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Multidisciplinary Treatment of Periodontia--Orthodontia to Improve Aesthetics: A Case Report

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Abstract.

Background: Overgrowth of the gingiva during orthodontic treatment is a very common condition characterized by gingival enlargement which is seen in pseudo-pocket formation with or without attachment loss. Gingival enlargement involving the anterior region can affect the quality of one's life related to aesthetics and function.

Objective: This case report describes the correction of gingival enlargement in orthodontic treatment with gingivectomy.

Case Report: A 21-year-old patient presented to the periodontics clinic of RSGM Prof Soedomo UGM on the referral of an orthodontic clinic with a complaint of gingival enlargement in the anterior region of the lower jaw which interfered with the movement of orthodontic's wire corrections. Gingival enlargement was treated by gingivectomy using scalpel.

Results: Two weeks' control showed that the gingival enlargement was corrected and orthodontic treatment could be continued.

Conclusion: Gingivectomy is a procedure that aims to treat gingival enlargement during orthodontic treatment with a fixed orthodontic appliance. In assisting the smooth running of orthodontic treatment, gingivectomy can also reduce the rate of periodontal disease and improve aesthetics.

Keywords: gingivectomy, gingival enlargement, fixed orthodontic appliance

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1. Introduction

Orthodontic treatment is carried out with the aim of improving dental aesthetics, not only improving jaw position and tooth deformity, but also to create a good gingival health condition [2]. Overgrowth of the gingiva during orthodontic treatment is a common condition characterized by gingival enlargement which can lead to the formation of pseudo pocket or gingival pocket with or without attachment loss. Overgrowth of the gingiva is defined as a condition in which the size of the gingiva increases than normal

which can cause aesthetic and dental hygiene problems. The term for this condition is gingival enlargement (GE) or gingival overgrowth (GO) [5].

Gingival enlargement (GE) considered as a successive inflammatory reaction to the accumulation of bacterial plaque [2]. The mechanism that explains the occurrence of gingival growth during orthodontic treatment has not been clearly elucidated, but it may be due to an increase in fibroblasts from amorphous ground substance with increased levels of glycosaminoglycans. An increase mRNA expression of type 1 collagen and an increase of keratinocyte growth factor receptor may play an important role in the over-proliferation of epithelial cells and lead to the development of GE [8]. Other factors such as chemical irritation produced by materials during orthodontic treatment, mechanical irritation by orthodontic brackets, and food impaction have also been proposed as a pathogenesis explaining the occurrence of GE [3].

Gingival enlargement causes more plaque accumulation and inflammation, which causes the transformation of the gingival sulcus into a periodontal pocket. GE treatment in periodontics begins with an initial phase therapy which includes dental health education (DHE), scaling and root planning. Gingival enlargement that does not shrink after these stages of treatment, it is necessary to have an operation in surgical phase therapy [5]. To establish a diagnosis and determine a treatment plan in the surgical phase, radiological examination is needed as a supporting examination. The action that can be done in patients with gingival enlargement is gingivectomy.

Gingivectomy is a gingival excision procedure or cutting of gingival tissue by removing the lateral wall of the pocket which aims to remove the pocket and gingival inflammation, so as to obtain a physiological, functional gingiva with good esthetics. The advantages of gingivectomy are simple technique, can eliminate pockets completely, improve accessibility and visibility for complete calculus elimination, gingival morphology can be predicted as desired [1,5].

This case report aims to describe the correction of gingival enlargement during orthodontic treatment with gingivectomy to improve function and aesthetics.

2. Case Report

A 21-year-old patient came to the periodontia clinic at RSGM Prof. Soedomo UGM, on the referral of an orthodontist at the orthodontic clinic with a complaint of gingival enlargement in the anterior region of the lower jaw which interferes with the movement of the orthodontic wire. The gingiva began to enlarge since ± 2 months ago and there

is no pain, the patient has been using fixed orthodontic appliances for 6 months. The patient denied history of systemic disease.

Figure 1: Initial condition of the gingiva and periapical radiographs.

On intraoral clinical examination, it was found the *agenisi* of teeth 31 and 41 were found a diastema that wanted to be corrected with a fixed orthodontic appliance. Objective examination showed that the gingiva was enlarged, dense, pink like the surrounding gingiva, and the gingival margin was blunt. Dental hygiene status (OHI) was moderate with moderate plaque and calculus index. Gingival enlargement on the labial side of teeth 32,33, 42 and 43, while the size of the gingiva on the lingual side was normal. There were gingival pockets on teeth 32,33, 42 and 43 as shown in table 1, and from the clinical examination this case was diagnosed as gingival enlargement. The treatment plan in this case includes the initial phase, the corrective phase and the maintenance phase.

Table 1: Gingival pocket

Tooth	Gingival Pockets					
	Mesio Buccal	Buccal	Disto Buccal	Mesio Lingual	Lingual	Disto Lingual
32	5mm	3mm	3mm	-	-	-
33	3mm	3mm	3.5mm	-	-	-
42	5mm	3mm	3mm	-	-	-
43	4mm	-	3mm	-	-	-

In the initial phase, scaling and root planing (SRP) were performed for plaque and calculus removal and oral hygiene instructions were given. At the time of the control procedure (SRP) 2 weeks later, the redness of the patient's gingiva had reduced but there were still gingival pockets, OHI = 2.6 (moderate), PCR = 11.6% and GI = 0.12 (mild). To see the height of the alveolar bone tooth region 32,33,42 and 43 we choosed the periapical radiology. Data from periapical radiology aims to determine the treatment plan in the curative phase. After saw the condition of the high alveolar bone, a consultation

with an orthodontist was made to remove the orthodontic bracket along with the wire because a gingivectomy will be performed in 1 week.

At the day for the gingivectomy treatment, first the patient was given an explanation of the procedure, risks and complications of the surgical procedure to be performed to the patient. Next, the patient checked the vital signs and charging informed consent. Because vital signs the patient was in normal limits, the gingivectomy procedure was started by performing asepsis in the working area with providone iodine 10%. Topical anesthetic application and continued local anesthetic infiltration in the labial of vestibule teeth 33 and 43. After anesthesia, gingival pocket depth was measured using a UNC 15 probe and the outer tissue wall was marked with a pocket marker forceps to create bleeding points. This is done by inserting the blunt end parallel to the tooth axis into the pocket. After touching the bottom of the pocket, clamping is done to make bleeding point as a projection of the bottom of the pocket. Each labial surface of the tooth was examined 3 times bleeding points.

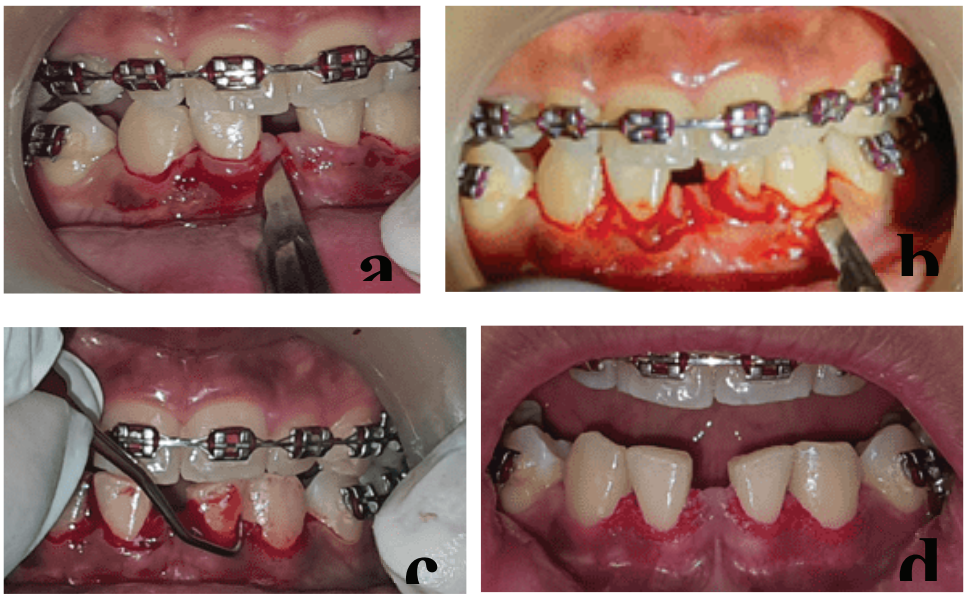

Figure 2: Gingivectomy procedure in the anterior region of the mandible.

An external bevel incision was made 1 mm apically of bleeding point with 45 degrees angle to the coronal by using *scalpel blade* No 15. Discontinue incision in the marginal area was done and followed by an interdental incision using *orban knive*. The excised gingival tissue was removed with a Gracey curette. Gingivoplasty was performed to smooth, thin, and obtain the physiological contour of the gingiva with blade No. 15 followed by irrigation with saline solution and control of bleeding. Resopack® periodontal dressing was applicated to protect the post gingivectomy wound from irritation. The patient was given amoxicillin 500 mg for every 8 hours for 5 days, mefenamic acid

500 mg if needed for post operative pain, and *chlorexidine* 0.12% (Minose 0.12%) as mouthwash.

On 7th day control post gingivectomy, there was still redness around the operation area and orthodontic brackets and wires were reinstalled. Two weeks after the procedure did not show any gingival enlargement in region 32,33,42 and 43 with orthodontic brackets and wires that has been installed but there is still a little redness due to the proliferation process.

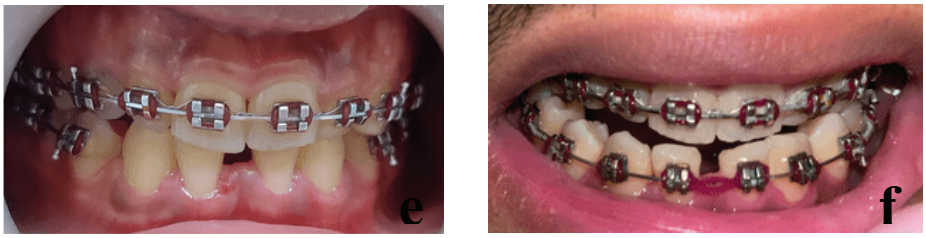

Figure 3: Gingival conditions on day 7 (e) and day 14 (f) post gingivectomy.

3. Discussion

Gingival enlargement (GE) is a condition in which the size of the gingiva increases than the normal size, causing aesthetic problems and can be a place for the growth of periodontal pathogen microorganisms. The occurrence of GE in patients undergoing orthodontic treatment is a common condition. Used the fixed orthodontic appliances also one of the local factors for gingival enlargement where there is a positive relationship between fixed orthodontic appliances and the incidence rate of gingival enlargement [6]. Surlin et al evaluated orthodontic patients with good dental hygiene showing GE without clinical signs of gingival inflammation. These patients showed elevated levels of matrix metalloproteinase-8 (MMP-8) and matrix metalloproteinase-9 (MMP-9) in the gingival crevicular fluid (GCF). During orthodontic treatment, mechanical stress appears to be one of the key factors determining the increase in MMP-9 production and the onset of GE [7].

In another study, we evaluated the possible role of allergic reactions to nickel, which is released from orthodontic appliances made of stainless steel. In vitro and in vivo studies have shown that released nickel ions can cause allergic reactions depending on the time of exposure, and are characterized by keratinocyte proliferation and an increase in epithelial cell proliferation [2].

Gingival enlargement is the body's inflammatory response to the products of the microbiota in plaque. The presence of fixed orthodontic appliances will facilitated the

accumulation of biofilm and bacterial colonization so that it will trigger inflammation. Gingival enlargement will make a difficult access to the tooth surface and bad self cleansing which results in increased plaque [9]. Initial treatment in this case is scalling and root planing, but if there was no decreased size of gingiva, at the next appointment a gingivectomy should be performed [4]. There is a possibility that there was calculus left in the subgingival but is not accessible to the instrument because of the difficulty of accessibility and visibility, so gingivectomy and gingivoplasty surgery is needed [5]. In this case, communication between periodontists and orthodontists is needed to treat patients with GE during treatment of fixed orthodontic appliances because increasing plaque that aggravated by orthodontic appliances will trigger recurrent inflammation.

4. Conclusion

Although the condition of gingival enlargement that occurs during fixed orthodontic treatment is a common condition, the determination and elimination of the causative etiologic factors need to be carried out carefully in order to avoid severe periodontal tissue destruction. Perio-ortho multidisciplinary care demands a complementary relationship in treating patients in orthodontic treatment. The gingivectomy procedure is an effective treatment for correcting aesthetic disturbances and functional for patients during treatment with fixed orthodontic appliances.

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