

CORRECTING Excessive Gingival Display

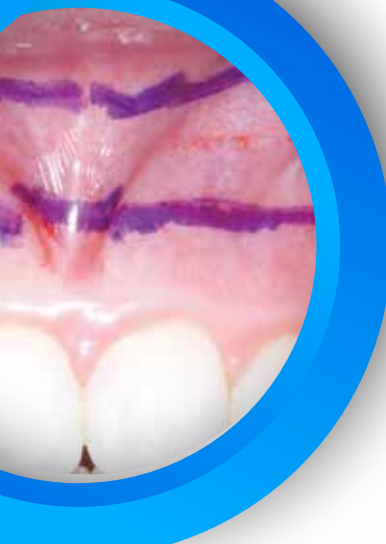
Surgical Lip Repositioning and Esthetic Crown Lengthening

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Abstract

Excessive gingival display can have a profound effect on facial esthetics. Commonly referred to as a “gummy smile,” excessive gingival display can have several etiologies. Treatment of a gummy smile begins with the correct diagnosis, determining the patient’s desires and expectations, and, finally, coordinating the appropriate treatment with the dental team that will be involved. This article addresses the lip repositioning procedure used to correct a patient’s excessive display after a gingivectomy.

Key Words: gummy smile, excessive gingival display, lip repositioning, gingivectomy, facial esthetics



Introduction

A beautiful smile undoubtedly can contribute to a person's confidence and overall mental outlook. With cosmetic dentistry, as with overall facial esthetics, 1 mm can mean the difference between success and failure. It has been said that the mouth accounts for nearly one-third of the factors that determine whether an individual is considered attractive.¹ Recent research has also suggested that a gummy smile can adversely affect the perception of a person's trustworthiness, intelligence, attractiveness, friendliness, and self-confidence.² A gummy smile is estimated to occur in approximately one in 10 individuals between the ages of 20 and 30, with a higher incidence in females.^{3,4} Restorative and laboratory techniques, combined with cutting-edge dental materials, have contributed immensely to our ability to sculpt beautiful teeth. Beautiful teeth, however, are only one component of dental esthetics, just as dental esthetics is only one component of overall facial esthetics. This close relationship of facial components can sometimes pose challenges for both the clinician and the patient in achieving an overall satisfying esthetic result. This article presents a case in which less-invasive techniques were used to improve the dental esthetics and overall facial esthetics of a patient who presented with a gummy smile.

Main Components of a Smile

The three major components of a smile are the teeth, gingival scaffold, and lip framework.⁵ The distance from the inferior border of the lip to the free gingival margin has been classified as noticeably unattractive at 4 mm by general dentists and laypeople.⁶ Patients who have a gummy smile often seek correction for it. In these instances, it is paramount to uncover the underlying etiology and assign an accurate diagnosis before presenting available treatment options. Silberberg and colleagues⁷ published a report in which they discussed the various aspects of excessive gingival display and its etiology and management.

Altered passive eruption, vertical maxillary excess (VME), hypermobile upper lip (HUL), or a short upper lip (SUL) are considered major etiologies of excessive gingival display.⁸⁻¹¹ Other etiologies include, but are not limited to, short clinical crowns, dentoalveolar extrusion, and gingival overgrowth or enlargement that may or may not be associated with medications. Any combination of these etiologies may contribute to excessive gingival display.

“...a gummy smile can adversely affect the perception of a person's trustworthiness, intelligence, attractiveness, friendliness, and self-confidence.”

Altered passive eruption occurs when the apical migration of the gingiva over the teeth is either delayed or not completed,¹² which usually results in teeth appearing short and square. Altered passive eruption may be addressed via restorative periodontal therapy, which is well documented in the literature.^{13,14}

VME

VME refers to a condition that involves an overgrowth of the maxilla in a vertical dimension, which often appears with long face syndrome.^{15,16} This diagnosis can be determined by using cephalometric analysis. Garber and Salama⁵ classified VME on the basis of the amount of gingival display and offered corresponding treatment modalities. They classified VME I as 2 to 4 mm of gingival display, VME II as 4 to 8 mm, and VME III as 8 mm or more of gingival display. Management of VME may include restorative treatment, orthodontic intrusion, periodontal treatment, orthognathic surgery, injection of botulinum toxin, or any combination of these procedures.^{5,17-19}

HUL

HUL occurs when the upper lip moves apically to the extent that it results in excessive gingival display. This movement is due to the muscles that elevate the lip. Peck and colleagues⁴ reported that individuals with excessive gingival display have a more efficient lip elevator muscle than do those with average smile lines, which can raise the upper lip an average of 1 mm—or nearly 20% more than the reference group—when smiling.

SUL

Excessive gingival display can also be associated with a SUL. Lip length can be determined by measuring from the inferior border of the upper lip to the subnasale. Normal lip length is between 22 and 24 mm in males and between 20 and 22 mm in females.⁴

Some clinicians have proposed that excessive gingival display as a result of VME, HUL, or SUL may be improved with the use of a surgical lip repositioning procedure. Several authors have described this procedure.²⁰⁻²²

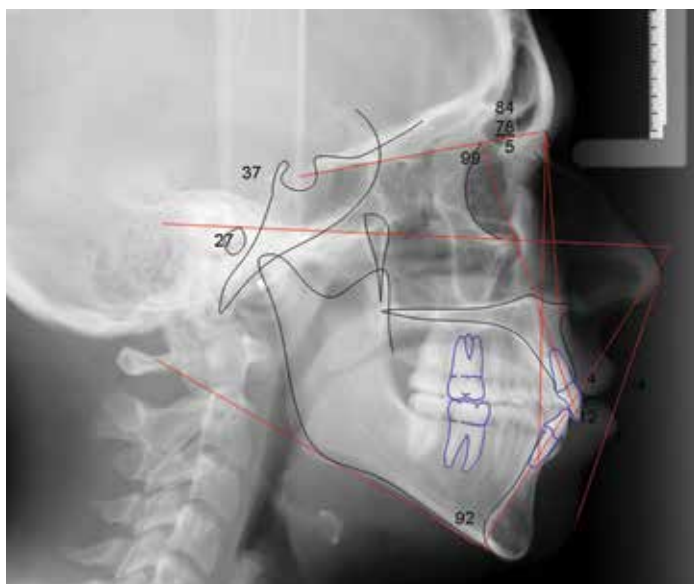


Figure 1: Lateral cephalometric analysis.



Figure 2: Patient's smile at presentation.



Figure 3: Diagnostic wax-up used to fabricate a surgical stent before the gingivectomy.



Figure 4: Immediately after gingivectomy.

Case Report

A 23-year-old woman presented to our clinic; her chief complaints were that her gums showed too much and that she disliked her teeth. The patient's health history was unremarkable and there were no contraindications to surgical treatment. The patient presented with 8 mm of gingival display when smiling. After examining tooth dimensions, the dentogingival complex, the excessive gingival display, and the lip length, and having an orthodontist obtain the appropriate measurements from a lateral cephalometric radiograph (Fig 1), we assigned a diagnosis of Class II VME5 with Type IA altered passive eruption²³ (Fig 2). The patient also displayed a normal lip length and HUL. Because of the severity of the VME, we recommended that she consult with an oral and maxillofacial surgeon to treat the jaw deformity. Against our recommendation, the patient declined the more invasive Le Fort osteotomy and opted for a less invasive surgical lip repositioning procedure. We decided to perform a gingivectomy without flap elevation or osseous resection because of the existing short roots and poor crown-to-root ratio due to previous orthodontic therapy, which had caused subsequent root resorption and created a 1:1 crown-to-root ratio. After all the pros and cons of treatment, including potential complications, were discussed with the patient, informed consent was obtained and the patient was scheduled for the two separate surgical procedures that we recommended (gingivectomy and lip repositioning) as an alternative to orthognathic surgery.

Gingivectomy

Local anesthesia was achieved with four carpules of lidocaine HCl 2% with 1:100,000 epinephrine administered at each of the surgical procedure appointments in the conventional manner, to anesthetize the area of surgical involvement. First, a diagnostic wax-up (Fig 3) was fabricated to aid in the fabrication of the surgical guide used for the gingivectomy, during which 1 to 2 mm of tissue was excised. The gingivectomy was completed via an extrasulcular beveled incision, along with soft tissue contouring, using diamond surgical burs (Fig 4). Care was taken to preserve as much of the existing keratinized tissue as possible. At the four-week postoperative appointment, the patient appeared to be healing within normal limits (Fig 5) and was scheduled for the lip repositioning procedure.

Lip Repositioning

The lip repositioning procedure was initiated 12 weeks after the gingivectomy. After local anesthesia was delivered as described, a sterile marker was used to outline the planned elliptical incision (Fig 6). An elliptical partial thickness incision was made from the mesiobuccal line angle of both maxillary first molars, bordered inferiorly by the mucogingival junction, extending about 10 mm to its apical extent (Fig 7). The epithelium was removed via partial thickness dissection of the alveolar mucosa. The elliptical incision lines running in the horizontal direction were approximated and sutured with a combination of Prolene and chromic gut sutures (Ethicon; Blue Ash, OH), taking into consideration proper alignment of the lip midline with the dental midline (Fig 8).

Postoperative

The patient returned two weeks later with no pain, infection, or paraesthesia, and the healing was uneventful (Fig 9). She reported no bruising or substantial swelling. The sutures were removed. Four weeks postoperative, the patient presented with a good soft tissue response and no complications.

After both of the surgical procedures, the patient was prescribed 600 mg of ibuprofen every eight hours for five days and 0.12% chlorhexidine digluconate rinse every 12 hours for two weeks. Cold compresses and limiting lip movement were also recommended for the first few days after the surgical lip repositioning procedure. A one-year postoperative photograph (Fig 10) shows a reduction in gingival display of about 5 mm. The patient's smile before and after the procedures is shown in Figures 11-13.

Summary

Excessive gingival display, or a gummy smile, can be improved by using a surgical lip repositioning procedure in combination with gingivectomy, as demonstrated in this case report. Indications for the use of surgical lip repositioning and gingivectomy include etiologies such as altered passive eruption, VME, HUL, SUL, short clinical crowns, dentoalveolar extrusion, gingival overgrowth, enlargement that may or may not be associated with medications, or any combination thereof.⁸⁻¹³ Properly designed long-term studies to evaluate this lip repositioning procedure are needed. Future research should include smile comparisons at established intervals in order to validate stability of the tissues across time.



Figure 5: Soft tissue healing four weeks after gingivectomy.



Figure 6: An elliptical-shaped outline was drawn with a marker to demarcate the borders of the tissue to be removed.



Figure 7: The tissue was removed via a partial thickness dissection with tissue removal from first molar to first molar.



Figure 8: Final suturing with 6-0 Prolene and 5-0 chromic gut sutures.



Figure 9: Soft tissue healing two weeks postoperative.



Figure 10: One-year postoperative photograph.



Figure 11: "Before" and "after" images.



Figure 12: Preoperative full-frontal view.



Figure 13: One-year postoperative full-frontal view.

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