Crown lengthening for gummy smile treatment related to altered passive eruption

Crown lengthening untuk perawatan *gummy smile* yang berhubungan dengan *altered passive eruption*

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ABSTRACT

One of the most common aesthetic problems patients complain about in dentistry is gummy smile; which can be caused by various factors, one of which is APE. Altered passive eruption (APE) is a condition where the gingiva looks larger, causing the teeth to look shorter when smiling, thus affecting the aesthetic appearance. Crown lengthening, either with or without bone reduction, is a frequent treatment in this case. The purpose of this case report is to explain how crown lengthening was used to treat a gummy smile caused by APE. A 21-year-old female patient presented to Hasanuddin University Dental Hospital with complaints of uneven upper gingiva and short teeth, as well as an unattractive smile. After aesthetic and periodontal tissue analysis, crown lengthening was performed which proved successful in aligning the gingival margin with the gingival crest and improving the patient's smile profile. The patient reported no pain or swelling after the procedure. So, it is concluded that a beautiful smile can be successfully achieved with good diagnosis, proper treatment planning and good skills.
Keywords: altered passive eruption, crown lengthening, gummy smile

ABSTRAK

Salah satu masalah estetik yang paling sering dikeluhkan pasien di bidang kedokteran gigi adalah *gummy smile*; yang dapat disebabkan oleh berbagai faktor, salah satunya adalah APE. *Altered passive eruption* (APE) adalah suatu kondisi gingiva terlihat lebih besar, menyebabkan gigi terlihat lebih pendek saat tersenyum sehingga memengaruhi estetika penampilan. *Crown lengthening*, baik dengan atau tanpa pengurangan tulang, adalah perawatan yang umum pada kasus ini. Tujuan dari laporan kasus ini adalah untuk menjelaskan *crown lengthening* dilakukan untuk mengobati *gummy smile* yang disebabkan oleh APE. Seorang pasien wanita berusia21 tahun datang ke Rumah Sakit Gigi Mulut Universitas Hasanuddin dengan keluhan gingiva bagian atas yang tidak rata dan gigi yang pendek, serta senyum yang kurang menarik. Setelah dilakukan analisis estetika dan jaringan periodontal, dilakukan *crown lengthening* yang terbukti berhasil membuat margin gingiva sejajar dengan puncak gingiva dan profil senyum pasien menjadi lebih baik. Pasien melaporkan tidak ada rasa sakit atau bengkak setelah prosedur. Disimpulkan bahwa senyum yang indah dapat berhasil dicapai dengan diagnosis yang baik, perencanaan perawatan yang tepat, dan keterampilan yang baik.
Kata kunci: erupsi pasif yang diubah, *crown lengthening*, *gummy smile*
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INTRODUCTION

Crown lengthening has traditionally been thought of as an adjuvant to restorative dentistry.[1] An interdisciplinary approach has emerged in response to the growing popularity of aesthetic-oriented treatment. As a result, crown lengthening procedures have become an essential component of the smile's aesthetic. In modern society, a smile is a symbol of beauty and well-being, a human expression that transcends language, culture, race, gender, time, and socioeconomic differences. The primary goal of crown lengthening is to create smile aesthetics based on patient demand. A variety of factors, such as tooth form/position and gingival tissue levels, can have an impact on overall smile aesthetics.[2,3]

A perfect smile displays the entire length of the upper anterior teeth up to the premolars, with the incisal curve of these teeth parallel to the inner curvature of the lower lip and slightly touching or leaving a minimum space with the lower lip. When a person smiles, the entire crowns of the maxillary central incisors are visible, as is 1 mm of pink attached gingival. Cosmetically, exposed gingiva of 2-3 mm is acceptable. When more than 3 mm of gingival is visible, a gummy smile is present. During an esthetic procedure crown lengthening with gingivectomy play a role in the operation.[4,5] As a result, the purpose of this case report was to describe the surgical sequence of aesthetic crown lengthening in a patient with altered passive eruption.

CASE

A 21-year-old woman addressed to the Dental Hospital of Universitas Hasanuddin with the complaint that the gums on her upper front teeth were not at the same height. As a result, smiling was regarded as less impressive. The patient also complains about having short upper front teeth. She had no systemic disorder, and denied using drugs or being allergic to certain foods. The maxillary anterior teeth were found to be shorter during an intraoral examination (Fig.1). An abnormal width and length ratio on teeth 13, 12, 11, 21, 22, and 23 was discovered during an examination using Chu's guide and revealed 1.5 mm depth on tooth 13, 1.5 mm depth on

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tooth 12, 2.5 mm depth on teeth 11, 1 mm depth on teeth 21, 1.5 mm depth on teeth 22; and 0.5 mm depth on tooth 23 (Fig.2A). There was no evidence of pocket or tooth mobility in the aforementioned region. The alveolar crest level was not close to the cementoenamel junction (CEJ) on the panoramic radiographic examination (Fig.2B).

Figure 1 Intraoral photos

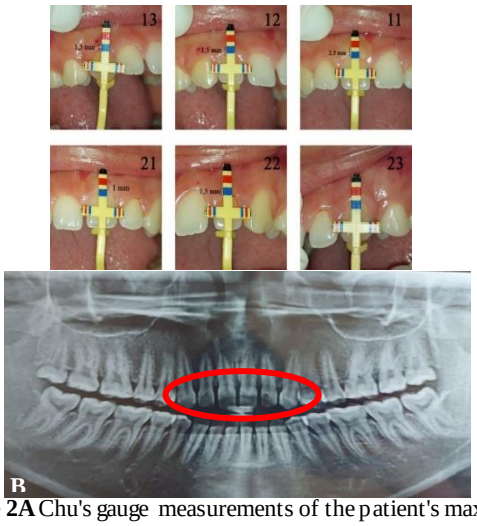

Figure 2A Chu's gauge measurements of the patient's maxillary anterior teeth, **B** panoramic photos of the patient; on the panoramic image, the alveolar crest height is not too close to the (CEJ).

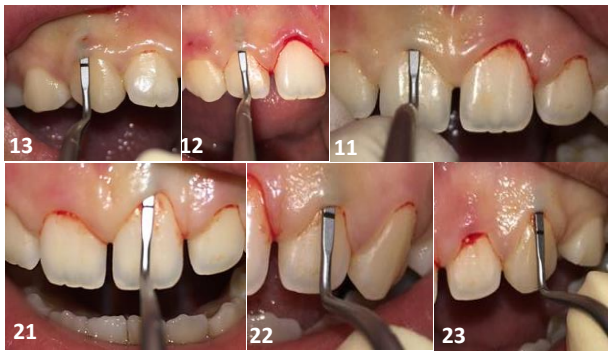

Figure 3 Measurement of bone sounding to determine whether or not the stages of alveolar bone reduction.

The patient was diagnosed with mucogingival deformities and a condition around the teeth based on clinical and radiographic examination (excessive gingiva display). APE was the cause of the etiology (type IA). In phase I, the proposed treatment plan included dental health education and upper and lower teeth scaling. The proposed phase II treatment was aesthetic crown lengthening without bone reduction (gingivectomy without bone reduction) on the 13, 12, 11, 21, 22, 23 regions. Because this patient did not require restorative phase, there is no phase III. The proposed phase IV treatment was maintenance. A bone sounding examination was performed to determine whether any cases required bone reduction or not (Fig.3).

Based on the results of measurements objectively on the patient, the results of the analysis as described in table 1.

MANAGEMENT

Aesthetic crown lengthening (gingivectomy without bone reduction) is the best option for APE type I-A treatment because it produces the best results with the fewest side effects for the patient. The aesthetic crown lengthening procedure on elements 13, 12, 11, 21, 22, 23 was carried out in stages. Initially, the patient was prepared, blood pressure was taken, and a written consensus was reached. The povidone iodine was used to achieve asepsis in both extraoral (lips) and intraoral settings (Fig.4). Anesthesia was achieved by infiltrating lidocaine HCl into the muccobuccal fold from teeth 13, 12, 11, 21, 22, and 23. (Fig.5A). Chu's gauge was used to measure the width and length of crown teeth 13, 12, 11, 21, 22, 23 and biological width was measured using bone sounding. The bleeding point is then made with pocket marker forceps (Fig.5B). The bleeding points guided the establishment of the external bevel incision with blade no.11 (Fig.5C). A kirkland was used to remove gingival tissue. The gingival margin was confirmed using Chu's guide after a sulcular incision was performed in the region of 13, 12, 11, 21, 22, 23.

Table 1 Analysis table of Chu's aesthetic gauge and sounding gauge measurements

Teeth	Mesio-distal width	Servicoincisal \width	Gingivectomy removal plan	Bone sounding measurement
13	6.5 mm	7 mm	1.5 mm	4 mm
12	6.5 mm	7 mm	1.5 mm	5 mm
11	7.5 mm	6.5 mm	2.5 mm	5 mm
21	7.5 mm	7 mm	1 mm	4 mm
22	6.5 mm	7 mm	1.5 mm	4.5 mm
23	7.5 mm	9 mm	0.5 mm	3 mm

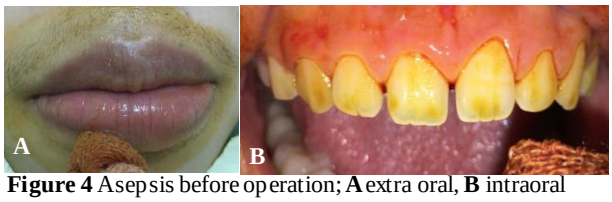

Figure 4 Asepsis before operation; **A** extra oral, **B** intraoral

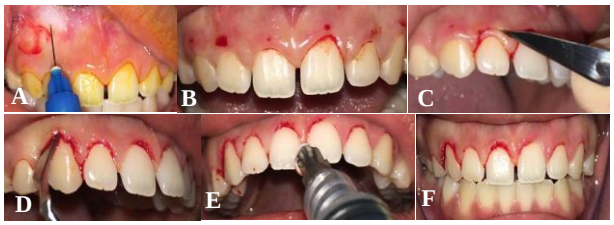

Figure 5 Stage of crown lengthening; **A** infiltration, **B** bleeding on point for the guided in gingivectomy, **C** bevel incision, **D** using of Kirkland for cut the tissue, **E** irrigation, **F** the result after crown lengthening operation

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Irrigation of the working area with saline (Fig.5E). The patient was given mefenamic acid 500 mg three times a day to take if pain occurred, as well as betadine gargle twice a day. The patient was given routine postoperative instructions to refrain from consuming hot and spicy foods or hot drinks for three days follow-lowing surgery. Patients were then asked to report and come in for evaluation 7 days after surgery. The patient denied having pain, and his gingiva was in good condition. Three months later, patients were recalled. There were no complaints of pain, and the gingiva was in good condition (Figure 6).

Figure 6 Result; **A** before crown lengthening, **B** 1-weeks after crown lengthening, **C** 3 months after Crown Lengthening

Figure 7 Comparison of **A** initial smile before operation; with **B** 3 months after surgical procedure

DISCUSSION

Crown lengthening without bone reduction was a phase II treatment performed after scaling and root planning in this case report. It is critical to determine the etiology of this excessive gingival display because determining the etiology leads to an appropriate and structured treatment plan. In this case, the patient was diagnosed with an excessive gingival display and APE type I etiology because the gingival margin was incisal from the CEJ and the alveolar crest was 1.5-2 mm apically from the CEJ, the gingiva dimension was wide, and the clinical crown teeth were short. This case is classified as subgroup-A based on the bone sounding and radiographic examination.

Periodontal surgical interventions such as gingivectomy or crown lengthening, with or without bone reduction, can correct excessive gingival display caused by APE. The surgical procedure chosen is determined by gingiva architecture, bone crest level, gingival biotype, and keratinized gingival width. All of these surgical procedures are designed to expose the clinical crown structure. As a result, the gingival margin is more incisal than the CEJ.[6-8]

Several studies have found that APE contributes to the occurrence of periodontal disease by interfering with oral hygiene maintenance, which can be affected by excessive gum closure above the teeth and a lack of adequate connective tissue adhesion to the root cementum. As a result, it has an impact on periodontal tissue defense. APE also has an aesthetically negative impact on the patient's smile because the teeth look wonky and the gums seem wide.[9]

In this case, the crown lengthening treatment results met the patient's expectations, with visible gingival margins that matched the gingival zenith and an improved smile profile (Fig.7). Etiology of the patient's gummy smile, APE, can be corrected. There were no complaints of excessive pain or complications following the procedure.

The crown lengthening procedure for APE or excessive gingival display case can achieve a predictable treatment result through diagnosis, treatment plan, and appropriate surgical technics.

This study found that gingivectomy, when used as a crown lengthening technique, has predictable results in the treatment of altered passive eruption or gummy smile. Preoperative planning helps to reduce unpleasant consequences and improves the gingival margin's postsurgical stability.

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