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Research article

Perio-Aesthetic Treatment With Frenectomy and Crown Lengthening: A Case Report

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Abstract.

Background: High frenum attachment has a detrimental effect on periodontal tissue and esthetics. High adhesion to the frenulum can lead to gingivitis and central diastema, which are indications for frenectomy. A better oral aesthetic appearance improves the overall appearance and personality and self-confidence when smiling. Short clinical crown is often a patient complaint, one of the causes being altered passive eruption.

Objective: To describe the correction of high frenulum with frenectomy and correction of altered passive eruption with crown-lengthening surgery with ostectomy.

Case Report: A 23-year-old patient presented to the periodontics clinic of Dental and Oral Hospitals Gadjah Mada University (RSGM UGM), with complaints of short front teeth and difficulty in cleaning the teeth in the maxillary anterior region. The management of high frenulum was done by frenectomy, followed by crown lengthening using a scalpel.

Results: The four-week control showed corrected altered passive eruption and coral pink gingiva.

Conclusion: Frenectomy is an action to overcome high frenulum which aims to prevent periodontal disease. Crown lengthening is a treatment for correction of functional and aesthetic disturbances associated with altered passive eruption.

Keywords: frenectomy, altered passive eruption, crown lengthening

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1. Introduction

A harmonious smile is considered as a symbol of beauty in modern society [1]. The importance of a better oral aesthetic appearance will improve appearance and personality and self-confidence when smiling. A wide smile is associated with a variety of factors; harmonization of the shape, location, and size of teeth in relation to the alveolar bone and gingival tissue. The attachment of the frenulum in the oral cavity is an important factor that influences the appearance of a smile, because it determines the shape of the lips and the fit of the teeth [2]. When a person smiles, the entire maxillary incisor crown and 1 mm of attached gingiva are visible. An open gingiva of 2-3 mm is esthetically acceptable [3].

The frenulum is a small fold of mucous membrane, fibrous tissue, and muscle fibers that attaches the inner lip or cheek to the alveolar processes, gingiva and periosteum. It stabilizes the movement of the lips or cheeks and tongue [2]. The attachment of the high frenulum to the upper lip occurs on the labial surface between the maxillary central incisors, this attachment results in gingivitis and central diastema. The attachment of the high frenulum in the maxillary central incisor area is more incense than the mandible on both the labial and lingual sides [4].

Blanch test is the most commonly used method for the diagnosis of high frenum attachment. It works by pulling the upper lip to observe the movement of the papillary margin, in which the upper lip is lifted and held until the area becomes ischemic [5]. Based on the extension of the fiber attachment, the frenulum is classified as follows: 1. Mucosa, when the fibers of the frenulum are attached to the mucogingival junction; 2. Gingiva, when the frenulum fibers are attached to the attached gingiva; 3. Papillae, when the frenum fibers of their attachment extend to the interdental papillae; 5. Penetration of the papilla, when the frenulum fibers pass through the alveoli and extend to the palatal papilla [6].

Frenectomy is a surgery procedure that aims to remove excess interdental tissue and reduce tension in the gingival margin tissue. Several methods have been used for surgical excision of the frenulum, including; scalpel, electrosurgery, and laser [7]. The utilization of a scalpel in frenectomy is the most commonly used technique in dentistry, but it has several disadvantages, including bleeding. Bleeding in frenectomy can be minimized with the use of electrosurgery or can be done by modifying the existing incision technique, namely the Incision below the Clamp (IBC) modified incision technique [4].

A short clinical crown that affects the patient's confidence is characterized by overexposure of the maxillary gingiva when smiling or speaking. [1,8] Common causes of short clinical crowns include caries, erosion, dental malformations, fractures, attrition, excessive tooth reduction, eruption disharmony, exostosis, and genetic variation. Therefore, this clinical crown length deficiency should be increased when the caries margin or fracture margin is placed in subgingival, the crown is too short for restoration retention, there is excess gingiva, and the anatomical crown is partially erupted [9].

Altered passive eruption can occurs in all or some of the maxillary anterior teeth that causes gummy smile. Such patients are often unaware that they have short teeth. Normally, the anterior teeth length are 11 mm, 9 mm, and 10.5 mm for the upper central incisors, lateral incisors and canines [10]. There are various techniques used to perform

crown lengtening procedures on anterior teeth, one of which is the Chu's aesthetic gauges technique [11].

Crown lengthening is a surgical procedure by exposing more tooth structure either around one tooth or a group of teeth [12]. The reason for crown lengthening is to restore the biologic width to a more apical position to avoid breaches that could result in bone resorption, gingival recession, inflammation or hypertrophy [13]. Bone sounding is used to determine the thickness of the soft tissue layer and the proximity of the alveolar bone during the planning stages of various surgical procedures [14]. Ostectomy consists of removing the supporting bone, and the amount of bone resected is determined by the degree of crown lengthening required [13]. Crown lengthening with bone correction requires flap access. However, in several cases this treatment can generate black triangle. The success of this technique is influenced by diagnosis, determination of indications and appropriate action. In the case of altered passive eruption, the proportions of the face, lips and all aspects must be observed, because crown lengthening has different techniques and not all of them have to involve bone reduction [15].

This case report aims to describe the correction of cases of high labial frenulum with IBC technique and cases of altered passive eruption with crown lengthening surgery with osteoctomy to improve function and aesthetics.

2. Case

A 23-year-old male patient came to the periodontics clinic of the RSGM UGM, with a complaint that his gums looked excessive so that his teeth looked short and looked thicker when smiling. There was no history of systemic disease. Extraoral examination revealed no abnormalities. Intraoral examination revealed adequate attached gingiva in the maxillary anterior region, scalloped gingival shape, asymmetrical and reddish gingival margins, short clinical crown, spongy consistency, unstippling texture, and probing depth of about 3-4 mm and a base of width and height frenulum extends to the interdental area of the maxillary anterior region. Dental hygiene status (OHI) was good with minimal plaque and calculus index.

After the initial phase in the form of scaling and root planing was carried out, an examination of the ideal proportion of the crown of the tooth was applied by using a chu's gauge. Based on clinical examination, the determined clinical diagnosis was altered passive eruption. On clinical examination of the frenulum, a blanch test was

performed by lifting the upper lip and holding it until the area became ischemic and a positive blanch test was obtained.

Based on the patient's complaints and the clinical examination that has been carried out, a treatment plan is carried out, namely initial treatment by removing plaque and calculus and then surgical treatment; labialis frenectomy procedure with IBC technique, then crown lengthening procedure with gingivectomy begins with an internal bevel incision accompanied by an ostectomy procedure. The procedure to be carried out has been informed and explained to the patient, and the patient agrees with all the treatment plans that will be carried out and the patient has signed an informed consent as a sign of approval for surgery.

Figure 1: A short clinical crown (left) and clinical examination of a high frenulum (right) are seen.

Figure 2: Labial infiltration of local anesthetics.

3. Treatment

Initial treatment was plaque and calculus removal and oral hygiene instructions. Control 1 was carried out a week later after scaling with OHI = 1.67 (Good), PCR = 9.8% and GI = 0.96 (mild). Then surgical treatment was carried out, including frenectomy and crown lengthening procedures with ostectomy.

Extraoral and intraoral asepsis were employed with betadine solution 10%. The first step was a frenectomy procedure. Local infiltration anesthesia was performed in the vestibule area on the right and left lateral frenulum followed by the palatine area near the incisive foramen. After being anesthetized, the clamp is placed parallel and attached to the lip, the incision is made by using a scalpel number 15 on the bottom and parallel to the clamp from the incisal direction to the base of the vestibule. Suturing was done with interrupted sutures with silk no. 5-0 immediately after incision in the most apical area of the incision. Followed by cleaning and taking the connective tissue that makes up the frenulum. Subsequently, a second surgical procedure was performed, namely crown lengthening.

Infiltration anesthesia was performed in the labial and palatal regions 13-23 and *chu's gauge* were used when performing crown lengthening. Chu's gauge is used to measure ideal tooth and gingival proportions as well as measurement of bone height. Making a bleeding point with a pocket marker from teeth 13-23 as a guide and limit for excess gingival gingivectomy. Gingivectomy with an internal bevel incision was performed using a number 15 scalpel following the bleeding point. Excess gingiva that has been excised with granulation tissue and remaining calculus or necrotic cementum was removed with a curette resulting a smooth and clean surface.

The ideal size of Dento Gingival Complex according to Bhuvaneswaran, et al. (2010) is less than 3 mm. If the distance is less than ideal, it is necessary to reduce the alveolar bone [16]. After gingivectomy was performed, ostectomy also was performed by making a flap with a full thickness incision from the distal tooth 13 to the mesial to tooth 23 with a sulcular incision. The flap was opened using a raspatorium to obtain a sufficient field of view to prevent the gum touched by the bur during alveolar bone reduction. A 10 mm round diamond bur was utilized. Then the gum was sutured with interrupted 5-0 silk sutures on the interdental papillae adequately so that primary wound healing is expected. The rough surface was dried and covered with a periodontal pack in the area where the frenectomy and crown lengthening were performed.

After surgery, the patient was given the following drugs: antibiotics (amoxicillin 500 mg, 3x daily for 5 days), analgesics (mefenamic acid 500 mg, 3x daily for 5 days), and mouthwash (minosep gargle 2x daily for 1 week). Post- operative instructions are given to the patient, namely to take medication regularly; maintain oral hygiene by brushing the teeth regularly and avoiding the operating area; avoiding hot, spicy, hard, sour and sticky foods; and don't rinse too hard.

The patient returned for a 1 week control, the patient did not complain of pain and the periodontal pack was still attached. The periodontal pack was opened, the gingival

margins and gingival color were still hyperemic and edematous, so the patient was instructed to continue the Minosep Gargle mouthwash for one week and maintain oral hygiene. The patient returned for a second control at week 4 for evaluation and removal of the sutures, the healing seemed complete, marked by complete re-epithelialization and keratinization, namely the gingival margin and gingival color appeared coral pink, there was stipling, no pain complaints. , and the sensitivity of the teeth. After frenectomy, a marked shift of the frenum attachment was seen at the mucogingival junction and a scar that healed without fibrous tissue.

Figure 3: Maxillary labial frenectomy procedure.

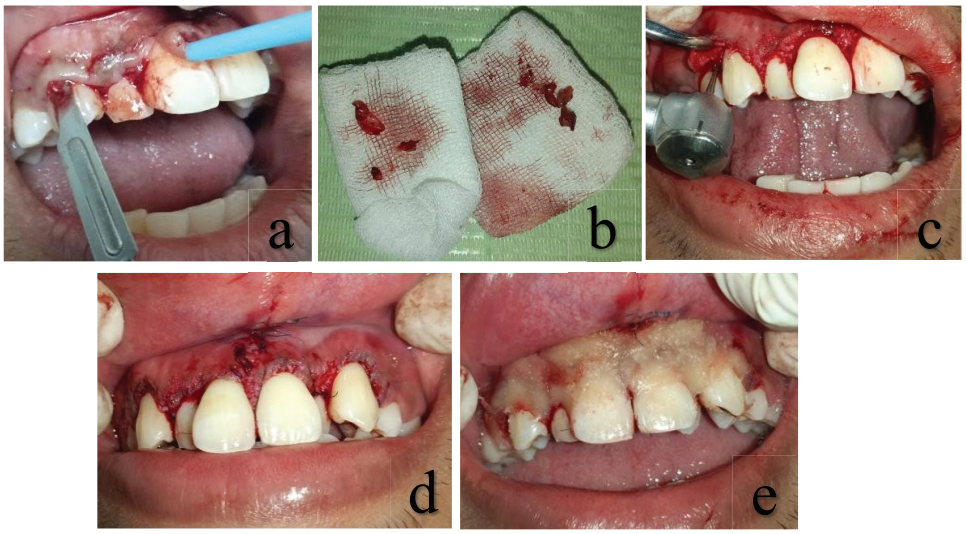

Figure 4: Gingivectomy procedure accompanied by osteectomy: a. gingivectomy with internal bevel incision, b. excessive gingival tissue, c. ostectomy, d. sutures with interrupted sutures, and e. installation of periodontal packs.

4. Discussion

4.1. Frenectomy

Abnormal attachment of the frenulum leads to the development and persistence of a central diastema, gingival recession, and speech problems [5]. Abnormal attachment

Figure 5: Control 1 week there is still redness on the gingiva.

Figure 6: 4 weeks control

of the labial frenulum is characterized by adhesions near the gingival margin or over the interdental papillae and even extending to the palatal region. This condition causes retraction of the gingival margins and is generally associated with difficulties in optimal teeth cleaning, thereby causing gingivitis, stretching of the gingival sulcus, accelerating plaque accumulation, and ultimately leading to a periodontal condition [2]. Frenectomy is the complete removal of the frenulum including its attachment to the underlying bone in order to prevent periodontal disease, esthetic improvement due to a central diastema, limited lip movement, and slurred speech [4,6].

Frenectomy can be performed using a scalpel, electrosurgery, or laser technique. Conventional frenectomy using a scalpel is the most common procedure because it is simple, inexpensive and practical. However, there is a higher complication arising from this procedure which is a larger incision wound, followed by excessive bleeding during the operation and creating discomfort for the patient. Electrosurgery and laser in frenectomy are proven to be effective in minimizing bleeding, not taking time, not needing suturing, and minimal complications such as postoperative swelling and ultimately more comfortable for the patient. However, electrosurgery and lasers require specialized equipment and require highly skilled operators, and involve high-cost operations. Other

than that, there are several disadvantages of electrosurgery and laser. They are risky to harm the tissue around operating area. The site will be necrotic due to excessive contact with the device, this procedure is contraindicated for patients with pacemakers, and produces smoke that will be inhaled by the patient during the procedure. One of the modified techniques that aims to reduce bleeding from open wounds that usually occurs in conventional techniques is the IBC technique [2].

In this case report, a modified frenectomy technique with an IBC approach is used,; first, the placement of the clamp parallel and attached to the cheek mucosa; Second, make an incision under the clamp and continue with suturing immediately after the incision in the mucolabial fold area. The results showed that the incision made under the clamp did not cause a widening wound on the lip mucosa, this was due to the lateral pull of the orbicularis oris muscle being restrained by the clamp, and the suturing action performed immediately after the incision at the top of the incision would resist the muscle pull after it was released. clamps. Sutures on the side are intended to connect the cut tissue as well as to reduce bleeding due to an open wound. Similar to frenectomy performed using electrosurgery, IBC technique is able to Minimize the bleeding that occurs during surgery performance [4].

4.2. Crown lengthening

A short clinical crown was found which was the patient's complaint. The short clinical crown in this case was caused by altered passive eruption, in which the gingival margin failed to migrate apically to reach the cementum enamel junction (CEJ), so that the position of the gingival margin was incisal/occlusal [17]. The aim of the action in this case is to form an ideally contoured gingival margin in proportion to the immediate post-surgery [15].

Crown lengthening is one of the most common surgical procedures in periodontal practice. The main indications for a crown lengthening surgical procedure include treatment of subgingival caries, crown or root fracture, altered passive eruption, cervical root resorption, and short clinical support. The aim of crown lengthening is to restore the biologic width to a more apical position to avoid breaches that could result in bone resorption, gingival recession, inflammation or hypertrophy [13].

After determining the problem, the number of soft tissue resections planned, the extent to which bone resection may be required, and the surgical technique can be determined. Soft tissue removal without any bone resection then there are two options; gingivectomy or apically positioned flap. If the alveolar crest is less than 3

mm from the anticipated gingival margin, then bone resection is required. Therefore it needs a full-thickness flap [10]. In this case report, a crown lengthening surgery was performed with a gingivectomy technique, an internal bevel incision was performed with an ostectomy. Aesthetic crown lengthening requires a gingivectomy procedure to expose the necessary additional tooth structure, therefore a minimum of 2 to 5 mm of keratinized tissue is required to ensure gingival health [9].

In the ostectomy procedure, the first incision will be the same as for the apically positioned flap, and the excess gingiva is removed before raising the full- thickness flap to expose the alveolar bone. After lifting the full-thickness flap, bone resection can be performed using a bur. Resection should be performed with saline irrigation to prevent overheating of the bone and to rinse away the remnants. Fine sutures such as the 5-0 suture are preferred to allow better healing and are less bothersome to the patient for the next week until the sutures are removed. It is very important to give proper instructions to the patient to avoid unwanted tissue movement during the healing phase [10].

5. Conclusion

The frenectomy procedure at high frenum attachment using the IBC technique has the advantage of reducing bleeding during surgery, providing comfort for the patient and can be performed easily by the dentist. Short clinical crown due to altered passive eruption is an aesthetic and functional disturbance that is often complained of by patients. The crown lengthening procedure is an effective treatment for correcting functional and aesthetic disturbances associated with altered passive eruption.

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