Interdental Jurnal Kedokteran Gigi
Website: https://e-journal.unmas.ac.id/index.php/interdental
ISSN 1979-9144 (print), ISSN 2685-5208 (online)

Case Report

Aesthetic Periodontal Enhancement Through Parallel Technique Frenectomy in Orthodontic Patient: A Clinical Case Report

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Received date: February 24, 2025 **Accepted date: July 6, 2026** **Published date: August 12, 2026**

KEYWORDS

Aesthetic soft tissue management, parallel frenectomy technique, periodontal stability, orthodontic diastema.

ABSTRACT

Introduction: A high maxillary labial frenum with midline diastema can compromise both dental aesthetics and periodontal health. Frenectomy using a parallel incision technique has been proposed as a minimally invasive approach to promote optimal soft tissue architecture while supporting orthodontic stability.
Case: A 22-year-old female patient presented with a high-attached maxillary labial frenum resulting in midline diastema during ongoing orthodontic treatment.
Case Management: A parallel technique frenectomy was performed before diastema closure to improve the width of attached gingiva and enhance soft tissue aesthetics. Clinical follow-up was carried out at 8, 13, and 46 days post-surgery, assessing attached gingiva width, gingival margin level, and papilla fill.
Discussions: Progressive healing demonstrated increased attached gingiva width, improved gingival margin level, and enhanced interdental papilla fill. Soft tissue contour appeared more harmonious with midline alignment, contributing to improved aesthetic outcomes and periodontal stability before diastema closure.
Conclusion: Parallel technique frenectomy can effectively enhance the aesthetic and periodontal condition in orthodontic patients with aberrant labial frenum attachment. Early surgical intervention before diastema closure may aid in achieving stable soft tissue architecture and optimizing future orthodontic outcomes.

DOI: 10.46862/interdental.v22i2.13766

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How to cite this article: Cakra M, Murdiastuti K, Wijayanti DA, Merukh DA, Handayani S. Aesthetic Periodontal Enhancement Through Parallel Technique Frenectomy in Orthodontic Patient: A Clinical Case Report Interdental Jurnal Kedokteran Gigi. 2026;22(2):424-9. doi: 10.46862/interdental.v22i2.13766

INTRODUCTION

Aberrant maxillary labial frenulum attachment is frequently associated with aesthetic concerns, most notably midline diastema, as well as potential impairment of periodontal health. When the frenum exhibits a high insertion, it may exert continuous traction on the marginal gingiva during lip movement, leading to mechanical stress, difficulty in plaque control, and an increased risk of gingival recession or loss of interdental papillae.[1,2,3] These effects are of particular concern in orthodontic patients, where soft tissue stability plays a crucial role in achieving optimal aesthetic and functional outcomes.

Conventionally, labial frenectomy is performed using a scalpel technique that involves excision of the frenal tissue in a diamond-shaped pattern, often including the interdental papilla. Although effective in eliminating frenal pull, this approach may result in excessive tissue removal, sacrifice of keratinized gingiva, postoperative scarring, and compromised aesthetic outcomes.[4,5] Such disadvantages can negatively affect long-term periodontal stability and aesthetic success, especially in patients undergoing orthodontic treatment.[1,3]

To overcome these limitations, modified surgical approaches have been introduced. One such modification is the parallel frenectomy technique, which involves two parallel lateral incisions along the frenum combined with blunt dissection, without excision of the interdental papilla. This conservative approach aims to minimize surgical trauma, preserve the continuity of keratinized tissue, and promote faster healing with improved soft-tissue aesthetic integration.[6,7] Clinical reports have demonstrated that this technique is associated with reduced postoperative discomfort, favourable wound healing, and enhanced periodontal outcomes compared with conventional frenectomy methods.[6,7] Specifically, the paralleling technique has been associated with significantly lower postoperative pain and speech-difficulty scores, together with greater improvement in plaque and gingival indices at one-month follow-up, compared with the conventional scalpel technique[6]; it also facilitates primary wound closure with reduced scarring and better preservation of the interdental papilla contour.[7]

Despite these reported advantages, the literature on soft-tissue healing patterns and periodontal parameters following the parallel frenectomy technique remains limited, likely reflecting its relatively recent introduction and the greater technical precision it requires compared with the well-established conventional or laser-assisted approaches; to date, few randomized studies have specifically evaluated its long-term clinical and patient-reported outcomes[16], particularly in orthodontic patients with midline diastema. Objective assessments of attached gingiva width, gingival margin stability, and interdental papilla fill are rarely described in detail.[8,9] Therefore, well-documented case reports remain essential to provide empirical clinical evidence supporting early soft tissue management using conservative frenectomy techniques.

This case report aims to contribute to the existing literature by presenting periodontal and aesthetic outcomes following a parallel frenectomy performed prior to orthodontic diastema closure, with systematic evaluation of soft tissue healing over multiple follow-up periods.

CASE

A 22-year-old female patient was referred from the orthodontic department to the periodontics department of Prof. Soedomo Dental Hospital to address an anterior diastema caused by a high frenum

that penetrated the incisive papilla, resulting in an unaesthetic smile and a lack of confidence.

Figure 1. Abnormal frenal attachment

CASE MANAGEMENT

Before the surgical treatment began, the patient was told of the circumstances and gave their informed consent. Before surgery, the patient was instructed to rinse his mouth with a 0.2% chlorhexidine digluconate solution. The armamentarium used in this procedure consisted of a basic diagnostic set, a UNC-15 periodontal probe, Gracey curettes (no. 1–2 and 3–4), an ultrasonic scaler and tip, a scalpel handle with blade No. 15C, a periosteal elevator, tissue and suture scissors, and a needle holder (Castroviejo). Topical and infiltration anesthesia was administered using an Articaine Hydrochloride 1: 100.000 solution delivered via an injection syringe, while irrigation was performed with saline (aquades) using an irrigation syringe. Cotton rolls, cotton pellets, and sterile gauze were used for isolation and hemostasis, together with povidone-iodine for local antisepsis. The surgical wound was closed with 5-0 nylon sutures and dressed with a periodontal dressing, while suction was used to maintain a clear operative field throughout the procedure.

After performing Asepsis and infiltration anesthesia, the upper lip was retracted to tighten the superior labial muscle attachment. To loosen the connective tissue attachment from the bone, a blunt dissection was performed after making an incision on both sides of the frenum using blade #15C. A horizontal incision is made at the base of the frenum to remove the incised frenum. Gauze was used to stop the bleeding.

Figure 2. Placement of the paralleling incision

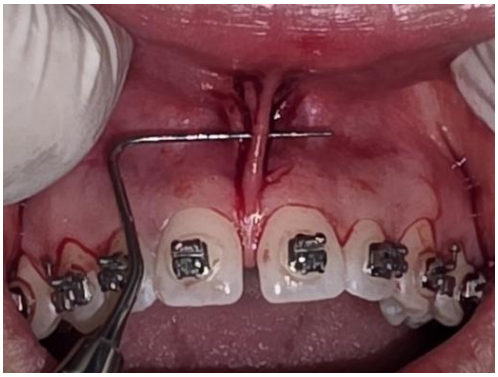

Figure 3. Dissection of the frenum from the underlying CT

Figure 4. Wound after frenum removal

To accomplish primary closure, the incision was sutured using six simple interrupted sutures with 5-0 nylon sutures. A periodontal dressing was

then applied. After post-operative instructions were given, the patient was prescribed 500 mg of amoxicillin for five days, 500 mg of mefenamic acid, and 0.2% chlorohexidine to gargle twice a day for one week.

Figure 5. Primary closure

Figure 6. Follow-up after 13 days

Figure 7. Follow-up after 49 days

DISCUSSION

The timing of labial frenectomy in orthodontic patients is still very much a point of debate and concern, especially when it comes to a case of a high, attached maxillary labial frenum related to midline diastema. In the situation where frenal fibres depict a close or through the interdental papilla, the marginal gingiva and papilla could be continuously stretched during lip movement. If this issue is not solved during orthodontic therapy, the tension may lead to periodontal stability being compromised, gingival recession, papillary loss, and post-treatment diastema relapse risk may be increased. [1,2,3]

Frenectomy done before orthodontic diastema closure is an excellent way to ensure that soft tissue healing and maturation are accomplished before the application of orthodontic forces. The healing time helps the body to reorganize collagen fibres and stabilize the gingival margin, thus creating a more favorable periodontal environment for the tooth movement that will follow.[8,9] In the current case, the frenectomy was intentionally done before space closure so that there could be continuous progress in the width of attached gingiva, stable levels of the gingival margin, and improved interdental papilla fill through the follow-up period.

Some researchers have pointed out that removal of the etiological soft tissue factor at an early stage can significantly lower the chances of relapse after orthodontic treatment, especially in cases where the frenum is a major factor in diastema formation.[1,3] Also, timely management of soft tissues can elevate the patient's aesthetic perception of the treatment, which is an outcome that has gained a lot of consideration recently in clinical practice. The positive periodontal and aesthetic recovery in this case serves as evidence for doing a frenectomy

before closing the diastema in patients who have been properly selected.

Traditionally, frenectomy methods frequently entail the removal of a significant portion of the frenum, and the excision area is sometimes extended to the interdental papilla. While these methods remove the pulling effect of the frenum successfully, they may cause several side effects, such as the removal of excessive tissue, scar formation, loss of keratinized gingiva, and aesthetic outcomes getting worse.[4,5] These disadvantages are very inappropriate for orthodontic patients in particular, whose papillary architecture and gingival harmony have to be preserved for the best aesthetic results.

The parallel frenectomy method is a conservative alteration that aims to lessen the surgical trauma and still release the frenal tension efficiently. The technique preserves the interdental papilla by the two parallel incisions made on each side of the frenum and by using a blunt dissection. Also, it keeps the continuity of the attached gingiva.[6,7] A few cases in the literature have been quoted to have demonstrated reduced postoperative pain, faster epithelialization, and more favorable aesthetic repair when using the parallel technique as compared to conventional scalpel approaches. [6,7,14]

The parallel technique provides similar benefits for soft tissue preservation compared with a laser-assisted frenectomy and is associated with reduced bleeding and patient discomfort. However, the parallel technique does not require any specialized equipment.[10,11,12] This therefore makes the method not only practical but also inexpensive when used in a regular clinical setting, e.g., a periodontal or orthodontic practice where the emphasis is mostly on aesthetic outcomes.[15] In this case study, the use of the parallel technique led to a smooth healing process and a good soft tissue contour without any visible scarring, thus confirming its clinical use.

The clinical outcomes observed in this case are consistent with findings reported in the existing literature. Progressive increases in attached gingiva width and stabilization of the gingival margin have been associated with conservative frenectomy techniques that preserve keratinized tissue and minimize surgical trauma.[6,8] The improvement in interdental papilla fill observed at later follow-up visits corresponds with reports of creeping attachment and gradual soft tissue maturation following frenectomy.[8,9]

Previous case reports focusing on the parallel frenectomy technique have highlighted its role in preventing black triangle formation and enhancing papillary aesthetics in orthodontic patients.[7] The healing timeline documented in this case—early epithelialization followed by gradual tissue maturation—reflects biological wound-healing patterns described in periodontal literature.[8,13,14] These findings reinforce the importance of technique selection and timing in achieving optimal aesthetic and periodontal outcomes.

Although laser techniques have been widely advocated for frenectomy due to their hemostatic properties, comparative studies indicate that well-executed scalpel-based techniques can achieve equivalent periodontal and aesthetic results when tissue preservation principles are respected.[2,7] The present case further supports this concept, demonstrating that the parallel incision technique can successfully enhance soft tissue stability without compromising aesthetics.

Nevertheless, this report has inherent limitations, including its single-case design and relatively short follow-up period. Long-term follow-up and controlled clinical studies are required to

further evaluate the stability of soft tissue outcomes after orthodontic space closure and to establish definitive guidelines regarding optimal frenectomy timing and technique selection.

CONCLUSION

This case report demonstrates that performing a parallel frenectomy technique before orthodontic diastema closure can result in favorable periodontal and aesthetic soft tissue outcomes. The conservative nature of the technique allows preservation of keratinized tissue and interdental papilla, contributing to increased attached gingiva width, stable gingival margin levels, and improved papilla fill during the healing period. Early soft tissue management should be considered an integral component of interdisciplinary orthodontic treatment planning to enhance aesthetic integration and periodontal stability.

ACKNOWLEDGEMENT

The authors would like to thank the patient for consenting to the publication of this case report and the accompanying clinical photographs. No external funding was received for this study.

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