

Case Report

Esthetic Crown Lengthening with Ostectomy for The Correction of Gummy Smile: A Case Report

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ABSTRACT

Introduction: Short clinical crowns may lead to esthetic concerns, particularly excessive gingival display (gummy smile).

Case: A 25-year-old female presented with a chief complaint of short teeth and excessive gingival display during smiling. Clinical examination revealed a gingival display of more than 2 mm, with no signs of periodontal inflammation and adequate keratinized gingiva. The diagnosis was excessive gingival display due to altered passive eruption type IB in the region of teeth 15–25.

Case Management: Crown lengthening with a full-thickness flap and ostectomy was performed. Follow-up evaluations up to one month demonstrated favorable healing, patient satisfaction, no spontaneous bleeding or periodontal pocket formation, and stable treatment outcomes.

Discussion: Accurate identification of altered passive eruption and appropriate management of the supracrestal tissue attachment are critical for successful esthetic crown lengthening. In this case, osseous resection was necessary to establish adequate periodontal dimensions and achieve stable esthetic outcomes.

Conclusion: Crown lengthening with ostectomy is an effective and predictable treatment modality for altered passive eruption type IB.

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INTRODUCTION

Gummy smile, also known as excessive gingival display, is an esthetic condition characterized by excessive exposure of gingival tissue during smiling or laughing. This condition is generally defined as gingival display exceeding 2 mm in the maxillary anterior region during a Duchenne smile.^{1,2} In recent years, this condition has received increasing attention along with growing awareness of dentofacial esthetics.^{3,4}

Smile esthetics are determined by the harmonious relationship among the teeth, gingiva, and perioral soft tissues, particularly the lips. An imbalance in any of these components may compromise overall smile esthetics. Therefore, comprehensive evaluation of dentogingival and dentofacial factors is essential for accurate diagnosis and treatment planning.⁵

Various treatment modalities have been developed to correct a gummy smile, depending on its etiology and severity. These modalities include crown lengthening procedures with or without alveolar bone reduction (osteotomy), lip repositioning, orthodontic treatment, and multidisciplinary approaches.⁶⁻⁹

Etiologically, a gummy smile can be classified into intraoral and extraoral factors. Intraoral factors include altered passive eruption (APE), gingival hyperplasia, compensatory overeruption, and den-toalveolar extrusion, whereas extraoral factors include excessive vertical maxillary growth, a short upper lip, and a hyperactive lip.^{6,10}

Among these causes, altered passive eruption is one of the most commonly encountered. This condition is characterized by failure of apical migration of the gingival margin following active tooth eruption, resulting in a short-appearing clinical crown without signs of inflammation.^{11,12}

Management of altered passive eruption generally involves esthetic crown lengthening procedures aimed at restoring appropriate dentogingival proportions through apical repositioning of the gingival margin. Depending on the position of the alveolar bone crest relative to the cemento-enamel junction (CEJ), crown lengthening may be performed with or without osteotomy to establish adequate supracrestal tissue attachment.^{13,14}

Management of altered passive eruption depends on the clinical classification and the position of the alveolar bone crest relative to the cemento-enamel junction (CEJ). When adequate supracrestal tissue attachment is present, gingivectomy alone may be sufficient to expose the anatomical crown. In contrast, when the alveolar bone crest is located at or near the CEJ, as observed in Type IB altered passive eruption, osseous resection is required in conjunction with crown lengthening to establish adequate supracrestal tissue attachment. This approach minimizes the risk of biologic width violation, gingival margin relapse, and chronic inflammation while providing predictable long-term esthetic and periodontal stability.^{9,12,14}

CASE

A 25-year-old female patient presented to the Dental and Oral Hospital of Udayana University with a chief complaint of short clinical crowns accompanied by excessive gingival display during smiling, which affected her self-confidence. The patient had no history of systemic disease, medication use, or allergies.

Intraoral examination revealed excessive gingival display (>2 mm), inadequate clinical crown length of the anterior teeth, adequate keratinized gingiva (>5 mm), and good oral hygiene without signs of periodontal inflammation (Figure 2). Bone sounding and panoramic radiographic examination

showed that the alveolar bone crest was located close to the cemento-enamel junction (CEJ), indicating inadequate supracrestal tissue attachment

(Figure 3). The diagnosis was established as excessive gingival display due to altered passive eruption type IB in teeth 15–25.



Figure 1. Extraoral view: (a) social smile, (b) Duchenne smile, (c) resting position.



Figure 2. Intraoral view during Duchenne smile showing excessive gingival display.

Table 1. Clinical crown dimensions, bone sounding measurements, and estimated gingivectomy and ostectomy requirements.

	15	14	13	12	11	21	22	23	24	25
Height	6	6.5	7	5.5	6.5	6.5	5.5	7	6.5	5.5
Width	7	7	7.5	6	7	7	6	7.5	7.5	7
Ideal crown height	8.5	8.5	9	7.5	8.5	8.5	7.5	9	9	8.5
Probing depth (M/B/D)	3/2/2	2/1/2	2/1/2	2/2/2	3/2/2	3/2/2	2/2/3	2.5/2.5/4	2/2/2	3/2.5/3
Bone sounding (M/B/D)	4/3/1	4/2/3.5	4/3/4	3.5/3/3	3.5/3/3	4/3/3	2/2/3	4/4/5	4/3/3	4/4/4
Gingivectomy	2.5	2	2	2	2	2	2	2	2.5	3
Ostectomy	2.5	3	2-3	2-3	2-3	2-3	2-3	1-2	2.5	2

*Measurements in mm

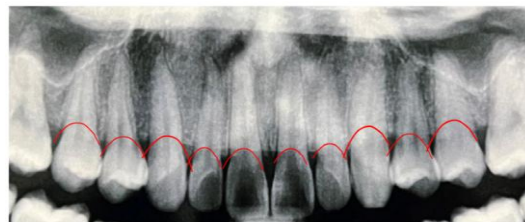


Figure 3. Panoramic radiograph of teeth 15–25. The red line indicates the cemento-enamel junction (CEJ).

Crown lengthening with ostectomy was selected as the treatment for this patient. The prognosis was considered favorable, supported by the patient's young age, good compliance, adequate

oral hygiene, absence of systemic disease, healthy periodontal condition, and absence of alveolar bone loss.^{7,8}

CASE MANAGEMENT

Esthetic crown lengthening with ostectomy of teeth 15–25 was selected as the primary treatment for altered passive eruption (APE) type IB, as it provides the most predictable outcome. The procedure was explained to the patient, and informed consent was obtained prior to treatment.

The instruments and materials used in this procedure included a periodontal probe, Chu aesthetic gauge, No. 15C surgical blade, periosteal elevator, Gracey curettes, ultrasonic scaler, round bur, diagnostic set, sterile saline solution, sterile gauze, 5-0 nylon sutures, Reso-Pac® periodontal dressing, 2% lidocaine hydrochloride with 1:100,000 epinephrine, and povidone-iodine solution.

The surgical procedure began with asepsis of the operative site using povidone-iodine, followed by topical and local infiltration anesthesia using 2% lidocaine hydrochloride with 1:100,000 epinephrine, administered in the region of teeth 15 to 25. Gingivectomy was performed by first determining the bleeding point using a periodontal probe, after which the gingival margin was confirmed using a Chu gauge, taking the gingival zenith into consideration. An internal bevel incision was then made using a No. 15C surgical blade following the bleeding point, and the gingival tissue was excised. The gingivectomy margin was subsequently re-evaluated using a periodontal probe and Chu gauge.

A full-thickness flap was then elevated through an intrasulcular incision at the gingival margin. The modified Simplified Papilla Preservation Flap (SPPF) technique was applied in the interdental papilla area. Mucoperiosteal flap reflection was performed using a periosteal elevator to obtain adequate surgical access, with an extension of 3–5

mm apical to the mucogingival junction in the region of teeth 15–25.

Ostectomy was performed using a round bur to achieve the desired bone reduction, followed by osteoplasty. Bone level was verified using a periodontal probe and Chu gauge, ensuring a minimum distance of 3 mm between the cemento-enamel junction (CEJ) and the alveolar bone crest. Scaling and root planing were then performed using Gracey curettes and a scaler to remove calculus deposits from the root surface. The surgical area was irrigated with saline solution. Gingival adaptation was achieved by applying gentle pressure with saline-moistened sterile gauze for approximately 3 minutes. Sutures were placed at the interdental papillae using 5-0 nylon thread with a vertical mattress technique to achieve primary wound closure. A total of 14 vertical mattress sutures were placed from the mesial aspect of tooth 16 to the mesial aspect of tooth 26. Periodontal dressing (Reso-Pac®) was applied to the surgical site. Postoperative medications included amoxicillin 500 mg, dexamethasone 0.5 mg, and mefenamic acid 500 mg, each administered every 8 hours, along with hyaluronic acid gel and 0.2% chlorhexidine gluconate mouthwash.

The patient was instructed to follow postoperative care guidelines, including taking medications as prescribed, maintaining oral hygiene, avoiding hot, spicy, sour, and hard foods, and refraining from brushing the surgical area.

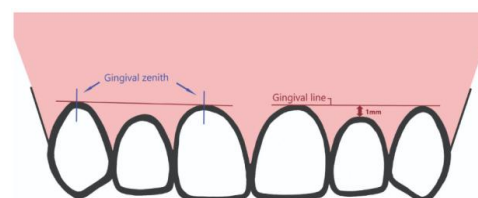


Figure 4. Reference for gingival zenith used to determine ideal gingival contour.¹⁵

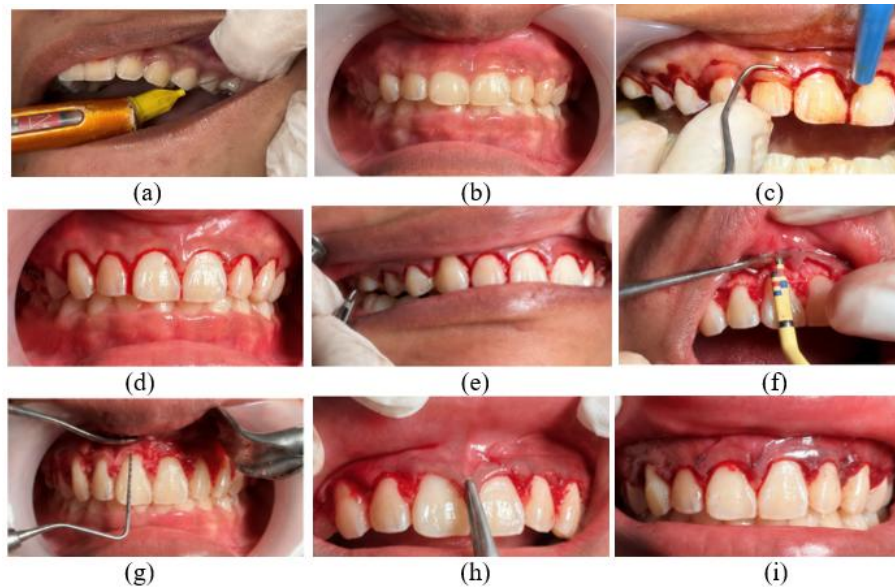


Figure 5. Surgical crown lengthening procedure on teeth 15–25: (a) local infiltration anesthesia, (b) determination of the bleeding point, (c) internal bevel incision, (d) gingivectomy, (e) simplified papilla preservation flap incision, (f) osteotomy, (g–h) verification of crown length after osteotomy, (i) suturing procedure.

At the first follow-up visit (1 week postoperatively), the patient reported mild swelling during the first and second days and mild pain approximately 1 hour after surgery. Intraoral examination showed that the sutures remained intact without signs of dehiscence. The gingival margin appeared slightly erythematous and edematous, with

spontaneous bleeding at tooth 13 and the interdental area between teeth 22 and 23. However, the interdental gingiva between teeth 13–14 and 12–13 appeared slightly higher than the surrounding gingival tissue. Irrigation with saline solution was performed, and the patient was instructed to apply hyaluronic acid gel to the area.



Figure 6. Clinical condition at 1-week postoperative follow-up: (a) frontal view, (b) right lateral view, and (c) left lateral view.

At the second follow-up visit (2 weeks postoperatively), the sutures were removed. Intraoral examination revealed persistent mild erythema at tooth 13 and the interdental area between teeth 22

and 23. Other gingival tissues showed good healing, characterized by a coral-pink color and stippled texture. However, the interdental gingiva between teeth 13–14 and 12–13 remained slightly elevated.



Figure 7. Clinical condition at 2-week postoperative follow-up: (a) frontal view, (b) right lateral view, and (c) left lateral view.

At the 4-week follow-up, the patient reported no complaints and expressed satisfaction with the treatment outcome. Intraoral examination showed residual mild erythema at tooth 13 and the interdental area between teeth 22 and 23, along with

slightly thickened gingival tissue in the interdental areas of teeth 12, 13, and 14. No spontaneous bleeding or periodontal pocket formation was observed, and the treatment outcome remained stable.



Figure 8. Clinical condition at 4-week postoperative follow-up: (a) frontal view, (b) right lateral view, and (c) left lateral view.



Figure 9. Comparison of clinical appearance: (a,b) pretreatment condition, (c,d) outcome at 1 month postoperatively.

DISCUSSION

Crown lengthening is one of the most frequently performed periodontal surgical procedures in patients with healthy periodontal conditions. This procedure is indicated to expose additional tooth structure for restorative or esthetic purposes. Crown lengthening can be

performed using various techniques, including gingivectomy or gingivoplasty, apically positioned flap procedures, and, when necessary, osseous resection.^{7,15,16}

Crown lengthening can be classified into functional and esthetic procedures. Functional crown lengthening is indicated to expose subgingival tooth structure for restorative purposes, such as

subgingival caries, crown or root fractures, and anatomical abnormalities. In contrast, esthetic crown lengthening is performed to correct excessive gingival display, which is generally defined as gingival display exceeding 2 mm during smiling.^{1,17,18}

In this case, the patient presented with excessive gingival display due to altered passive eruption type IB, which required osseous resection to establish adequate supracrestal tissue attachment.

The apicocoronal dimension of the dentogingival attachment has traditionally been known as the biologic width; however, this terminology has recently been updated to supracrestal tissue attachment to better reflect its anatomical components. This structure serves as a physiological barrier that protects the underlying alveolar bone from microbial invasion. Supracrestal tissue attachment can be clinically evaluated using bone sounding by measuring the distance from the gingival margin to the alveolar bone crest and subtracting the sulcus depth. A dimension of less than 2 mm indicates inadequate attachment.^{17,19,20}

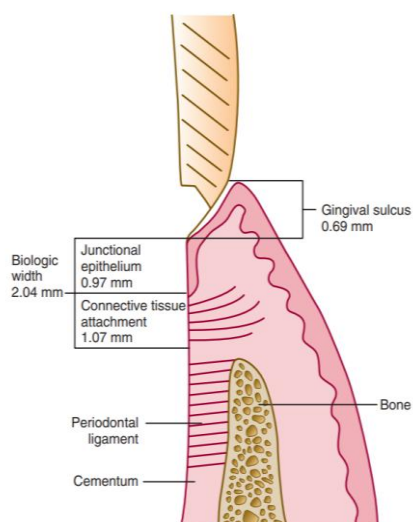


Figure 10. Schematic representation of the supracrestal tissue attachment, comprising the junctional epithelium and connective tissue attachment.¹⁷

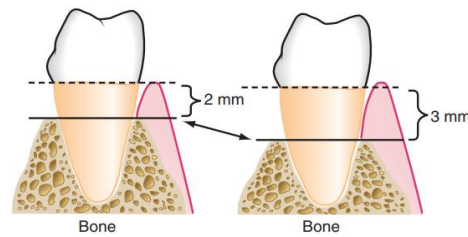


Figure 11. Illustration of the distance required between the alveolar bone crest and the gingival margin to achieve adequate supracrestal tissue attachment.¹⁷

The success of crown lengthening procedures depends on the establishment of adequate supracrestal tissue attachment, which generally requires a minimum distance of 3 mm between the alveolar bone crest and the gingival margin. Failure to achieve this dimension may result in chronic inflammation and suboptimal esthetic outcomes.

CONCLUSION

Crown lengthening with ostectomy is an effective and predictable treatment modality for altered passive eruption type IB, as it allows adequate re-establishment of the supracrestal tissue attachment and yields stable, satisfactory esthetic outcomes.

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