Esthetic crown lengthening with ostectomy and frenotomy for treatment of gummy smile: 
A case report from Prof. Soedomo Dental Hospital, Yogyakarta-Indonesia

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ABSTRACT

Introduction: A gummy smile is usually seen when gingival exposure more than 3 mm is visible. Esthetic crown lengthening may include a variety of surgical techniques for the gummy smile treatment, all of which aim to improve the esthetic appearance of teeth and gingiva. Crown lengthening is a surgical procedure aimed at removal of periodontal tissue to increase the clinical crown height.

Case: A 21-year-old woman was referred to the Prof. Soedomo Dental Hospital. The patient presented good general health and anterior maxillary teeth with short clinical crowns. There was no periapical radiolucency at radiographic. Gingival exposure was 6 mm. Preoperative intraoral examination showed healthy gingiva, and the clinical crown ratio was about 1:1. At clinical examination, periodontal pocket depth was 3 mm or less, and bone sounding was 3.5 mm or less. After determining the problem, esthetic crown lengthening surgery was performed under local anesthesia. Chu’s aesthetic gauge ratio used to measure ideal clinical crown ratio allowed gingivectomy. Mucoperiosteal flap raised after incision followed by ostectomy to maintain biological width. The flap was repositioned and sutured with various suture technique. Frenotomy was performed to release flap tension, and periodontal dressing was applied after frenotomy. Intraoral examination in 3 months follow up showed reduced gingival exposure to 3 mm and ideal clinical crown ratio.

Conclusion: The esthetic crown lengthening with ostectomy and frenotomy for treatment of gummy smile was successful to reduced gummy smile and reach ideal clinical crown ratio.

Keywords: Crown lengthening, gummy smile, gingivectomy, ostectomy, frenotomy


INTRODUCTION

Crown lengthening has been traditionally known as an adjunct to restorative dentistry.1 To date the increasing popularity of aesthetic-oriented treatment, an interdisciplinary approach has developed. As a result, crown lengthening procedures have become an integral component of the aesthetic and smile. A smile is a symbol of beauty and well being in the modern society, human expression, transcending language, culture, race, gender, time and socioeconomic differences. The main goal in crown lengthening procedure is to produce smile aesthetics based on patient demand. A variety of factors including teeth form/position and gingival tissue levels may influence the overall smile aesthetics.2

A perfect smile is characterized by exposure of the total length of the upper anterior teeth up to the premolars, showing the incisal curve of these teeth parallel to inner curvature of the lower lip, and slightlyouching or leaving a minimum space with the lower lip. When a person smiles, the entire crowns of maxillary central incisors and 1 mm of pink attached gingival is visible. Exposed gingiva of 2-3 mm is cosmically acceptable. A gummy smile is usually seen when more than 3 mm of gingival is visible. Additional 1mm might be coronally added to the 2mm dento gingival junction, as an optimal distance between the bone crest and the margin of restoration.3 Also during an esthetic crown lengthening procedure, sometimes bone removal and frenotomy play an important role in the final location of the free gingival margin after healing.4 Therefore, this case report aimed to describe surgical sequence of aesthetic crown lengthening with ostectomy and frenotomy in altered passive eruption.

CASE REPORT

A 21-year-old woman was referred to the Prof. Soedomo Dental Hospital presented with a chief complaint of gingiva overexposure. The patient presented good general health and anterior maxillary teeth with short teeth. Radiolucency its not showed at radiographic. Gingival exposure was < 6 mm. Preoperative intraoral examination showed healthy gingiva, and the clinical crown ratio was about 1:1 (Figure 1).
Figure 1  Clinical Crown short with ratio 1:1

Figure 2  Bone sounding measure

Figure 3  Chu’s aesthetic gauge measure

Figure 4  Incision guide or bleeding points

Figure 5  Incision with external bevel incision

Figure 6  Ostectomy with diamond bur

Figure 7  Result after ostectomy

Figure 8  Suturing After Ostectomy
Clinical examination reveals periodontal pocket depth was 3 mm or less. After determining the problem, esthetic crown lengthening surgery was performed under local anesthesia. After that, bone sounding was performed to measure the distance between alveolar and margin gingiva. The bone sounding measure result is 3.5 mm or less (Figure 2).

Using “T-bar tip” Chu’s aesthetic gauge measure the ideal clinical crown ratio. The gauge was placed in the center of the tooth incisor, and it was observed that the red marks of the horizontal arm determined the width of the tooth, therefore the red mark of the vertical arm indicated the height of the clinical crown (Figure 3).

Incision guide or bleeding points were performed to mark the desired height of the clinical crowns (Figure 4). The incision is following bleeding point with external bevel incision (Figure 5).

Mucoperiosteal flap raised after incision followed by ostectomy to maintain biological width. Ostectomy performed with diamond bur, especially for crown lengthening (Figure 6). After ostectomy (Figure 7), a mucoperiosteal flap was repositioned and sutured with various suture technique (Figure 8). Because over tension of flap, frenotomy was performed to release the flap tension (Figure 9). After all surgery was performed, the periodontal dressing was applied. At one week, removed periodontal dressing and irrigation with saline. Sutures were removed 14 days after surgical procedures (Figure 10). Follow up after three months showed the tissue healing (Figure 11).

**DISCUSSION**

In the present report, aesthetic crown lengthening was described using the aesthetic measurement gauges, to evaluate a proportional width and height of dimension of clinical crown, osseous level and adequate level of interdental papilla was obtained. It is important to mention that the papilla display should be evaluated during the smile design of a patient. In this case, clinicians have treated this case using conventional gingivectomy procedures with blade and Chu’s aesthetic gauges. Although, some cases will require ostectomy to provide a stable gingival complex and prevent gingival rebound to the preoperative levels. Employing gingival recontouring procedures as the only method of clinical crown lengthening is the result of not fully understanding the dimensions of biologic width. Ingber et al. (1977) stated the term “biologic width”
to describe the distance from the alveolar crest to the base to the sulcus with distance approximately 2 mm, 1 mm of epithelial attachment and 1 mm of connective tissue attachment. When bone sounding measure at 1 mm gingival sulcus depth must be added to this dimension. When bone sounding on the labial of incisor in a probing depth measurement of ≤ 3 mm must employ ostectomy and an apically repositioned flap to achieve crown lengthening. However, if bone sounding is >3 mm, a gingivectomy procedure can be used as successful treatment. For example, bone sounding of 5 mm, may employ at 2 mm gingivectomy without preoperative levels.

CONCLUSION

Crown lengthening surgery sometimes includes ostectomy and frenotomy to create balance in esthetic appearance. However, the whole periodontal condition of the patients and their hygiene habits should be evaluated. An accurate diagnostic and interdisciplinary approach is mandatory for excellent result in esthetic areas.

REFERENCES