



Research article

Prevention of Post-Gingivectomy Gingival Recession in Fixed Orthodontic Patients with Gingival Enlargement: A Case Report

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Background: The use of fixed orthodontic appliances can affect periodontal tissues. It can increase the risk of plaque and calculus accumulation. One of the effects on the periodontal tissue is gingival enlargement. The usual treatment for gingival enlargement is gingivectomy with an external bevel. This treatment carries a risk of gingival recession if the base of the pocket is apical to the cemento-enamel junction (CEJ).

Objective: To report the actions to be taken in case of post-gingivectomy gingival recession.

Case Report: An 18-year-old woman presented to the Dental and Oral Hospital, Universitas Gadjah Mada Prof. Soedomo, with complaints of swelling of the lower front gums, partially covering the crown of the teeth, sometimes bleeding when brushing her teeth, but no pain. The patient has been in fixed orthodontic treatment since early 2018. The treatment in this case in the form of gingivectomy gave good results which aimed to remove the gingival pocket, form a new gingival anatomy and create a new gingival margin. In addition, a new gingival margin was considered coronal with suturing and fixation on the brackets to prevent recession.

Conclusion: The risk of gingival recession after gingivectomy can occur, especially in the gingiva with a thin biotype. Coronally advance flap may be an option to position the gingival margin coronal to the CEJ to prevent gingival recession after gingivectomy procedure.

Keywords: gingival enlargement, gingivectomy, fixed orthodontic appliance, coronally advanced flap

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Published: 25 April 2022

Publishing services provided by Knowledge E

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Selection and Peer-review under the responsibility of the NaSSIP 6 Conference Committee.



1. Introduction

Tooth movement due to orthodontic appliances can affect the periodontal soft tissues. The changes that often occur are gingival overgrowth, gingival recession, and gingival invagination (common in orthodontic treatment with extraction) [1]. Excessive gingival growth can cause gingival pockets with or without attachment loss and if it occurs in

the anterior region it will affect the patient's quality of life, especially the health of the oral cavity and periodontal tissue, aesthetic disorders, phonetic changes, and mastication disorders [2,3]. Gingival enlargement in fixed orthodontic patients can be caused by inflammation due to bacterial plaque accumulation around the gingival margin, chemical irritation due to bracket adhesive material, mechanical irritation due to band use, and food impaction [4,5].

Gingival enlargement is classified based on its etiological factors, inflammatory gingival enlargement due to chronic gingivitis, drug-induced enlargement, gingival enlargement association with systemic conditions, gingival enlargement association with systemic diseases, and gingival fibromatosis. The degree of gingival enlargement can be scored as follows: Grade 0 (no signs of gingival enlargement), Grade I (enlargement limited to the interdental papillae), Grade II (enlargement involves the papilla and marginal gingiva), and Grade III (enlargement covers three-fourths or more of the crown). Clinical signs of gingival enlargement that often appear are enlarged, smooth, shiny gingiva, soft consistency, red color and rounded edges [6].

Gingivectomy is a surgical procedure to excise the enlarged gingiva and its healing is secondary intention [6]. Indications for gingivectomy include suprabony pockets, adequate keratinized gingival tissue, pocket depth greater than 3 mm, horizontal alveolar bone defect and no need for osseous surgery, gingival enlargement, limited access area, unesthetic and asymmetrical gingival topography, to facilitate restoration of teeth, to improve the physiology and contour of the gingiva after acute necrotizing ulcerative gingivitis and flap procedures, as well as to expose soft tissues that impede tooth growth [7]. Gingival enlargement that did not change after the initial phase of therapy in the form of scaling, root planing, and polishing, fibrotic tissue and suprabony pocket was an indication for gingivectomy [8].

The aim of this paper is to describe cases of gingival enlargement in patients undergoing orthodontic treatment, therapy to eliminate the gingival enlargement by gingivectomy procedure and how to prevent gingival recession after the surgical procedure.

2. Case Report

An 18-years-old woman came into RSGM Prof. Soedomo, Universitas Gadjah Mada. She was referred from the Pedodontics Clinic to the Periodontics Clinic with complaints of swollen gingiva on the lower anterior and is covering part of the crown of her teeth and frequent bleeding when brushing her teeth since late 2018 until now. She has been in

fixed orthodontic treatment since early 2018 and is now in the finishing stage. She did not complain of pain, was not taking medication, was not suspected of having systemic disease, and had no history of allergies to food or drugs. She is a senior high school student. She consented to her case being published.

Clinical examination at the first visit showed that the gingival margins in the regions 35, 34, 33, 31, 41, 43, 44, 45, 46, 47 were rounded and moved coronally over the crown of the tooth, redness, oedema, soft consistency, rounded papillae interdental surfaces, unstipling attached gingiva texture, and bleeding on probing (BOP), and from overbite and overjet measurements, the results were 5.5 mm and 7 mm (Figure 1). The oral hygiene index (OHI) score was 5.5, O’leary’s plaque control record (PCR) score was 84.6%, and the gingival index (GI) score was 1.24. The results of pocket depth measurements in the lower jaw found gingival pockets in almost the entire lower jaw region (table 1). Panoramic x-ray examination showed that there was no defect to the alveolar bone, teeth 32 and 42 were agenese, there were dental germs 48, teeth 18 and 48 mesioangular impaction class II B, and there were radiopaque areas in the form of dental brackets and labial arch wires on the crowns of teeth 16 to teeth 26 and teeth 36 to 46 (Figure 2). According to classification of periodontal and peri-implant diseases and condition we can conclude that the diagnosis for this case is gingival enlargement due to dental plaque and calculus aggravated using orthodontic appliances or moderate gingival enlargement-dental plaque induced.

TABLE 1: Probing Depth Measurement of Lower Jaw on 1st visit

Tooth	47	46	45	44	43	41	31	33	34	35
Facial	435	535	537	735	534	434	426	625	534	423
Lingual	444	—	334	—	—	—	—	—	—	333
BOP	+	+	+	+	+	+	+	+	+	+

The initial phase of therapy that was carried out during the first visit was dental health education and instructions about cleaning the teeth and mouth and scaling using an ultrasonic scaler on the upper and lower jaws. An evaluation was carried out on the 2nd visit (1 week after scaling) it was found that the condition of oral hygiene had improved. The oral hygiene index (OHI) score was 0.83, the plaque score was 16%, and the gingival index (GI) score was 0.36 and a hyaluronic acid gel was administered by applying it to the gingival area that had enlarged and then carried out by the patient herself at home 2 times a day in the morning and evening after brushing his teeth and she was not allowed to eat or drink for 30 minutes.

The 3rd visit (1 month after scaling) resulted in an oral hygiene index score (OHI) being 1, a plaque score being 14.84%, and a gingival index (GI) score being 0.03. In addition,



Figure 1: Clinical condition at first visit.



Figure 2: Panoramic X-ray.

the results of the probing depth measurement also experienced a significant change (table 2). The gingival enlargement of the mandible was fibrotic and reduced in size when compared to the condition at the first visit (Fig. 3).

TABLE 2: Measurement of Lower Jaw Pocket Depth 1 Month Post Scaling

Tooth	47	46	45	44	43	41	31	33	34	35
Facial	—	—	225	525	524	423	323	324	422	—
Lingual	—	—	—	—	—	—	—	—	—	—
BOP	+	+	+	+	+	+	+	+	+	+



Figure 3: Clinical condition 1 month after scaling.

At the 4th visit, the gingiva in the lower anterior region was still large, pink in colour, no bleeding on probing, spongy consistency, and fibrous appearance (Fig. 4). The result of OHI measurement was 1, PCR is 0.096%; and GI of 0.03. According to classification of periodontal and peri-implant diseases and condition we can conclude that the diagnosis for this case is gingival enlargement due to dental plaque and calculus aggravated using orthodontic appliances or moderate gingival enlargement-dental plaque induced. Therefore, it was decided to perform a gingivectomy.

Prior to surgery, the equipment and materials were prepared, the patient signed the informed consent, measured the patient's vital signs and blood pressure, the operator and the operator assistant wore level 3 personal protective equipment (PPE) because they would work in the aerosol room.



Figure 4: Clinical condition at 4th visit.

The surgery begins with the patient gargling with povidone iodine solution for 1 minute, drying the operating area and disinfecting the operating area using povidone iodine. Then a topical anaesthetic is applied to the vestibule and interdental papillae

area and then a local anaesthetic solution is injected in the area using cytoject. Gingival pocket depth was measured using a UNC 15 probe and the outer tissue wall was marked with a pocket marker to create bleeding points. A continuous external bevel incision was made 1 mm apical to the bleeding point using Kirkland knives at an angle of 45° to the tooth root and ending at the apical end of the epithelial attachment. The interdental papillae were excised using Orban knives at a 45° angle. The excised gingival tissue and granulation tissue were cleaned using a curette. Deposits attached to the tooth surface and roots were cleaned and smoothed using Gracey no. 1-2, 3-4, and 5-6 as well as ultrasonic scaler (USS). The remnants of the gingival tissue were trimmed with tissue scissors. Then, a gingivoplasty was performed using a #15 blade on the gingiva. The surgical area was irrigated with 0.9% saline solution and pressed with sterile gauze moistened with 0.9% saline solution for 2-3 minutes.

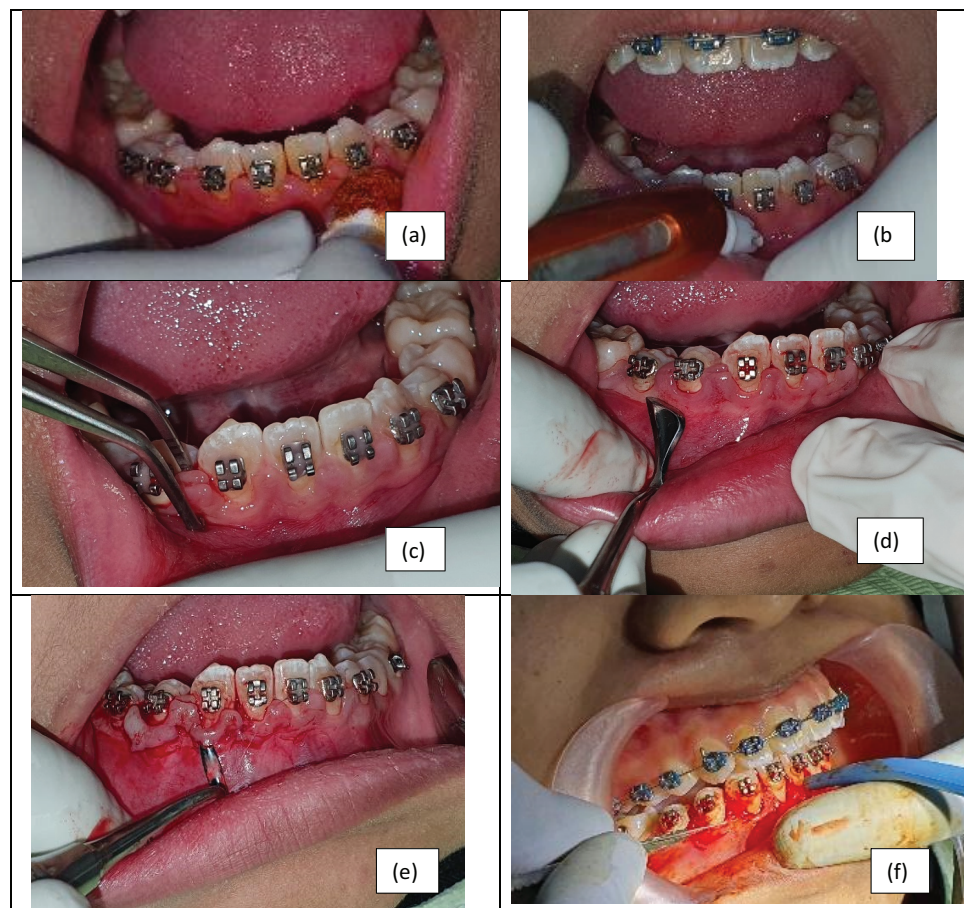


Figure 5: Gingivectomy procedure: (a) asepsis of the operating area, (b) anesthesia, (c) creation of a bleeding point with pocket markers, (d) external bevel incision with Kirkland knives, (e) gingival excision with Orban knives, (f) gingivoplasty with blade #15.

Examination of the surgical area was carried out again before being closed with a periodontal pack. On examination, the gingival margin on the labial surface of teeth 33 and 41 was 1 mm apical to the cemento-enamel junction (CEJ) (Fig. 6). The new gingival margin was reflected using a periosteal elevator in order to free it from the tension of the flap then pulled coronal over the CEJ then sutured with interrupted suture technique using nylon 6.0 thread by tying the thread to the bracket on tooth 41 and on tooth 33 with the aim of fixation on the facial surface (Figure 7). This is done with the aim of preventing the occurrence of gingival recession in the region. The operating area was then re-irrigated using 0.9% saline solution and covered with a hydrophilic periodontal dressing (Figure 8).



Figure 6: Clinical features after gingivectomy.



Figure 7: Post-sutured.

The patient was given postoperative instructions and was prescribed Amoxicillin 500 mg once every 8 hours per day for 15 days, 6 tablets of mefenamic acid 500 mg for postoperative pain, and chlorhexidine digluconate 0,2% mouthwash. Patients were recalled after 1 week, 2 weeks, and 4 weeks.

The first evaluation was carried out 1 week postoperatively, the periodontal pack was removed 24 hours postoperatively, there was no enlargement, no complaints of pain, the gingiva still looked red because it was still healing, the gingival margins of teeth 33



Figure 8: Periodontal pack application.

and 41 seemed to cover the CEJ, and sutures in teeth 33 and 41 are still present (Figure 9). The patient also feels happy because her gums are not swollen like before.



Figure 9: Clinical features of the first evaluation.

The second evaluation was carried out 2 weeks postoperatively, the patient complained of pain and aches in tooth 33, there was no gingival enlargement, there were still signs of inflammation in the interdental papilla area, and suture was removed (Fig. 10).

The third evaluation was carried out 1 month postoperatively, the patient did not complain of pain and felt comfortable both in masticatory function and aesthetic function, never bleeds again when brushing teeth, the gingiva looks pink, there is no gingival enlargement, the interdental papilla looks rounded and reddish, BOP (-), the gingival margin in teeth 33 and 41 was above the CEJ (Fig. 11).



Figure 10: Clinical features 2 weeks postoperative.



Figure 11: Clinical features 1 month after surgery.

3. Discussion

Classification of gingival enlargement is based on its etiological factors such as inflammatory enlargement due to chronic gingivitis, drug-induced enlargement, associated with systemic conditions, associated with systemic diseases, and gingival fibromatosis [6]. Gingival enlargement in this case was caused by plaque and tooth movement caused by fixed orthodontic appliances. The result of measuring the OHI score and PCR score at the time of the first visit was 5.5 and 84.6 %. Several studies said that poor oral hygiene also increased the prevalence of gingival enlargement [9,10].

Scaling, root planing, and polishing are the initial phase of therapy in periodontal disease treatment procedures. This action can relieve gingival inflammation and eliminate pathological microorganisms found in the supragingival and subgingival areas.

Scaling is the removal of plaque, calculus, and stains on the surface of the crown of the tooth. Root planing is the removal of necrotic and/or soft cementum tissue, dentin, calculus, elimination of bacteria and toxins from the tooth root surface in order to obtain a smooth root surface [6,7,8]. In this case, the initial phase of therapy was carried out at the first visit and after 1 week evaluation showed a significant increase in the index of oral hygiene and decreased gingival inflammation. The oral hygiene index (OHI) score decreased from 5.5 to 0.83, O'leary's plaque control record (PCR) score decreased from 84.6% to 16%, and the gingival index (GI) score decreased from 1.24 to 0.36 and a hyaluronic acid hydrogel was applied to the gingival area. The hydrogel can reduce an inflammation, accelerate the healing process, antibacterial, cell proliferation and migration, angiogenesis and re-epithelialization through the proliferation of keratin basal cells [11].

At the 3rd visit (1 month after scaling) the oral hygiene index score (OHI) was being 1, a plaque score being 14.84%, and a gingival index (GI) score being 0.03. The gingival enlargement of the mandible became fibrotic and reduced in size when compared to the condition at the first visit. Gingival enlargement that is fibrous and cannot be reduced after the initial phase of therapy requires gingivectomy [7]. Gingivectomy was not performed at this visit because the plaque score was still at 14, 84%. Surgical therapy cannot be performed if the plaque score is more than 10% [12]. Gingivectomy was performed on the 4th visit after obtaining a plaque score of 0.096%, an OHI of 1, and a GI of 0.03.

After the gingivectomy procedure, we found the new gingival margin on the labial surface of teeth 33 and 41 was 1 mm apical to the cemento-enamel junction (CEJ). This is probably because the base of the pocket is apical to the CEJ. An error occurred during pocket marking. The pressure applied when inserting the pocket marker into the gingival sulcus is too large and too deep [7] or there may have been damage to the buccal bone but the panoramic radiograph was not clear and this is a contraindication to a bevel incision external [7]. To overcome this, we moved the new gingival margin to coronal above the CEJ and then suturing it with interrupted suture technique using nylon 6.0 thread by tying the thread to the bracket on tooth 41 and on tooth 33 to get a fixation on the facial surface, prevented gingival recession in the region [13]. Nylon suture with a size of 6.0 was chosen because it did not cause an inflammatory reaction in the tissue, the needle size was small, so it was atraumatic in the thin gingival tissue, and did not cause food impaction.

Sutured was removed at the 2nd visit (14 days after gingivectomy) and showed good results, the new gingival margin position was coronal to the CEJ. Accordance with a

study by Tatakis and Chambrone in 2015 which said that threads taken more than 10 days after CAF procedure gave better results on healing compared to threads taken less than 10 days [14]. However, the patient complained of pain and aches in tooth 33. This was probably due to the inflammation in that area. Complications that can occur after periodontal surgery are pain and inflammation [15].

The patient's complaints disappeared after an evaluation at 1 month after gingivectomy. This is in accordance with a study by Susin et al who said that the main process of wound healing of periodontal tissues was completed within 2 or 3 weeks followed by tissue maturation and restoration [16].

One month later, the patient came to RSGM Prof. Soedomo with no complain and is satisfied with the result. She can clean her teeth easily and her gum back to normal in a good shape and no bleeding.

4. Conclusions

Gingival enlargement in this case occurs due to inflammation caused by bacteria plaque and the use of fixed orthodontic appliances. It occurs due to suboptimal cleaning by the patient and the effect of tooth movement by orthodontic appliances. The treatment to remove the gingival enlargement that did not shrink after the initial phase of therapy in this case was a modified gingivectomy with the technique of removing the new gingival margin from the CEJ and fixing it on the facial surface with sutures and prevent gingival recession.

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