

# A case report: Surgical esthetic crown lengthening procedure for gummy smile treatment

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(CASE REPORT)



## A case report: Surgical esthetic crown lengthening procedure for gummy smile treatment

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### Abstract

<sup>1</sup> **Background:** In modern society, a harmonious smile is considered a symbol of beauty. An attractive smile can improve appearance so that a person is more easily accepted in society. In planning dental treatment to be carried out, aesthetic considerations are very relevant because of the relationship between smile and facial beauty.

<sup>20</sup> **Purpose:** The purpose of writing this article is to describe a crown lengthening accompanied by bone reduction <sup>1</sup> to correct an excessive gingival display in a patient with altered passive eruption (APE) of the maxillary anterior teeth.

<sup>2</sup> **Case:** A 28-year-old female patient came to the Periodontology Specialist Polyclinic at RSGM Airlangga University with complaints that the gums on the upper front teeth looked more dominant. The patient did not have problems with the periodontal tissue and had no history of systemic diseases such as diabetes, high blood pressure, and had no history of allergies to food and drugs.

**Case Management:** After analyzing the periodontal tissue, the choice of crown lengthening with bone reduction was chosen to treat this case. Conclusion: procedures Crown lengthening have been performed as a viable option to facilitate restorative therapy or improve esthetic appearance.

**Keywords:** Gummy Smile; Crown Longening; Altered Passive Eruption; Case report

### 1. Introduction

<sup>3</sup> A gummy smile is usually seen when more than 3 mm of gingiva is visible. The shape of the lips and the position of the lips when speaking and smiling cannot be changed easily, but the dentist can modify/control the shape of the teeth, interdental papillae, and the position of the gingival margins and incisal edges of the teeth [1]. A number of study has set criteria certain for appearance gingiva which considered could receive in a manner aesthetic. Morley et al. (2009) preferred an anterior gingival view range of 1-3 mm, while Kokich et al. (2006) put forward a maximum 3 mm gingival display as an esthetic standard, and Geron et al. (2005) stated an upper limit of 1 mm [2].

<sup>19</sup> Several methods that can be performed to widen the clinical appearance of dental crowns have been described including gingivectomy, flap surgery with bone reduction, flap with apical displacement, and orthodontic therapy [1]. Crown lengthening is a periodontal resection procedure which aims to remove a portion of the supporting periodontal tissue to increase the exposure of the clinical crown of the tooth. This is a common procedure for several indications of restorative treatment [3,4]. The most common cases dentists encounter are short clinical crowns due to caries, erosion, malformations, fractures, attrition, reduction of excess teeth, incomplete eruption, exostosis and genetic variation. Short

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clinical crown lengths should be increased or extended when the carious or fractured tooth margins are subgingival, so that the crown can have retention with the restoration [3,5].

The ultimate goal of crown lengthening is to provide adequate crown dimensions for a stable dentogingival complex and for placement of restorative margins, thereby achieving the best marginal seal and an aesthetically pleasing final restoration [6,7]. Several studies have also shown that an attached gingival width of 2 to 3 mm is preferable for the successful retention of restored teeth. Because of the repair character of this procedure, there is a risk of reducing the width of the attached gingiva; thus, this width should be diagnosed and carefully evaluated when planning a crown lengthening procedure [6,8,9].

When correcting the position of the marginal gingiva, care must be taken to maintain its biological width. Often, bone recontouring is essential to maintain the integrity of the biologic width and allow for proper placement of the margins [1]. Biological width (BW) is defined as the physiological dimensions of the junctional epithelium and connective tissue attachment, according to a pilot study conducted by Gargiulo et al. In this study, the authors demonstrated that humans, on average, exhibit a connective tissue attachment of 1.07 mm, above the alveolar bone crest, and a connective epithelium, below the floor of the gingival sulcus, by 0.97 mm. The combination of these two measurements results in an average biological width of 2.04 mm [10-13].

Ingber et al. suggested that an additional 1 mm coronally at the 2 mm dentogingival junction, is the optimal distance between the bony crest and the restoration margin, to allow proper tooth healing and restoration [6,14]. Moreover, during the aesthetic procedure of crown lengthening, bone reduction plays an important role in the final position of the free gingival margin after healing. Therefore, the purpose of writing this case report article is to explain the sequence of esthetic crown lengthening surgery as a gummy smile therapy after orthodontic treatment.

## 2. Case Report

The patient came to the Periodontology Clinic at RSGM Airlangga University to have treatment on the anterior region of the maxilla. The patient last cleaned coral 2 weeks ago. The patient brushes his teeth 2 times a day, in the morning when taking a shower and at night before going to bed. The patient claimed to have no history of high blood pressure, diabetes, and other systemic diseases. The patient claimed to have no history of drug allergies and food allergies.

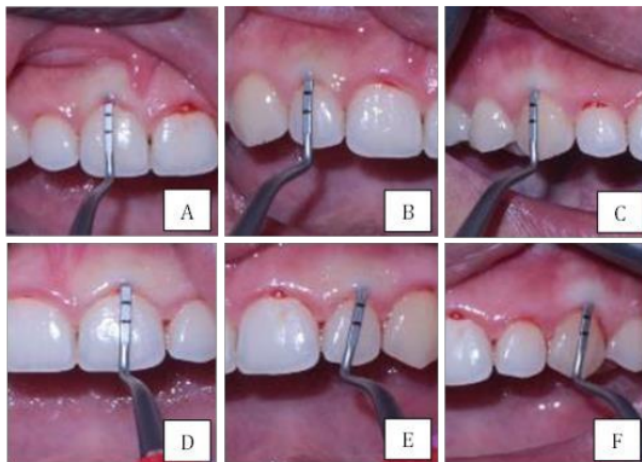
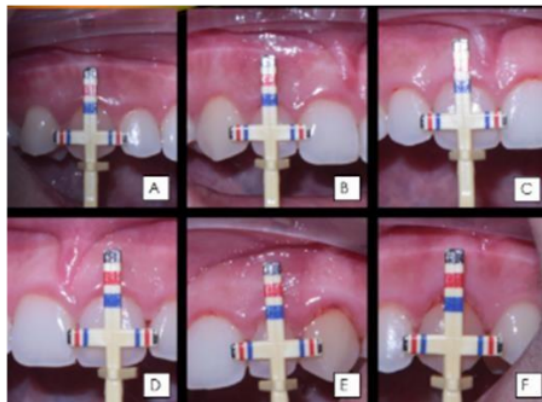


Figure 1 Bone sounding examination of teeth region 13, 12, 11, 21, 22, 23 before crown lengthening surgery

Based on the clinical examination that has been carried out, the patient was diagnosed with mucogingival deformity and conditions around the teeth (excessive gingival display) with plaque etiology and accompanying conditions in the form of altered passive eruption (APE) with a bone sounding result of 1mm. The treatment plan in phase 1 is dental health education (DHE), scaling teeth in the upper and lower regions. The planned phase II treatment is crown lengthening with bone reduction (gingivectomy with bone reduction) in regions 13, 12, 11, 21, 22, 23. There is no treatment plan in phase III and phase IV treatment is in the form of a maintenance phase.



**Figure 2** Clinical Crown Proportion with Chu Gauge Dental region 13, 12, 11, 21, 22, 23



**Figure 3** Digital smile Design



**Figure 4** Dental Panoramic Examination

### 3. Case Management

crown lengthening with bone reduction (gingivectomy with bone reduction) is an appropriate treatment option for APE because of predictable results and minimal side effects for patients compared to other treatments. procedure crown lengthening begins with asepsis in the patient by administering providone iodine, and continues with local anesthetic infiltration using septocaine in the mucobuccalfold of teeth region 13, 12, 11, 21, 22, 23. Crown teeth with width and length 13, 12, 11, 21, 22, 23 were measured using Chu's gauge and biological width was measured using bone sounding. Bleeding points are made using pocket marker forceps (PMF). External bevel incision was performed using blade no.



15c following the bleeding point. Excision of the gingival tissue using a curette. Then sulcular incisions were made in regions 13, 12, 11, 21, 22, 23 with blade no. 15c and confirm the gingival margin using the Chu-gauge. performed full thickness flap followed by an ostectomy (bone reduction) in regions 13, 12, 11, 21, 22, 23 using a round bur. Irrigation of the surgical area using saline. The flaps are then repositioned and sutured using interrupted sutures. Patients were given a prescription in the form of amoxicillin 500 mg 3 times a day for 5 days and mefenamic acid 500 mg 3 times a day and taken if pain occurs, and chlorhexidine gluconate 0.2% twice a day. Postoperative routine instructions were given to patients not to consume hot and spicy food or hot drinks for 3 days after surgery. The patient came for control 7 days postoperatively, denied any pain and sutures were in good condition. The control patient returned 15 days later, there were no complaints of pain and the stitches were in good condition then debridement was carried out using saline irrigation and the stitches were removed



**Figure 5** Crown lengthening procedure accompanied by bone reduction in tooth regions 13,12,11,21,22 and 23



**Figure 6** (A) Pre-operative clinical condition. (B) Clinical condition post-operative H+3 months post crown lengthening procedure. There were no signs of inflammation and the gingival zenith was in the expected position

#### 4. Discussion

Crown lengthening is a surgical procedure to provide adequate crown retention and for aesthetic improvement in restorative procedures and in teeth with caries or subgingival fractures; moreover, this surgical procedure can establish accurate bone width and correct gingival asymmetry [6,15,16]. Crown lengthening procedures include a number of techniques including gingivectomy or gingivoplasty, apical flap procedures and may involve reducing bone and promoting tooth eruption with or without fiberotomy [3,17]. In cases with bone sounding of 5 mm or more on the keratinized gingiva, a gingivectomy procedure was chosen [3,6].

Several factors must be considered when performing an aesthetic crown lengthening procedure which requires a gingivectomy procedure to expose the tooth so that a minimum of 2 to 5 mm of keratinized gingival tissue is required to ensure gingival health [6,18,19]. In addition, papilla preservation is another important aspect of the surgical procedure that must also be considered. The interproximal bone was carefully removed to preserve the anatomical structure, so that the interproximal tissue was allowed to proliferate coronally; papillae should replace the distance from the apex of the bone to the base of the contact area (about 5 mm or less) [6,20,21]. To achieve a harmonious and successful long-term restoration, the distance between the alveolar crest and the prosthetic margin, which allows the restoration of the biological width, should be at least 3 mm [6,22]. This can be achieved through the crown lengthening procedure as described in this case report.

In doing Crown lengthening requires several considerations including biological aspects and tooth anatomy. From a biological perspective, it is necessary to pay attention to the dimensions between the crest of the alveolar crest and the free gingiva margin. Average dimensions 2.75 - 3.00 mm. The margin of the restoration should not extend more than 3 mm from the apex of the alveolar crest. If more will cause inflammation, irritation of the marginal gingiva, patient discomfort, easy bleeding, poor esthetics, and damaged periodontal tissue. From the aspect of dental anatomy, it is necessary to pay attention to the length and shape of the crown root and root ratio, the roots must not be exposed excessively to a maximum of 3 mm from the Cemento Enamel Junction (CEJ), the height of the furcation, smile line (anterior teeth), the presence of interdental space, what is the position of the lips there is muscle hypertonus, lip hypermobility [3,23]. Several studies have shown that the biologic width regenerates on its own after a crown lengthening procedure within 6 months, so the ideal time for restoration placement after crown lengthening surgery is 6 months [6].

In these cases, careful diagnosis and treatment planning are important to predict the success of APE treatment. Measurements using Chu's aesthetic gauge have been used successfully to guide reduction of excess gingival tissue and improve tooth size proportions. These measurements include the tip of Chu's Proportion Gauge, which represents an objective mathematical assessment of the tooth size range [24,25]. The full thickness flap in the crown lengthening procedure in this case aims to facilitate access for the necessary bone reduction. The results obtained after 3 months of evaluation were said to be quite good, because the gingival margin was in the expected position.

An exaggerated display of gingiva or a gummy smile represents a concern for aesthetics that is emotionally disturbing for many. Dentists must understand the various causes, determine the right diagnosis, and make an aesthetic treatment plan that can be predicted clinically for the success of crown lengthening therapy in the gummy smile condition.

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## 5. Conclusion

Crown lengthening is a viable option to facilitate restorative therapy or improve esthetic appearance. However, to plan a crown lengthening procedure, the patient's overall periodontal condition and hygiene habits must be evaluated. Furthermore, an accurate diagnostic and interdisciplinary approach is mandatory to obtain better, conservative and predictable results in the field of aesthetics.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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