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Case Report

Frenectomy Using Z-Plasty Technique in Case of Aberrant Frenum on Aesthetic Zone

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KEYWORDS

Aberrant frenum, Aesthetic, Central diastema, Frenectomy, Z-Plasty

ABSTRACT

Introduction: Aberrant frenum can cause many problems such as central diastema, food impaction, dental caries, and aesthetic problems. This case can be handled with frenectomy, which is Z-Plasty technique can be used to treat thick and wide frenulum associated with papillary penetrate and central diastema. **Case Report**: A 17 years old girl was referred from orthodontist to Department of Periodontics, RSGM UGM Prof. Soedomo Yogyakarta for treatment of maxillary labial frenulum. Intra-oral examination revealed a diastema on the maxillary central incisor of 2.5 mm and frenulum attachment extended to the palatine papilla. In this case, collaborative perio-ortho treatment was carried out, frenectomy with Z-Plasty technique done to correct thick frenulum and fixed orthodontic treatment to correct central diastema after completion of periodontal treatment. Evaluations are carried out every 7 days for the first 2 weeks then at 3 and 6 months after periodontal procedure. **Conclusion:** Frenectomy using Z-Plasty technique was able to correct wide and thick frenulum that extends to the palatine papilla. Good wound healing, minimal scarring and color matching the surrounding tissue, and perio-ortho collaboration treatment was successfully carried out with satisfactory results according to patient expectations.

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INTRODUCTION

A beautiful smile is the earliest form of human communication and the first thing that people pay attention to. The harmony of a smile is determined by many things, such as lips, shape, position and color of teeth and also gingiva. People of all ages are increasingly reflecting their smiles and overall appearance.[1] Lips have a small fold consisting of mucous membrane, muscle, and connective tissue called frenulum. Function of frenulum is to attach the inner lip to alveolar process, gingiva, and underlying periosteum. Aberrant frenum or abnormal frenulum attachment can cause aesthetic problems such as central diastema and gingival recession, beside that it can hinder the movement of orthodontic appliances.[2,3]

An abnormal or deviated frenulum is detected visually by pulling the upper lip to apply pressure on the frenulum and looking for movement of the papillary tips which appear pale. Placek et al. (1974) classified the frenulum based on the level of attachment into 4 types; 1. Mucosa: when the frenal fibers attach to the mucogingival junction; 2. Gingival: when the frenal fibers are inserted into the attached gingiva; 3. Papillary: when the frenal fibers extend to the interdental papilla; 4. Papillary penetration: when the frenulum fibers cross the alveolar process and extend to the palatine papilla.[4]

The prevalence of central diastema cases was 14.8% found in the upper jaw and 50% of them were associated with papillary penetration frenulum attachments.[5] A thick and wide maxillary labial frenulum that adheres close to the gingival margin is often considered a causative factor for central diastema.[6] The main role of frenulum is to provide stability and balance to the upper lip and bones.[7] An abnormal frenulum is clinically defined as a prominent band of tissue attached to the palatine papillae that shows a pale color when there is pressure or pulling on the frenulum.[4] Some of the losses and disorders caused by frenulum abnormalities are diastema, dental caries, periodontal problems due to food impaction, damage to the upper lip, and aesthetic problems.[8]

To correct an abnormal frenulum condition, frenectomy can be performed which is able to completely eliminate frenulum including its attachment to the bone. Frenectomy can be performed using a scalpel, electrocautery, and laser.[9,10] Frenectomy is a surgical procedure that involves removing or modifying the frenulum, a small fold of tissue that attaches two structures in the oral cavity. There are several frenectomy techniques, such as: 1. Conventional frenectomy; 2. Miller Technique; 3. V-Y Plastic; 4. Z-Plasty; 5. Frenectomy with electrosurgery; 6. Laser frenectomy.[11] Z-plasty is a surgical procedure that is able to improve the aesthetics and function of scars. This procedure involves a vertical incision in the frenulum and the creation of two triangular flaps of the same dimensions which are then transposed over one another to form a "Z" flap. This causes tissue tension to be distributed in various directions, reducing disturbances in wound healing and allowing better healing.[4]

In this case, the patient complained about aesthetic problems regarding her gap teeth. The patient has a thick and wide frenulum, which extends to the palatine papillae and there is a diastema on the maxillary central incisor. Frenectomy procedure with scalpel can be carried out using the Z-Plasty technique according to the patient's clinical condition, where this technique can provide good results aesthetically from the scar.[12] After the function and aesthetics of periodontal tissue has been resolved, central diastema cases are immediately treated. Cases of central diastema can be corrected with fixed orthodontic devices so that the formation of the dentition improves.[13]

This writing aims to report the results of frenectomy treatment using the Z- plasty technique and collaboration between periodontics and orthodontics to obtain good aesthetics in accordance with the patient's wishes.

CASE REPORT

A 17 years old girl patient came to the Department of Periodontics, RSGM Prof. Soedomo Yogyakarta on the referral of orthodontist to carry out a frenectomy on the maxillary labial frenulum which was suspected to be the cause of the central diastema of teeth 11 and 21. Extra oral examination found no abnormalities and the patient admitted that he had no history of systemic disease. On intra oral examination a diastema was found on the maxillary central incisor and the attachment of the labial frenulum are high to the palatine papilla. In blanch test, there was movement of the interdental papilla and a pale color (Figure 1. A and B). The diastema distance between teeth 11 and 21 was 2.5 mm. From the results of the clinical examination and based on the classification of the level of frenulum attachment, this condition includes the papillary penetration type of maxillary labial frenulum attachment.

Figure 1. (A) blanch test (+). (B) Attachment of frenulum to the palatine papilla.

Patient is explained about the treatment that will be carried out and asked to sign an informed consent, then preparations are made for frenectomy using the Z- Plasty technique. Patient was instructed to rinse her mouth with povidone iodine, then asepsis of the working area was carried out. Local anesthesia is performed by infiltration in the labial vestibule area and the palatal surface near incisive foramen. The length of the incision was measured according to the height of the frenulum and a Z-shaped flap design was created with an angle of 60^{o} (Figure 2). A vertical incision is made along the frenulum from the labial to the lower border in the interdental direction using blade no. 15c (Figure 3) and separate the fibrous tissue and lip muscle (Figure 4A), after that, a horizontal incision is made with the same length as vertical incision in upper border towards the left and the lower border towards the right at an angle of 60^{o}. The final result of the incision is to form a triangular flap with the same shape and size, then irrigation is carried out using saline solution. The triangular flap was transposed in opposite directions (Figure 5A) and simple interrupted suture was done using 5-0 nylon (Figure 5B). Then a periodontal dressing was applied (Figure 5C) and a prescription was given for Amoxicillin 500 mg (3 times a day for 5 days), Mefenamic acid 500 mg (3 times a day for 3 days) and 0.2% chlorhexidine gluconate mouthwash (2 times a day for 2 weeks), then post-operative instructions was given.

Figure 2. Z-shaped flap design.

Figure 3. Vertical incision.

Figure 4. (A) Separating fibrous tissue and lip muscle. (B) Result after cleaning. (C) Incision of palatine papillae.

Figure 5. (A) Flap was transposed. (B) simple interrupted suture. (C) Periodontal dressing application.

The first follow up was carried out 1 week after frenectomy. It can be seen that periodontal dressing is still in place (Figure 6A), then periodontal dressing is removed (Figure 6B) and irrigation is carried out using saline solution. The wound after frenectomy procedure still looks redness and the stitches are still in place. Patient was instructed to follow up for another 7 days.

Figure 6. 7th day follow up. (A) Periodontal dressing still in place. (B) Redness on stiches area. (C) Wound healing in palatine papillae.

The second follow up was 14 days after surgery showed normal gingival color with some reddish color in the suturing area, in the palatal area there was no inflammation found and the wound had healed, there were no complaints of pain, then hectating aff was performed (Figure 7).

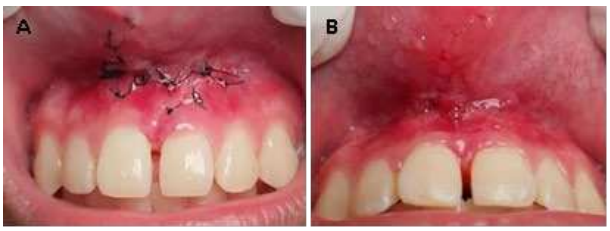

Figure 7. 14th day follow up. (A) Before hecting aff (B) After hecting aff.

Follow up was carried out again at 3 months after frenectomy. To treat central diastema, orthodontic treatment was carried out by orthodontist (Figure 8) and 6 months after the procedure (Figure 9). The gingival color appears normal, there is no inflammation and there are no scars anymore.

Figure 8. 3 month follow up and fixed appliance done by orthodontist. Right side (A). Left side (B). Palatine side (C).

Figure 9. Conditions during the 6-month follow up.

DISCUSSION

The Z-Plasty method is a frenectomy technique intended for high and thick frenulum, in accordance with the opinion of Srivastava, et al.[11] who said that Z- Plasty technique is effective in cases of thick frenulum. Frenectomy using Z-plasty technique in this case was successfully performed, effectively eliminating high and thick frenulum. The wound healed after 2 weeks of treatment. This is in accordance with the opinion of Mehrotra, et al.[14] who said that frenectomy with the Z-Plasty technique can avoid bad outcomes related to scar tissue and allows for better redistribution of scars.

The choice of treatment techniques and procedures will depend on the patient's needs and clinical condition as well as the skills and preferences dentist. Each technique and procedure have its own advantages and disadvantages. Effective communication between doctors and patients is essential to achieve the best treatment outcomes tailored to the patient's condition and needs. In this case, patient had a high and thick frenulum with aesthetic concerns, making the Z-plasty technique the most suitable and effective method to correct this condition.

After eliminating the frenulum, fixed orthodontic treatment is carried out and there is a reduction in diastema, which is in line with Mei & Jiang[13] that the diastema can be corrected with orthodontic treatment for good results. It can be happened because labial frenulum which extends to palatine papillae has been completely eliminated. So that perio-ortho collaborative treatment can provide the aesthetic results as patients expect, in accordance with the statement of Syahriel, et al.[10] that orthodontic treatment accompanied by removal of etiological factors through frenectomy will get good results.

CONCLUSION

Frenectomy using Z-plasty technique in case of aberrant frenum on aesthetic zone is carried out with the following results: (1) Good wound healing; (2) Minimal scar tissue and color matches the surrounding tissue; (3) The perio-ortho collaboration treatment was successfully carried out with satisfactory results according to the patient's expectation.

CONFLICT OF INTEREST

Authors declare that there are no conflicts of interest related to this manuscript.

PATIENT CONSENT STATEMENT

Written informed consent was given to the patient participating in this case report and for the publication of this study.

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