treatment. Z-plasty frenectomy is commonly used for patients with thick frenulum and shallow vestibule. The presence of two transposed flaps in this technique can provide stress distribution in the tissue to minimize the occurrence of scar tissue formation.

**Case Report:** A female patient, 20 years old and systemically healthy, came to RSGM Prof. Soedomo with complaints of a maxillary front tooth gap that disturbed her self-confidence. The patient was referred by an orthodontist colleague.

**Result:** Clinical examination in the form of a blanch test and vestibule depth. From the examination, it was found that the patient had frenulum attachment to the anterior interdental papilla (Kotlow class III) and a shallow vestibule. In this situation, the Z-plasty technique was chosen. Satisfactory results were obtained with no scarring and no residual connective tissue that could cause diastema recurrence.

**Conclusion:** Frenectomy using the Z-plasty technique was successful in removing the thick frenulum without the formation of scar tissue, and proved to be more aesthetically pleasing than other conventional methods.

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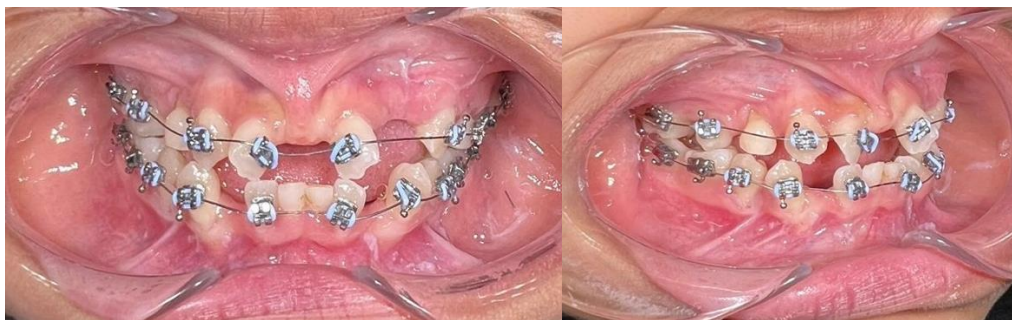
## INTRODUCTION

Oligodontia is one of the abnormalities in the number of teeth, in which an individual has no more than six teeth in the oral cavity. This disorder can occur genetically or be influenced by environmental factors.<sup>2,10,20</sup> This condition causes multiple diastemas, so orthodontic treatment needs to be carried out for this condition.<sup>10</sup> Abnormal attachment of the superior labial frenulum can also cause the diastema to reopen so that post-orthodontic treatment relapse can occur.<sup>7</sup> Z-plasty frenectomy is indicated for patients with a thick frenulum and shallow vestibule. The two transposed flaps in this technique can provide tissue tension distribution to minimize scar formation.<sup>17</sup> This technique can be used to improve the aesthetic and functional appearance of the wound post-surgery and prevent scar formation.<sup>8</sup> The basic Z-plasty technique uses two triangular flaps with a 60-degree angle on each side, and in theory will reorient the wound length to 90 degrees, reduce wound edge tension, and close the wound tightly.<sup>4,15</sup>

The purpose of this case was to see the benefits and success rate of frenulum surgery with the Z-plasty technique on a thick frenulum with a shallow vestibule from an aesthetic point of view in orthodontic patients undergoing orthodontic treatment.

## CASE REPORT

A 20-year-old female patient came to the periodontia resident clinic of RSGM UGM Prof. Soedomo Yogyakarta on recommendation from an orthodontia resident with complaints of a maxillary front tooth gap that disturbed her confidence. This condition has been there for quite some time. There was no history of systemic disease or medication allergies in the patient. Intraoral examination revealed a diastema central maxillary incisor with a thick superior labial frenulum and shallow vestibule. Panoramic radiographic examination showed the patient had agenesis of the seeds of teeth 18, 16, 14, 12, 22, 24, 25, 28, 38, 34, 44, and 48. Examination with the blanch test showed frenulum attachment to the anterior interdental papilla (Kotlow class III).



**Figure 1.** a) Attachment of thick frenulum with a shallow vestibule in frontal view; b) Thick frenulum attachment with shallow vestibule side view

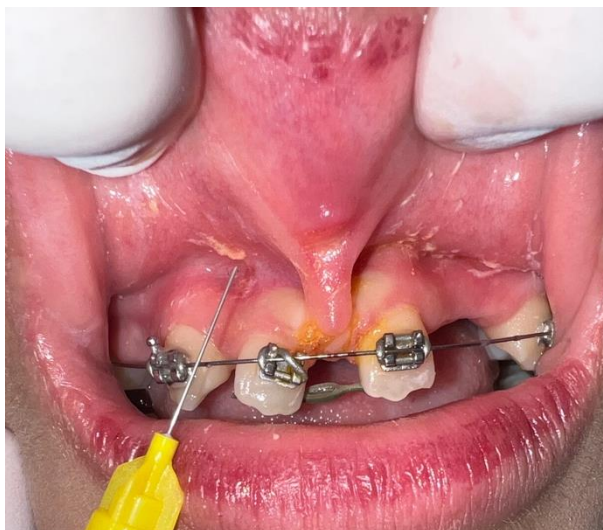
**PROCEDURE**

The patient was planned for frenectomy treatment with the Z-plasty technique after undergoing the initial phase treatment of scaling and polishing. Asepsis was conducted on the surgical area, followed by septocain infiltration anesthetic on the vestibule, lateral frenulum, and papilla area on the palate.



**Figure 2.**

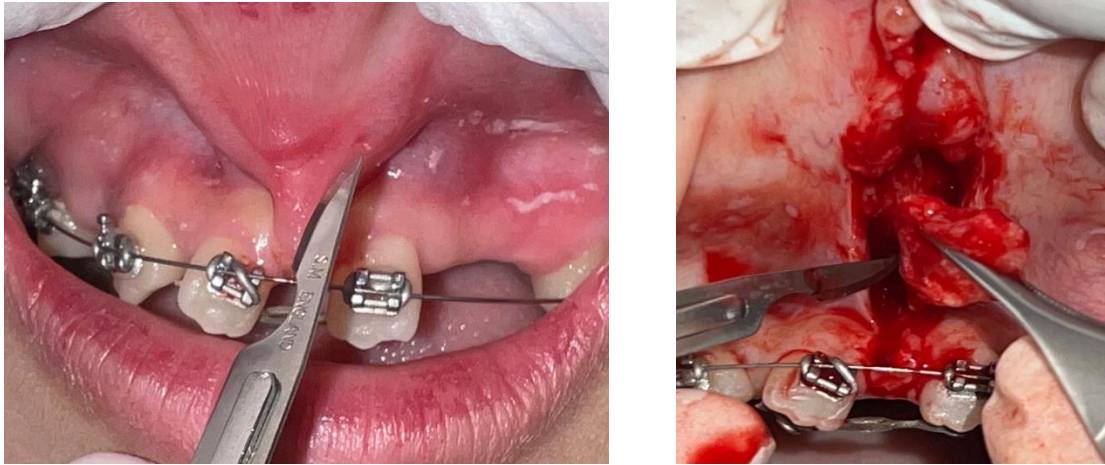
Performed asepsis using povidone-iodine before the surgical procedure is performed.



**Figure 3.**

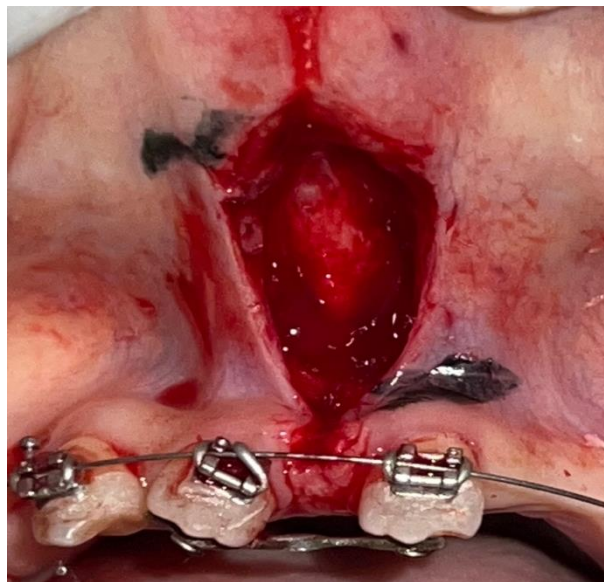
Anesthesia of the surgical area at the mucobuccal fold

The first incision was a vertical incision at the base of the frenulum until it reached the base of the attachment, namely the interdental papilla, followed by the removal of connective tissue and muscle fibers from the frenulum to the bone base below, as well as those that penetrated the palate, using the blunt dissection method.



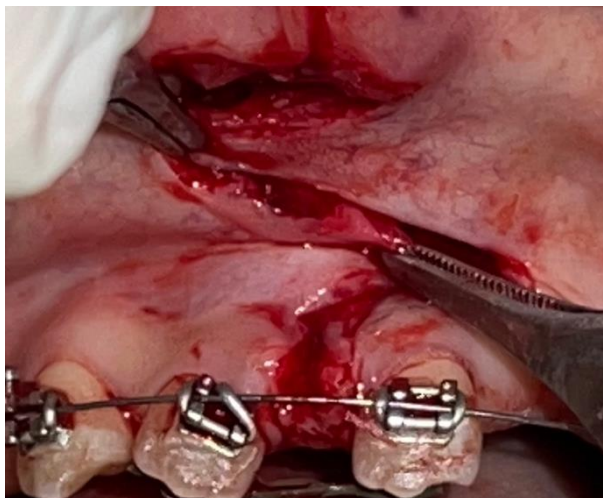
**Figure 4.** a) The first vertical incision at the base of the frenulum; b) frenulum tissue retrieval

After all frenulum tissue attachments have been taken, a horizontal incision design was made where the incision would be made, how long the incision is, the angle to be formed, and the position of the flap after transposition to help ease the surgical procedure. Then the incision was made using blade no.15c on the lateral part of the frenulum according to the design that had been formed by forming an angle of 60 degrees from the first vertical incision.

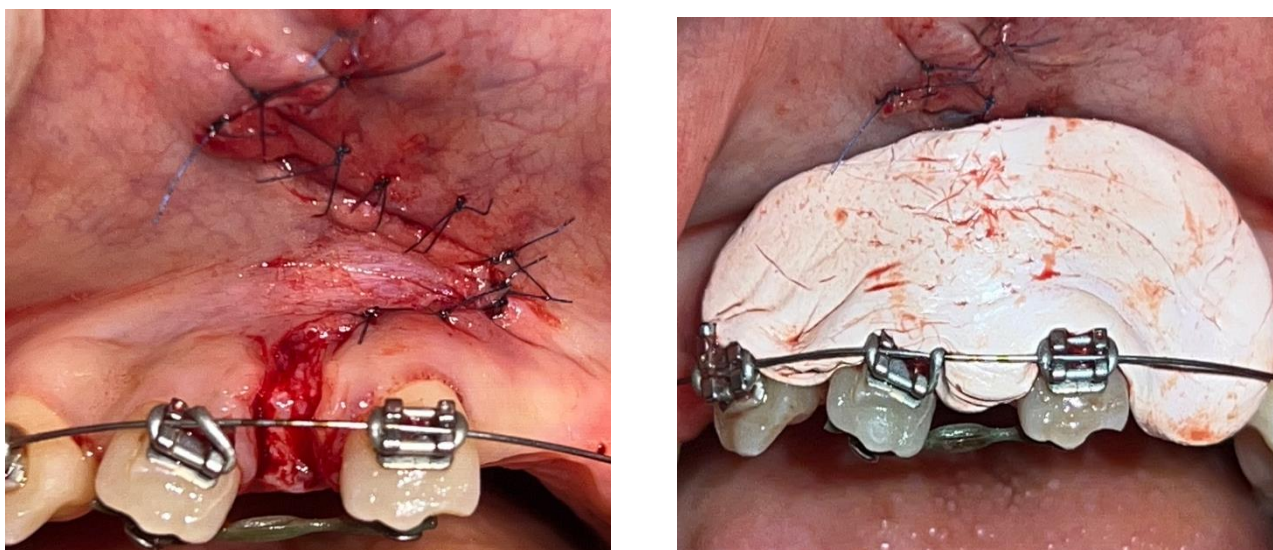


**Figure 5.** Design with an incision to form a triangular flap with a 60-degree angle and both sides of the same length.

The same incision length would form two triangular flaps with the same dimensions, and this would make it easier to transpose the flaps and create a low pull on the wound. Rotate the two flaps in the opposite direction of the apex and close with simple interrupted sutures using size 5/0 nylon non-resorbable thread.



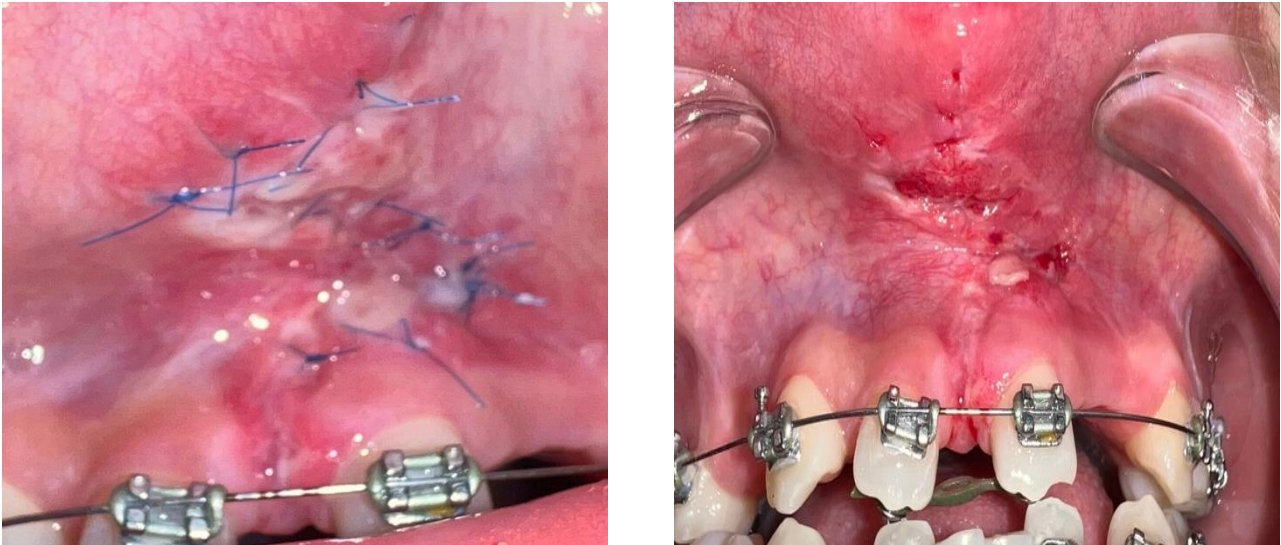
**Figure 6.** Flap position after rotation and transposition, forming a "Z" design



**Figure 7.** a) Suturing the flap with simple interrupted sutures using 5/0 nylon thread; b) closing the surgical area using a periodontal pack.

The wound was then healed with a periodontal pack, and the patient was instructed to take amoxicillin 500 mg every 8 hours for 5 days, mefenamic acid 500 mg three times a day for 3 days, and maintain oral hygiene by washing with 0.2% chlorhexidine solution after brushing teeth twice a day. The patient was told to conduct a 7-day post-surgery control.

On the 8th day after surgery, the patient returned for control and there were no complaints or pain in the surgical area. The heciting-aff was performed on the 8th day because the patient was unable to come on H+14.



**Figure 8.** a) H+8 condition after Z-plasty frenectomy; b) clinical condition after hecting-aff  
The patient returned to control H+25 post-surgery, not complaining of any pain or discomfort.



**Figure 9.** H+25 condition after Z-plasty frenectomy

There was no scar on the surgical scar area and new frenulum attachment. The patient would continue orthodontic treatment for diastema closure after this.

## DISCUSSION

Gaps between the teeth can occur partly due to frenulum attachment to the central incisor, so orthodontic treatment alone is not sufficient.<sup>1,16,19</sup> An abnormal frenulum can be detected visually by pulling the upper lip to see the movement of the papillary edge or by performing a pallor test until the area becomes ischemic. Frenulum attachment is divided into four types: mucosa attachment, gingival attachment, papilla attachment, and papilla penetration. A frenectomy should be performed if an aberrant frenulum is discovered.<sup>3,18</sup>

Indications for frenectomy are frenulum abnormalities that cause diastema, frenulum attachment close to the gingival margin causing a recession, and a shallow vestibule. Some frenectomy procedures that are often used are conventional techniques (using hemostats), the Miller technique, VY plasty, Z-plasty, and electrocautery.<sup>5,12</sup>

The Z-plasty technique was shaped to direct the scar in a better direction using a natural skin fold or line with less tension. The Z-plasty flap design could be made with three different angles: 30 degrees, 45 degrees, and 60 degrees, although the 60-degree angle produced superior results than the 30 and 45-degree angles. This 'Z' shaped design distributes the tissue tension, thus aiding healing along the incision line. It also provided a camouflage effect on the scar, decreased soft tissue tension, lengthened the lip, minimized scar tissue formation, and improved lip function. <sup>1,6,16</sup>

## CONCLUSION

The Z-plasty technique successfully repaired a thick frenulum without scarring, proving to be more aesthetically pleasing than other conventional techniques

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