Aesthetic Crown Lengthening in Type IA-Altered Passive Eruption: A Case Report

Galuh Candra Kirana¹ and Sri Pramestri Lastianny²*

¹Periodontic Specialist Program, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia
²Department of Periodontology, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia

ORCID
Sri Pramestri Lastianny: https://orcid.org/0000-0001-8484-9615
Galuh Kirana: https://orcid.org/0000-0001-8484-9615

Abstract.

Background: Altered passive eruption (APE) is one of the etiologies of the gummy smile condition. The APE type IA can be corrected by aesthetics crown lengthening using the gingivectomy technique.

Objective: To correct the condition of excessive gingival display et causa APE type IA with an aesthetic crown-lengthening procedure using a gingivectomy technique.

Case Report: A 26-year-old female patient complained about her gummy smile which made her maxillary front teeth look short. The probing depth of the patient’s anterior teeth was at normal measurement.

Conclusion: The condition of altered passive eruption type IA can be corrected by an esthetic crown-lengthening procedure using gingivectomy technique to obtain good and optimal aesthetic smile results.

Keywords: altered passive eruption, excessive gingival display, crown lengthening, gingivectomy

1. Introduction

The beauty and satisfaction of patients with treatment outcomes is one of the goals that distinguishes the success of treatment, if it is acceptable or truly satisfying[1]. Awareness of the importance of aesthetics aspect became dentist consideration for evaluating the treatment outcomes, which are influenced by the alignment between the patient’s teeth, gingiva and lips[2].

The lower contour of the upper lip line, as an smile aesthetic component, is normally located in the cervico-coronal of the teeth, so that the patient’s teeth and gums are optimally exposed when smiling[3]. Sharma et al.[2], defined the normal appearance of the exposed gingiva between the lower contour of the upper lip and the gingival margin of the anterior teeth. The normal exposed gingiva is 0-2 mm, while gingival appearance
of more than 2 mm is included in the condition of excessive gingival display or also called "gummy smile"[4].

The condition of the gummy smile can be caused by several etiologies, such as altered passive eruption, maxillary bone excess, bimaxillary protrusion, gingival enlargement, and upper lip abnormalities[3]. Altered passive eruption (APE) as one of the etiologies of the gummy smile is a condition where the gingival margin is located coronally than the cemento enamel junction (CEJ) position. It partially covers the labial area of the teeth in adulthood. This happens because of the disruption of the passive eruption stage, also known as the delayed/ retarded passive eruption[5]. Coslet et al.[6], classified APE conditions into four groups. This classification is divided based on two things. Types I and II are differentiated based on the adequacy of the keratinized gingiva, while subtypes A and B are distinguished based on the position and distance of the alveolar crest to the CEJ (table 1 and Figure 1).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type IA</td>
<td>Keratinized gingiva &gt; 2 mm, alveolar crest-CEJ normal (1,5 mm)</td>
</tr>
<tr>
<td>Type IIA</td>
<td>Keratinized gingiva &lt;2 mm, alveolar crest-CEJ normal (1,5 mm)</td>
</tr>
<tr>
<td>Type IB</td>
<td>Keratinized gingiva &gt; 2 mm, alveolar crest-CEJ not enough</td>
</tr>
<tr>
<td>Type IIB</td>
<td>Keratinized gingiva &lt; 2 mm, alveolar crest-CEJ not enough</td>
</tr>
</tbody>
</table>

Figure 1: APE classification (Coslet et al. [6]).

The treatment for gummy smiles caused by APE is a crown lengthening procedure with or without ostectomy[3]. The aim of the procedure is increasing the length of the clinical crown to improve the aesthetic condition (aesthetic crown lengthening) and/or providing adequate structural support for restorative treatment (functional crown lengthening). In the crown lengthening treatment process, there is a biological basis in the form of a biological width that needs to be maintained and a consideration in determining the type of technique would be used[7]. Biological width consists of junctional epithelium (0.97 mm) and connective tissue (1.07 mm)[8]. Gupta et al.[9]
showed in 85% of the population biological width is about 2 mm and its physiological location varies by age differences, tooth migration, and orthodontic treatment.

Ernesto et al. [10] propose four indication of crown lengthening:

**TABLE 2: Indication of crown lengthening by Ernesto et al. [10]**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Characteristics</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Sufficient soft tissue allows gingival exposure of the tooth without exposure of the alveolar crest and violation of the biologic width.</td>
<td>Gingivectomy</td>
</tr>
<tr>
<td>Type II</td>
<td>Sufficient soft tissue allows gingival excision without exposure of the alveolar crest but in violation of the biologic width.</td>
<td>Gingivectomy and ostectomy</td>
</tr>
<tr>
<td>Type III</td>
<td>Gingival excision to the desired clinical crown length will expose the alveolar crest.</td>
<td>Gingivectomy and ostectomy, limited flexibility</td>
</tr>
<tr>
<td>Type IV</td>
<td>Gingival excision will result in inadequate band of attached gingiva</td>
<td>Limited surgical options. No flexibility.</td>
</tr>
</tbody>
</table>

This case report has aim to evaluate the esthetic crown lengthening procedure to correct a patient with altered passive eruption type IA.

**2. Case Report**

A 26 year old female patient came to the RSGM Prof. Soedomo FKG UGM and complained about her gummy smile and made her maxillary front teeth look short. The patient does not feel any pain. The patient had just completed four years of orthodontic treatment in January 2021. The condition that the patient complained about had existed before the use of his orthodontic appliance. The patient did not have a habit of smoking or consuming alcohol, and denied having a history of systemic illness or allergies.
Objective examination of the patient showed the presence of gingival conditions covering the cervico-coronal area of teeth 14, 13, 12, 22, 23, and 24 which were visible in the patient’s normal smile. The probing depth in the mid buccal area of these teeth was 2.5 mm for teeth 14 and 24, and 3 mm for teeth 13, 12, 22, and 23. Bone sounding were performed on each tooth (table 3). There was no tooth mobility and trauma of occlusion. Visual evaluation for the patient’s lip line when smiling normally showed the lower border of the patient's upper lip was about 2 mm from the cervico-coronal area of teeth 14, 13, 12, 22, 23 and 24 (Figure 3).

Figure 3: (a) Normal smile; (b) highest smile; (c) right angle; (d) left angle.

An OPG X-ray (Figure 4) has been performed. There is a horizontal bone loss in the patient’s posterior region. The calculation of the aesthetic crown lengthening plan can be seen in table 4. The measurement and calculation become the basis reason for performing a 2 mm gingivectomy. Other considerations for plan are based on following reasons: classification of APE type IA patients, lower contour of the upper lip line when the patient smiles, the height of the gingival margin on the ideal reference tooth (11 and 21) and ideal crown length based on the ideal crown root ratio of 2:3 (table 3).

Clinical and radiographic examinations as well as the calculations became the basis for the patient’s diagnosis of altered passive eruption which in the latest AAP is included in the diagnosis of mucogingival deformities and conditions around teeth: excessive gingival display.

Clinical conditions and examination results are the basis for determining the diagnosis and treatment plan. The patient has been explained and agreed on the treatment plan.
At the initial stage, the patient was given dental health education (DHE) regarding her existing clinical conditions and had been performed scaling and root planing (SRP) at the first dental visit. In the corrective phase, the patient was planned to be treated with an aesthetic crown lengthening treatment without ostectomy using gingivectomy technique for 14, 13, 12, 22, 23 and 24. In the maintenance phase, the patient was scheduled and asked to do a control at a week after surgery and periodically every 6 months.

Aesthetic crown lengthening treatment procedure using gingivectomy technique on the 14, 13, 12, 22, 23 and 24 was performed at the second visit (Figure 5). The patient preparation was done by assessment of vital signs and the patient's medical approval for the procedure. The asepsis procedure was performed in the operating area. The patient was given local anesthesia with lidocaine HCL 2% at the apical area of the operative teeth. The gingiva labial and buccal were marked with a pocket marker by the depth of 2 mm. An external bevel incision was made on the labial and buccal gingiva with a #15 scalpel blade and orban to cut the interdental papillae. The excised tissue was removed and followed by gingivoplasty procedure. Re-evaluation was carried out with SRP and saline irrigation. After the procedure was completed, the operation area was dried with sterile gauze and covered with a pack (Resopac). The patient was given postoperative instructions and prescribed with amoxicillin 500 mg tablets to be taken every 8 hours and mefenamic acid tablets 500 mg taken if necessary for five days.
The patient was controlled via telemedicine (because of limitation in Covid19 situation) on the day seven post-operative. Patients were evaluated visually, the pack has disappeared completely, the condition of the gingival margin has healed and the patient is satisfied with the results of the treatment. The lower contour of the patient’s upper lip line also optimized. The new probing depth measurement should be measured to check if the gingival sulcus optimized by the surgery when it possible to do the direct follow up.
3. Discussion

Altered passive eruption (APE) is characterized by the absence of damage or signs of inflammation in the patient’s periodontal tissues[11]. In this case, the patient’s chief complaint was corrected by aesthetic crown lengthening using gingivectomy procedure. The patient had a mean probing depth of the complained area was 2.5-3 mm. The patient’s condition was diagnosed with altered passive eruption type IA. The condition of APE type IA is determined by the failure of the exclusive passive eruption stage of the teeth, causing an excess of gingival area that overlaps the clinical crown, but the distance of the alveolar bone crest to the CEJ is normal[5]. This diagnosis became the basis reason to choose an aesthetic crown lengthening using gingivectomy procedure for the case’s treatment.

The gingivectomy procedure is the simplest technique of crown lengthening without the need for bone reduction. This technique is performed by cutting the excessive gingival area[12]. Zangrando et al.[13] in his study introduced a modification in the classification of APE conditions. The consideration in determining the diagnosis with this modified APE classification is not only the width of the existing keratinized gingiva and the distance between the alveolar crest to the CEJ, but also the involvement of an altered active eruption (AAE) condition that may occur as long as the existing APE. This modification of the APE classification provides several alternative treatment techniques (table 5). Referring to the clinical condition and tissue measurement in patients and their diagnosis, the gingivectomy technique is the right and efficient choice to treat the type IA APE.

<table>
<thead>
<tr>
<th>APE</th>
<th>Type I</th>
<th>Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without AAE</td>
<td>External/Internal bevel incision</td>
<td>Internal bevel incision and apically positioned flap</td>
</tr>
<tr>
<td>With AAE</td>
<td>Internal bevel incision and ostectomy</td>
<td>Internal bevel incision, ostectomy and apically positioned flap</td>
</tr>
</tbody>
</table>

The results from the aesthetic crown lengthening using gingivectomy technique on the patient’s case showed that the technique was successfully correcting the patient’s complaints and give a good healing of the gingival tissue. The results on the day seven post-operative showed lower contour of the patient’s upper lip line was optimized and the treatment succeed in providing patient aesthetic satisfaction.
4. Conclusion

This case report shows that the aesthetic crown lengthening procedure using gingivectomy technique is the right choice of treatment in overcoming the patient's gummy smile complaints caused by the condition of altered passive eruption type IA. A complete examination and measurement in the initial planning is a very important key to support and strengthen the rationale for choosing the right treatment procedures. Patients with type IA APE in this case report showed a good and optimal aesthetic crown lengthening treatment results by achieving patient satisfaction and good tissue healing after the surgery.

5. Acknowledgements

I thank the following individuals for their expertise and assistance throughout all aspects of our study and for their help in writing the manuscript.

References


