



## Research article

# Frenectomy and Gingival Depigmentation as a Preliminary Preparation for Orthodontic Treatment: A Case Report

Azizah<sup>1\*</sup>, Surijana Mappangara<sup>2</sup>, Supiaty<sup>2</sup>, Siti Raodah Juanita Ramadhan<sup>1</sup>, and Fatmawati Madjid<sup>1</sup>

<sup>1</sup>Periodontology Specialist Educational Program, Faculty of Dentistry, Hasanuddin University, Makassar, Indonesia

<sup>2</sup>Periodontology Department of Dentistry, Hasanuddin University, Makassar, Indonesia

**ORCID**

Azizah: <https://orcid.org/0000-0003-3545-3803>

**Abstract.**

**Background:** High attachment of labial frenulum causes central diastema and obstructs the movement of orthodontic devices. A surgical approach is needed in the form of frenectomy to improve the attachment of the frenulum. The presence of gingival hyperpigmentation due to excessive deposition of melanin is also an aesthetic problem. This hyperpigmented and uneven appearance of gum color can be corrected by ablation procedures, one of which is by using a scalpel scraping technique.

**Objective:** To discuss the procedure for frenectomy and gingival depigmentation in preparation for further orthodontic treatment.

**Case Report:** An 18-year-old woman was referred from the Department of Orthodontics to the Department of Periodontia, Hasanuddin University Dental and Oral Hospital, with the chief complaint of central diastema and hyperpigmented gum. The patient was planned to receive orthodontic treatment and was also disturbed by the darker color of her gums. The patient had no family history of hyperpigmented gums, smoking or consuming drugs. There was a high attachment of the frenulum, categorized as papilla-penetrating type, and gingival hyperpigmentation was caused by intrinsic factor, which based on DOPI was classified as grade 3. The surgery was done in two steps. Gingival depigmentation was done one week after the frenectomy procedure.

**Results:** The results of the treatment showed improved adhesion of the frenulum and eliminated gingival hyperpigmentation.

**Conclusion:** Frenectomy and gingival depigmentation improved the patient's appearance and frenectomy allowed preparation for further orthodontic treatment.

**Keywords:** gingival hyperpigmentation, central diastema, frenectomy, orthodontic treatment

Corresponding Author: Azizah;  
email: [drgazizah@yahoo.com](mailto:drgazizah@yahoo.com)

Published: 25 April 2022

Publishing services provided by  
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Selection and Peer-review under the responsibility of the NaSSIP 6 Conference Committee.

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## 1. Introduction

A perfect smile is what everyone wants. One motivation for someone to get dental care is for aesthetic purposes [1]. The harmony of a smile is determined by the shape, position, and color of the teeth [2]. The existence of central diastema is often regarded as an aesthetic problem where one of the etiologic factors is the attachment of an abnormal frenulum [1].

Frenulum is defined as a small band or fold of mucosal membrane that attaches the lips and cheeks to the alveolar process and that limits their movements [3]. Frenal attachment may be of four types: a). papillary, where the frenulum is inserted into the interdental papilla; b). mucosal type, where the frenulum is attached in the alveolar mucosa; c). papillary penetrating types, where the frenulum is inserted from the facial to palatal papilla; d). gingival, where the frenulum is in the attached gingiva [4]. Abnormal adhesion of the frenulum can cause a recession, plaque accumulation, and diastema, and can be an obstacle in orthodontic treatment [5].

Under normal conditions, along with dentoalveolar growth, the superior labialias frenulum initially attached to the alveolar process between deciduous teeth will grow into the occlusal and the attachment area will be more apical or closer to the vestibulum. The failure of the attachment of the frenulum to move towards the apical is what causes the central diastema [5].

The healthy gingival tissue is part of a charming smile. But one problem that is often complained of is the darker color of the gingiva. Healthy gingival color is coral pink, but color differences can occur in different tribes/races [6]. The size and number of blood vessels, the thickness of the epithelium, the degree of keratinization and pigment are the determining factors for gingival color. The main pigments that contribute to the normal color of the oral mucosa are melanin, carotene, reduced hemoglobin and oxy-hemoglobin [7]. Melanin is a basic pigment that gives color to the gingiva. Melanin is a non-hemoglobin pigment derived from melanocyte cells, which are dendritic cells from the neuroectodermal layer located in the basal layer and the gingival epithelial spinous [8].

Hyperpigmentation of the gingiva is caused by excessive melanin deposits in the basal and suprabasal lining cells. The degree of pigmentation varies from person to person, this depends on melanoblast activity [9]. Classification of pigmentation based on Dummett- Gupta oral pigmentation index (DOPI) is: 1)no clinical pigmentation (pink gingiva), 2) mild clinical pigmentation (mild light brown colour), 3) moderate clinical

pigmentation (medium brown or mixed pink and brown), 4) heavy clinical pigmentation (deep brown or bluish black) [10].

From the intraoral examination of the patient, it is found that the condition of the frenulum will complicate the planned orthodontic treatment, besides that the patient's complaint due to gingival hyperpigmentation requires an aesthetic approach in its management. This case report aims to augment the procedure for frenectomy and gingival depigmentation as preparation before orthodontic treatment.

## 2. Case Report

Female patient aged 18 years came to Hasanuddin University Dental and Oral Hospital with complaints of maxillary front teeth diastema. Also, patient feels discomfort with the colour of her gums. Before orthodontic treatment, a frenectomy and gingival depigmentation are planned. Patients were referred from the Orthodontics department to the Department of Periodontia. Intraoral examination showed high attachment of the frenulum reaching the interdental papilla and gingival hyperpigmentation (Figure 1). The patient's oral hygiene was good, there was no caries or calculus, normal oral mucosa, normal gingival tissue and no enlargement. No pocket periodontal or mobile teeth. The radiographic examination does not show bone loss.

From the history obtained information that there is no family history of patients who have dark-colored gums, patients do not have the habit of smoking and do not consume certain drugs. Frenulum attachment is categorized as papilla penetrating type and gingival hyperpigmentation is caused by intrinsic factor which based on DOPI, is classified as grade 3, moderate clinical pigmentation (medium brown or mixed pink and brown). The prognosis of this case was good.



**Figure 1:** An intraoral appearance. High frenulum adhesions and darker colored gingiva were seen (Source: Author's own work).

Dental health education (DHE), scaling and root planing was done at the first visit as a initial therapy. The patient was explained that the surgical procedure to be performed

at the next visit. At the next visit, the patient was re-examined the condition of his oral cavity. Blood pressure, pulse, and temperature are checked again before the surgical procedure begins. Frenectomy is the first procedure performed. The patient signed informed consent and the tools

and materials were prepared. Disinfection was carried out using iodine solution, (Figure 2A) followed by local anesthesia with pehacain (lidocaine and epinephrine in a ratio of 1: 80,000) in the anterior maxillary region (Figure 2B). The frenulum was clamped using two hemostats, then excision of the upper and lower hemostats using a scalpel (Figure 2C). To remove the attachment of fibrous tissue blunt dissection is performed (Figure 2D). Saline was irrigated before the wound was sutured using a 4-0 nylon thread (Figure 2E), then covered with a non-eugenol periodontal dressing (Figure 2F). Prescribed antibiotic Clindamycin caps 300 mg (three times a day for 7 days), diclofenac 50mg (two times a day for 3 days) and chlorhexidine mouthwash for 10 days.



**Figure 2:** A. Disinfection, B. Infiltration anesthesia, C. The frenulum was clamped with two hemostats and excised, D. after blunt dissection, E. suturing, F. periodontal pack application. (Source: Author's own work).

Patient were asked to control a week postoperatively (Figure 3A). Surgical wound healing looks good and there are no signs of complications or infection Then depigmentation with the scalpel technique is done. It starts with disinfection of the work area (Figure 3B), then anesthetics are performed on the anterior maxilla and mandible (Figure 3C). The hyperpigmented epithelium is removed using blade no. 15 (scraping) with minimal pressure so that there is no excessive gingival scraping (Figure 3D). Irrigation is done using a saline solution, visible after the scraping (Figure 3E). Periodontal packs were applied (Figure 3F) and patients were asked to comply with postoperative instructions.

The patient was instructed not to eat or drink hot. The patient should immediately return for control if the periodontal pack is removed, to be re-installed on the periodontal pack. Observations after surgery were carried out a week later, and the patient was still instructed to use chlorhexidine mouthwash for 1 week.

### 3. Discussion

In this case, the patient's chief complaint is aesthetic problems, which are caused by central diastema and darker gingival color. By examination of the Blanche test, it is known that the central diastema is caused by the attachment of a high frenulum. Blanche test is done by pulling the upper lip then looking pale caused by the pull. If the paleness is seen to cross

into the palate it means that the diastema is caused by an abnormal frenulum [11]. A papillary attachment was found in this case, which later would complicate the orthodontic treatment planned for the patient.

To correct this condition, frenectomy can be performed. It is the complete removal of frenum including its attachment to the bone. It is indicated for, correction of abnormal diastema. Frenectomy is indicated to prevent accumulation of irritants, the deflection of the wall of periodontal pocket which may aggravate its severity, its interference with post-treatment healing, to prevent pocket formation and also injury while brushing [4]. Frenectomy can be done with conventional techniques, electrosurgery or laser [1]. A conventional techniques using a scalpel are chosen in this case. Frenectomy with conventional technique is relatively secure, safe, and practical and does not involve the use of sophisticated measures like electrosurgery and laser; however, bleeding remains a significant drawback. Incision below the clamp technique is a sound alternative to conventional techniques and poses a lesser risk of excessive bleeding and provides for



**Figure 3:** A. Follow-up after 1 week postoperatively, B. Desinfection, C. Infiltration anesthesia, D. Scraping, E. after gingival depigmentation, F. Apply periodontal pack , G. follow up 2 weeks post depigmentation (Source: Author's own work).

better aesthetics. This method is simple and provides comfort to both the patient and the operator [12].

Another patient's aesthetic complaint is gingival hyperpigmentation. From the anamnesis obtained information that there is no family history of the same complaint and the patient did not consume certain drugs or smoking. Gingival pigmentation, in this case, can be classified as physiologic (ethnic/racial) gingival pigmentation. Normally, each person has different degrees of melanin distribution through the epidermis.

The color variation may be uniform, unilateral, bilateral, mottled, macular or blotched and may involve the gingival papillae alone or extend throughout the gingiva into other oral tissue [7].

Gingival uneven appearance and dark colors can be overcome by gingival depigmentation or ablation. Chemical use, abrasion using diamond bur or scalpel, soft tissue autograft, partial flap surgery, cryosurgery, and laser use are some procedures to eliminate gingival hyperpigmentation [2].

In this case, the surgical method used is a scalpel method. This procedure involves removing the gingival epithelium and a layer of connective tissue underneath. Secondary healing will occur and the new epithelium is formed usually without melanin pigmentation [2]. This method is more economical because it does not require a lot of equipment. The disadvantage of this technique is that bleeding can occur during or after surgery. But this can be overcome by applying a periodontal pack 7-10 days after surgery [6,7,13]. Patients are satisfied with the results obtained, but need to be reminded that repigmentation (recurrence) can still occur. Follow-up a week after gingival scraping showed improvement in gingival contour and color. The frenulum attachment is normal and ready for orthodontic treatment.

## 4. Conclusion

Comprehensive examination and treatment are needed to resolve patient complaints involving various disciplines. Gingival frenectomy and depigmentation are treatments with an aesthetic approach to improving the patient's appearance and preparation for further orthodontic treatment.

## 5. Acknowledgments

This manuscript was supported by Department of Periodontology, Dentistry Faculty, Hasanuddin University.

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