



## Research article

# Aesthetics Crown Lengthening with Anterior Gingival Depigmentation: A Case Report

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**ORCID**Ahmad Syaify: <https://orcid.org/000-0002-5197-912X>**Abstract.**

**Background:** Crown lengthening (CL) is a perio–aesthetic treatment to gain an ideal proportion of teeth and gingiva, and depigmentation is a treatment to treat gingival hyperpigmentation.

**Objective:** To describe the treatment of altered passive eruption (APE) with CL procedure and gingival depigmentation using a scalpel scraping technique.

**Case Report:** A 21-year-old man presented with a complaint of short maxillary front teeth and brownish gum. Intraoral examination revealed a disproportionate tooth size and gingival hyperpigmentation in the maxillary and mandibular anterior regions. Crown lengthening and gingival depigmentation procedures were performed in one visit. In gingival depigmentation procedure epithelial tissue was removed from the mucogingival junction up to the interdental papilla. At the one-week follow-up, the gingiva was still reddish. After four weeks, the gingiva healed, and there was no re-pigmentation.

**Conclusion:** Crown lengthening and gingival depigmentation are perio–aesthetic treatments that improve tooth size and gingival proportion to achieve a better aesthetics.

**Keywords:** crown lengthening, depigmentation, perio–aesthetic surgery

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## 1. Introduction

A smile is an important aspect of someone's appearance, affects body expression, and influences social interactions. Therefore, the demand for dental aesthetics remains high as patients desire an ideal smile [1]. A balanced relationship between dental elements (color, shape, position, and symmetrical) is needed within the gingiva, mucosa, and lips [2]. Patients usually complained about their teeth length that looked short and showed excessive gingiva (gummy smile). Ideally, the entire length of the clinical crown of the anterior maxillary teeth is shown, and the incisal curve of the maxillary teeth will be paralleled with the lower lip curvature [3].

The clinical crown length is marked by the distance from the gingival margin to the incisal edge or occlusal aspects [4]. Touati stated that each anterior maxillary tooth has a

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certain aesthetic role. The central maxillary incisors provide stability and balance, lateral maxillary incisors give charm, and the canines give strength to the aesthetic zone [5]. Twosend (1993) said that the central maxillary incisors teeth must be in the same length while the lateral incisors must be 1-2 mm shorter. The length size of maxillary central incisors teeth must be around 13,5 mm, and the maxillary lateral incisor length is 12 mm [6].

The maxillary central incisor length is 10.5 mm (from the incisal edge to the cemento-enamel junction (CEJ)) and 8.5 mm wide (from mesial to distal) in three major racial groups; Caucasoid, Mongoloid, and Negroid. Gillen et al. concluded that the central incisors and canine were the same length and were 20% longer than lateral incisors. The length and width ratio of the canine crown and lateral incisor crown were similar, that is 1:2. Instead, the length and width ratio of central incisors is 1:1. The clinical crown length of a man's teeth is greater than the woman's teeth in three major racial groups; Caucasoid, Mongoloid, and Negroid [7]. Crown lengthening is one of gummy smile corrective treatments caused by APE. CL can be performed by gingivectomy with or without bone reduction. Crown lengthening with bone

reduction is a surgical procedure to maintain the dentogingival complex and improve aesthetics smile [8]. There are some cases where gingival recontouring is required. In APE, the clinical crown height is less than the anatomical crown height, appearing short and wide teeth and produce a high smile line with the look of a gummy smile [9]. Overall gingival correction should be provided to maintain the biological width (BW) [10].

Harmonization of a smile depends not only on the shape, position, and color of teeth but also on the condition of the gingiva. Gingival hyperpigmentation generally does not appear as a pathological problem, but complaints of blackened gingiva are often an aesthetic problem, especially in patients with high smile lines. Physiological pigmentation of oral mucosa is clinically manifested as cell pigmentation melanin produced by melanocytes in the basal and suprabasal layers of the epithelium with varying amounts in different ethnic groups [11]. Increased activity of melanocytes can cause gingival hyperpigmentation. This condition can occur due to heredity and can be triggered by mechanical, chemical, and physical factors. Systemic conditions include endocrine disorders, Albright syndrome, malignant melanoma, antimalarial therapy, Peutz-Jeghers syndrome, trauma, hemochromatosis, chronic lung disease, and racial pigmentation, also known as the cause of hyperpigmentation [12].

The Dummett-Gupta Oral Pigmentation Index (DOPI) classified gingival pigmentation into 1) No clinical pigmentation; pink gingival color, 2) Mild clinical pigmentation; light brown gingival color, 3) Moderate clinical pigmentation; gingival color is medium brown

or a mixture of pink and brown, 4) Severe clinical pigmentation; gingival color dark brown or bluish-black [13].

Many treatments for gingival hyperpigmentation, consisting of many methods, such as gingivectomy with free gingival autografting, electrosurgery, cryosurgery, abrasion with diamond burs, and many types of lasers have been used to treat gingival depigmentation. To remove melanin pigmentation on the gingiva must be done carefully and not damage the teeth. If the procedure is not done properly, it can cause a gingival recession, damage to the periosteum and alveolar bone, and impaired wound healing [14,15].

Depigmentation using a scalpel is the simplest technique and does not require sophisticated equipment, it is enough to use instrumentation commonly available in daily practice, although it requires more adequate skills from the operator. The healing process from using this technique is faster than other techniques. However, this process causes bleeding during the procedure and after the procedure which requires a periodontal dressing for 7 – 10 days [15].

Laser, electrosurgery, and cryosurgery are not effective costs. The depth of control is a limitation of chemical cauterization and cryosurgery. Electrosurgery generates hidden heat, causing damage to surrounding tissues. Gingivectomy and bone denudation are invasive surgical procedures that can cause patient discomfort and bone loss [15].

This case report aims to discuss the management of CL in case of APE along with gingival depigmentation in one visit. The patient has consented to his case being published in the interest of science.

## 2. Case and Management

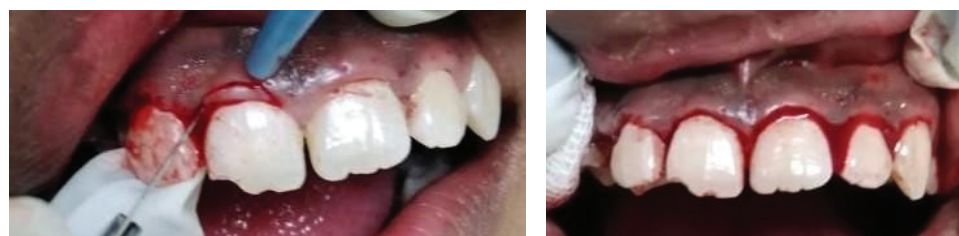
A 21-year-old male patient came to the Periodontics Clinic of Rumah Sakit Gigi dan Mulut Universitas Gadjah Mada Prof. Soedomo, Yogyakarta, Indonesia, complaining his maxillary teeth were shorter, and his gums were brownish, which made him less confident. Patient started to concern about his appearance and felt the need to improve it since high school. The patient was not taking any medication and denies that anyone in his family has had similar complaints. The patient is an active smoker ( $\leq 10$  cigarettes/per day) since six years ago. Intra-oral examination found the anterior maxillary teeth disproportionate and gingival hyperpigmentation in the region of teeth 14 to 24 and teeth 34 to 44 (Figure 1). The gingival hyperpigmentation may be obtained from the patient's history of smoking.



**Figure 1:** Disproportionate tooth size and gingival hyperpigmentation.

The initiation phase is directly carried out at the first visit by dental health education (DHE), scaling, and root planing. After obtaining a plaque control record score of 7.8%, CL and depigmentation were planned at the next visit. Crown lengthening and gingival depigmentation procedures were performed with a technique using a scalpel.

Before started the procedure, the patient was explained in advance about the course of treatment, including the risks and complications of the procedure. Once understood, the patient signed the informed consent form. Crown lengthening procedure was initiated by disinfection of the surgical area, administration of topical anesthetic, and continued infiltration anesthesia around the vestibule area and the labial of attached gingiva (lidocaine and adrenaline in a ratio of 1:100,000). Furthermore, the pockets on each surface were explored with a periodontal probe and marked with a pocket marker. The internal bevel incision was made by moving the scalpel in an interproximal direction using a number 15 scalpel with a depth of 2-4 mm from the gingival margin following the bleeding point (Figure 2a and 2b).



**Figure 2:** a. Internal bevel incision b. After the incision.

After the CL procedure was completed, then continued with gingival depigmentation. With infiltration anesthetic in the surgical area, the hyperpigmented epithelium was removed by scraping using a scalpel and blade number 15 (Figures 3a and 3b). After ensuring that it was clean, bleeding was controlled by pressing sterile gauze soaked

in saline for 3×5 minutes. The entire surgical area was irrigated with saline solution, then covered with a resorbable periodontal dressing (Figure 4). The patient was given antibiotic Amoxicillin 500 mg every 8 hours for five days, analgesic Mefenamic acid 500 mg if necessary, and Chlorhexidine mouthwash 0.12% twice a day for one week.



**Figure 3:** a. Scraping of gingival hyperpigmentation by a scalpel b. After scraping.



**Figure 4:** Covering would be postoperative by a resorbable periodontal dressing.

At a visit one week later, the patient still had complaints that the depigmented wound was still a little sore when exposed to spicy and sour food, there was already visible healing in both the postgingivectomy and depigmentation wounds. The periodontal dressing has been absorbed and the healing process is going well without any post-surgical complications characterized by the formation of new tissue and epithelialization. The patient was instructed to continue taking analgesics and using mouthwash (Figure 5). At the 4-week postoperative visit, the gingival soft tissue showed complete re-epithelialization (Fig. 6).

After seeing the results of the treatment that has been done, the patient feels satisfied and now the patient becomes more confident. Patients are also motivated to better maintain the cleanliness and health of their teeth and gums.

### 3. Discussion

One of the aesthetic problems in dentistry that patients often complain about is the gummy smile. According to the American Academy of Periodontology, several factors



**Figure 5:** One week after post-surgery.



**Figure 6:** One month after post-surgery .

can cause the gummy smile and APE [17]. Excessive gingival, which includes mucogingival deformities around the teeth described as having the gingival margin farther from the incisal to the crown. Excessive gingiva can cause a short clinical crown [18,19]. In this case, the patient feels that his upper front teeth appear shorter.

Altered passive eruption clinically has a crown that looks short. Marcushamer et al. have observed a wide range of Asian length-to-width ratios on central incisors (0.65-0.81), lateral incisors (0.57-0.77), canines (0.57-0.77) [5,6]. Altered passive eruption has no signs of periodontal disease such as inflammation, suppuration, and bleeding on probing [20]. In the above case, clinical examination showed no signs of periodontal disease in the shorter crown. The choice of treatment for excessive gingival in APE depends on several examinations such as probing depth, detection of CEJ, and bone sounding. This examination aims to observe the adequacy of soft tissue and determine the need for bone reduction [2,21]. In this case, we found that the probing depth was 2–3 mm, and the bone sounding was 4–6 mm.



Crown lengthening can be an option for excessive gingival treatment caused by APE in the above cases. Crown lengthening can be performed without bone reduction (gingivectomy). Garber and Salama suggested that simple CL can be performed to expose hidden areas induced by gingival excess in type IA based on the classification of the CEJ relationship and the alveolar crest. Type IA means that the gingival margin is further to the incisal aspect of the crown, the width of the keratinized gingiva is wider than normal, the clinical crown is short, and there is a space of 1.5 mm more or less between the CEJ and the alveolar crest [22].

The treatment for APE or gummy smile is as follows: 1) Type I-A: gingivectomy (crown lengthening without bone reduction), 2) Type I-B: gingivectomy with bone reduction (crown lengthening with bone reduction), or the scalloped inverse-beveled flap to CEJ (positioned/repositioned flap), 3) Type IIA: apically positioned flap (repositioned flap), and 4) Type II-B: apically positioned flap with bone reduction (osseous surgery) [17].

Ernesto classified an aesthetic crown lengthening into: Type I, Sufficient soft tissue allows gingival exposure of the tooth without exposure of the alveolar crest and violation of the BW; Type II, Sufficient soft tissue allows gingival excision without exposure of the alveolar crest, but in violation of the BW; Type III, Gingival excision to the desired clinical crown length will expose the alveolar crest; and Type IV, Gingival excision will result in an inadequate band of attached gingiva [23].

We chose the conventional CL technique using scalpel number 15. Berceste et al. said that the current study stated that scalpel CL had a faster wound healing process [7].

Aesthetic needs are a trend nowadays, and every patient wants to see a beautiful smile. To achieve this, it is not only the teeth but also the gingiva has an important role. The gingiva is a mucous membrane firmly attached to the bone maxillary and mandible periosteum. Healthy gingiva has a clinical appearance with a pink color, has a rubbery consistency, resilient and adheres tightly to the underlying bone, and has a stippling surface texture on the attached gingiva. Gingival depigmentation, also known as ablation, is an aesthetic procedure performed to restore normal gingival color [24].

Gingival depigmentation can be executed by several techniques, including scraping using a scalpel, cryosurgery, electrosurgery, or laser. As performed in this case, the scalpel scraping technique has the advantage of using instrumentation commonly available in daily practice. However, it requires adequate skill from the operator. Postoperative pain due to scalpel friction can be managed with the use of periodontal dressing and analgesics prescription.

In this case, CL and gingival depigmentation management with scraping technique in one visit showed satisfactory results, both in terms of effectiveness and aesthetics (Figure 7).



**Figure 7:** Pre and post crown lengthening and depigmentation treatment.

#### 4. Conclusion

Crown lengthening and gingival depigmentation are appropriate perioaesthetic treatment procedures to resolve aesthetic problems, increase patient confidence, and make the patient's control plaque easier. The selection of the right technique in surgical procedures will determine the success of treatment and comfortable for patients.

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