

The Z-Plasty Technique on the Frenectomy Approach of the Aesthetic Gingival Recession In Frenulum Labial Mandibular Case

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ABSTRACT The frenulum is an anatomical structure in the oral cavity. Its formed folds of mucosa membranes attach the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum. Abberansia frenulum is one of the causes of aesthetic and functional problems such as gingival recession, which occurs either due to plaque control or muscle pull issues. One of the treatment options for the anomaly of the frenulum case is by performing a frenectomy procedure. This paper aimed to explain using the z-plasty technique in abberansia frenulum treatment with hypertrophy frenum associated with midline diastema and short vestibule. A 36-year-old female patient came to Periodontic Clinic in Oral dan Dental Hospital, Universitas Padjadjaran, Bandung, Indonesia, with chief complaint pain in 41 teeth, and clinically the gingiva appears recession and short vestibule. This situation is alarming in terms of aesthetics and functionality. The treatment of frenectomy with the z-plasty technique is an indication for this case. The frenectomy with the z-plasty method has shown favorable results in aesthetics and functional appearance. The z-plasty technique helped in reducing soft tissue tension so that it can minimize scar formation

KEYWORDS: Abberansia Frenulum; Frenectomy; Gingival recession; Z-plasty

INTRODUCTION

A beautiful smile is the best part of the face and is the earliest form of human communication. The harmony of a smile is determined by the shape, position, and color of the teeth and gingiva. People of all ages are increasingly worried about their smiles and overall appearance. Mucogingival problems such as gingival recession become one of the issues that significantly affect the smile line. This condition can occur with or without loss of attached gingival tissue.^{1,2}

Gingival recession is assessed by the appearance of the tooth's clinical length and the variation in proportions when compared with adjacent teeth. The mucogingival problem occurs with two clinical features. The first, a disturbance near the mucogingival area, which results in pocket formation. Second, the state of opening of the

mucogingival complex area results in gingival cleft and recession.¹ The etiology of the gingival recession is the high attachment of the labial frenulum. It influences surrounding periodontal tissue's condition and causes aesthetic problems, plaque retention, hypersensitivity dentin, and root caries.^{2,3} The frenectomy is one of the strategies to overcome this condition, so the abnormal attachment is minimized.

Frenectomy is removing the entire frenulum, including the extension to the underlying bone, while frenotomy is the incision and relocation of the frenulum attachment. The technique chosen must be as indicated. In this report, the Z-plasty procedure for hypertrophic frenulum, with common passion, is usually associated with midline diastema and shallow vestibules.⁶

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CASE REPORT

Mrs. P, a 36-year-old patient, came to the Periodontics clinic of the Dental and Oral Hospital of the Faculty of Dentistry, Padjajaran University, with gum complaints getting lower front lower teeth for the past year. In these areas, often feel pain when drinking cold, more sensitive when brushing teeth, and aesthetically disturbing.

The patient wanted to be treated for these complaints. The diagnoses have shown the presence of Miller class III recession in the tooth 41 region, the

aberration of the mandibular labial frenulum, blanch test (+), plaque score of 24.8% (O'Leary index). Besides, the mobility of grade II tooth 41, grade I of teeth 31, and 42 also shallow vestibules, and absence of traumatic occlusion (fig 1a, 1b). The patient did not have a systemic disease that could affect periodontal treatment. The radiological examination was found horizontal bone damage in the recession area (**Figure 1c**)



Figure 1. Miller class III recession. (a) Clinical features of Maxilla and Mandibula, (b) Lateral picture of the frenulum condition, vestibulum, and tooth 41 recession, and (c) Periapical radiograph of tooth 41

Based on the diagnosis of the subject, it has concluded the case is gingivitis. Its infection was induced by dental biofilm accompanied by mucogingival deformity (mandibular labial frenulum aberration). Treatment plans included informed consent, Maxilla, and mandibular root scaling and planing, providing Dental Health Education (DHE), routine blood tests, splinting, an indication of frenectomy surgery with the Z-plasty technique. The patient approved this report.

Frenectomy performed on this patient used the Z-plasty technique due to a shallow vestibule and a complete frenulum aberration. Before surgery, extraoral and intraoral aseptic were performed using povidone-iodine. The infiltration anesthetic was then served in the mesiobuccal fold area of teeth 41-42 (**Figure 2a**) and the labial mucosa. A diagonal incision with angulation of 60-90° with the same length as the frenulum incised (**Figure 2b**).



Figure 2. The infiltration anesthetic of the mesiobuccal fold area of teeth. (a) The anesthetic procedure, (b) Adjustment of incision pattern, (c) Incision procedure for the Z-plasty technique, (d) Transposition of the flap after the incision, (e) Suturing, and (f) Periodontal pack application.

Incision procedure and creating a double rotational flap. Incision using blade no 15C. Submucosal tissue dissection over each flap's base to obtain a double rotational flap of at least 1 cm. The flap was mobilized 90° to cover the vertical incision horizontally. Bleeding was treated by suppressing the functional area using a sterile tampon that has been moistened with adrenaline 1: 80000. The operating area was rinsed with 0.9% physiological

NaCl solution and aqua dest alternately until clean (Figure 2d). Finally, suturing the mucosal area with interrupted sutures using a sterile needle, nylon thread size 5.0, and periodontal pack application (Figures 2e and 2f). Postoperative and control instructions were given to the patient. There are differences in clinical features before frenectomy, one week of control, and three weeks of control (Figure 3a-c).



Figure 3. the mucosal area with interrupted sutures. (a) Pre-treatment clinical feature, (b) Clinical quality after 1-week control post frenectomy, and (c) Clinical feature three weeks post frenectomy

DISCUSSION

Gingival recession is defined as a change in the gingival margin's position towards the cemento-enamel junction (CEJ). The distance between the cemento-enamel junction (CEJ) and the gingival margin represents the level of recession. Gingival recession is a term that refers to exposure to the root surface, and this is a common and undesirable condition.^{2,4} The gingival recession's etiology is an aberration of frenulum traction, excessive pressure, and inappropriate techniques and methods when brushing teeth. Also, destructive periodontal disease, teeth location, alveolar bone split, high muscle attachment, occlusal trauma, and iatrogenic factors.^{2,3}

Detailed information on the state of gingival recession is needed as a basis for determining a diagnosis, prognosis, treatment plans, and communication among clinicians.^{2,3,4} Miller, in 1985, classified four classes of marginal tissue recession based on the level of the gingival margin with the area of the mucogingival junction (MGJ).^{4,5,6} (a) Class I: recession margin area does not extend toward MGJ, and there is no loss of interdental bone or soft tissue; (b) Class II: recession margin area extends toward or out of MGJ, there is no loss of interdental bone or soft tissue; (c) Class III: recession margin area extends toward or out of MGJ, loss of bone or interdental soft tissue, or in the presence of mild dental malposition; and (d) Class IV: recession margin area extends toward or out of MGJ, loss of

bone or interdental soft tissue, and or severe dental malposition.

The recession caused by frenulum traction that indicated the frenectomy or frenotomy.³ A high frenulum causes aesthetic and functional problems such as gingival recession either due to interference with plaque control or muscle traction. It can cause midline diastema, which causes aesthetic problems, interferes with orthodontic treatment, and can cause relapse after treatment. Frenectomy is the procedure of removing the entire frenulum, including attachment to the underlying bone, while frenotomy is the incision and relocation of the frenulum attachment.^{7,8}

The frenulum comes from the Latin 'fraenum'. The frenulum is an anatomical structure formed by folds of mucosal membranes and connective tissue and muscle fibers that attach the lips and cheeks to the alveolar mucosal and or gingival and periosteum on the underlying. Knox and Young studied the frenulum histologically and found that the frenulum had elastic fibers and muscle fibers (Orbicularis Oris-horizontal bands and oblique fibers). However, Henry, Levin, and Tsaknis found that the frenulum consisted of elastic fibers and dense collagen tissue without muscle fibers.^{6,9} Examination can be done visually by lifting the frenulum to see the papilla tip's movement or the pale color resulting from ischemia in the stretched region (Blanch Test).^{7,8}

The indications of frenectomy are aberration frenulum causing midline diastema, adherence of the frenulum close to the gingival margin causing the recession, and making it difficult to maintain oral hygiene, frenulum aberration with inadequate attached gingival width, and shallow vestibules.⁹ Several frenectomy procedures have been applied for abnormal frenulum treatment. They were classical techniques (using a hemostat), Miller technique, VY plasty, Z-plasty, and electrocautery.^{8,9}

In this case, a frenectomy was performed using the Z-plasty technique. This technique is indicated for hypertrophic frenulum, with low attachment, usually associated with midline diastema and shallow vestibules. This technique's advantage is that it is possible to position the flap with skin folds without traction or excessive tissue tension. So that, the scar tissue formed will be increasingly minimal.^{9,10} The Z-shaped pattern will

redistribute the tissue's pressure so that it helps to heal along the incision line. The Z-shaped design also produces a camouflage effect on the scar.^{8,9} From each diagonal edge formed, two arms of the same length (to avoid wrinkling) are extended in the opposite direction. An angle of 60 ° is formed between the arm and the general diagonal. This component determines the results and elongation of the Z-plasty technique.⁸

Frenectomy with the Z-plasty technique is indicated in the broad and thick hypertrophy frenulum associated with midline diastema and shallow vestibules.^{8,10} The Limberg basis explains of the Z-plasty method were (a) Extend the tissue, usually along to release tension and allow movement of the incision area, (b) Narrowing the scar in the transverse direction, and (c) Regulate the direction of the scar by disguising and thinning the resulting scar tissue.

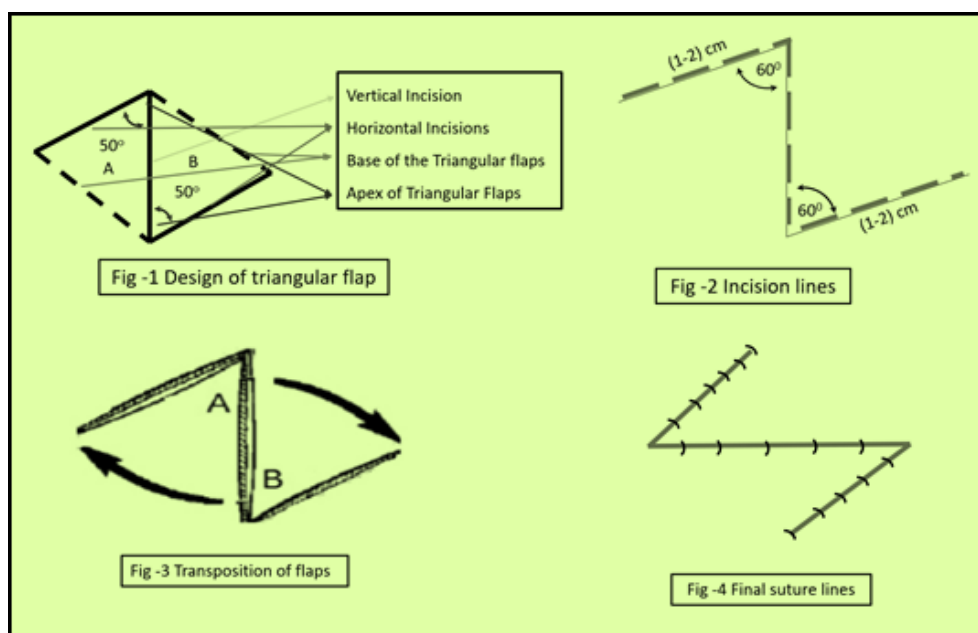


Figure 4. Incision and suturing line in Frenectomy with Z-plasty technique⁸

CONCLUSION

The frenulum aberration is one the etiologies of the recession. It has disturbed the aesthetics and function necessary for surgical procedures in frenectomy choice of Z-plasty technique is adjusted for diagnosis frenulum aberrations clinically to affect the treatment plan and prognosis. Its approach provides minimal scar

formation. This technique is easy to do and gives excellent aesthetic results. The Z-plasty pattern effectively redistributes the mucosa's tension in the healing process along the incision line.¹⁰ In this case, wound healing began to occur, and there was no traction of the frenulum when the patient came to control in the third week after frenectomy.

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Authors Contribution: NI and IK; Conceptualization, Supervision, Formal Analysis, Investigation, Writing – Original Draft Preparation and Writing – Review and Editing. NI; Original Draft Preparation, Review and Editing, and Statistical Analyses.

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