

Case Report**Minimally Invasive Correction Of Excessive Gingival Display Through Lip Repositioning : A Case Report**Annanya gupta¹, Ellora Madan², Tabinda khan¹, Shivi mittal¹**ABSTRACT**

Excessive Gingival Display (EGD) is a multifactorial condition that needs to be managed in a sequential manner in order to reach the proper treatment technique that targets and resolves the underlying etiologies. An innovative procedure called lip repositioning has been introduced and used recently either alone or in combination with other techniques. It can be used in certain cases as an easier, less complicated alternative to major surgical methods providing a pleasant satisfactory camouflage effect with lower morbidity. A case report is presented to show the preparatory and surgical steps used to treat a 25-year-old patient with EGD using lip repositioning technique as an alternative to invasive surgery with satisfactory results.

INTRODUCTION:

Excessive gingival display (EGD), commonly termed gummy smile, is a condition characterized by an overexposure of the maxillary gingiva while smiling (¹). It is distinguished by showing more than 1.5-2 mm of the gingiva (²). The amount of discrepancy considered unattractive varies between populations; however, an excess of more than 3 mm is agreed upon worldwide (¹⁻³).

EGD can be caused due to dental, soft tissue, or skeletal discrepancies. Bholá *et al.* classified the etiological factors of EGD into five categories: (a) altered passive eruption, (b) bony maxillary excess, (c) conditions causing gingival enlargements such as dental plaque, medications, hormonal changes, and hereditary gingival fibromatosis, (d) deficient lip length, and (e) excessive mobility of the maxillary lip.⁴

Treatment varies according to the etiology of EGD. EGD caused by the altered passive eruption is treated by gingivectomy and apically positioned flap with or without osseous reduction.

Many techniques have been used to restore the dentogingival relation for the management of gummy smile. Such techniques include crown lengthening procedures, orthodontic leveling of the gingival margins of maxillary teeth, maxillary teeth intrusion, lip repositioning, orthognathic surgery and nonsurgical procedures like the use of the botulinum toxin.⁵

Lip repositioning procedure was first described in 1973 by Rubinstein and Kostianovsky as part of medical plastic surgery.⁶ Later on, it was introduced in dentistry, after being modified in 2006 by Rosenblatt and Simon.⁷

The authors described it as an alternative procedure for invasive orthognathic surgery for the treatment of EGD due to vertical maxillary excess (VME). The main objective of this surgical procedure is to limit the retraction of the elevator smile muscles (zygomaticus minor, levator anguli oris, orbicularis oris, and levator labii superioris) by removing a strip of tissue in the buccal vestibule between the mucogingival junction and upper lip musculature which leads to a reduction in the vestibular depth and causes muscle restriction and reduction in the gingival display.^[8]

The procedure was performed by removing a band of mucosa including the frenum of the upper lip from the maxillary buccal vestibule apical to the mucogingival junction as a partial thickness flap.⁹ This method has been subject to many modifications including preservation of the maxillary labial frenum. It was theorized that preservation of the frenum decreased the level of morbidity accompanying the procedure.¹⁰ In 1983, Miskinyar, reiterated a novel technique including myotomy and partial resectioning of one or both levator labii superior muscles bilaterally when repositioning the lip.¹¹ The method was again endorsed by Litton and Fournier who theorized correcting gummy smile via repositioning the lip surgically using elevator muscle detachment where the upper lip is too short.

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In another study by, Rees and Latrenta, a camouflage procedure was described where access was obtained through the columella, followed by subperiosteal dissection of the upper lip elevators.¹²

In this case report, we aimed to showcase lip repositioning as an efficient approach to decrease excessive gum exposure and rectify asymmetry with minimal invasiveness.

CASE PRESENTATION

The 27-year-old female patient, two, presented with aesthetic complaints of gingival display while smiling (Figure), a complaint that has followed her throughout her life.

The patient's medical history did not indicate any systemic disease or other health issues.

Upon clinical examination, excessive gingival display over 4 mm was shown, with normal maxillary anterior anatomic proportions. Short clinical crowns with moderate gingival phenotype are also observed. During probing, gingival pockets are detected, while examination using the visual method reveals adequate gingival attachment.

SURGICAL PROCEDURE

The procedure was carried out under local anesthesia of the infraorbital nerve, supplemented with anesthesia in the vestibular sulcus and the keratinized gingival region, bilaterally, using 2% xylocaine with 1:100,000 epinephrine. The technique consists in doing an elliptical incision in the depth of the vestibule. To delineate the areas for incision, a bilateral lip retractor was used to ensure consistent lip expansion on both sides (right and left). The initial contour of the incisions was marked with a sterilized dermatological pencil (Surgical Marker) (Figure). The lower border of the incision was delimited approximately 1 mm above the mucogingival line, and the upper border was delimited 10 mm above the previous one (twice the average gingival exposure height).

The two lines were connected at the distal ends (in the regions of the first premolars), and the labial frenulum was preserved in the midline to maintain a reference during closure of the surgical edges.

For the superficial mucosal incisions, the same bilateral lip retractor was employed to maintain adequate exposure. 15C scalpel blades were used. A partial-thickness dissection was performed, and all epithelium was excised along the rectangular contour, exposing the underlying connective tissue. After removal of the mucosal strip on both sides, suturing was done, the technique used was interrupted simple sutures, ensuring complete coaptation of the surgical edges to guarantee proper alignment of the midline of the lip with the midline of the teeth.

Postoperative instructions were given to the patient after surgery.

Antibiotics (amoxicillin 500 mg tid for 5 days) and analgesics (ibuprofen 650 mg tid for 4 days) and a 2% chlorhexidine mouthwash (2 times per day for 15 days) were prescribed as

part of the postoperative guidelines. The patient was instructed to rest and apply ice, maintaining a soft and cold diet for 2 days.

In addition, the patient was instructed to minimize their speaking and smiling in order to avoid making active lip movements and refraining from brushing the surgical region for a full week.

The surgical site was irrigated with saline throughout the first week of follow-up, and there were no biological problems.



Fig. 1a: preoperative measurements taken, b: incision outline made, c: gingival epithelium removed using scalpel, d: postoperative view after 15 days, e: post operative measurements, f: 2 months post operative

DISCUSSION

Periodontal therapy now focuses on "optimal esthetics," a shift in dentistry that has been a part of the quest for beauty since ancient civilizations. A pleasing dentogingival appearance depends on the extent of gingival exposure, with a "Gummy smile" appearance where more than 3 mm of gingiva is displayed. This article explains how a straightforward surgical procedure called lip repositioning can reduce gummy smiles. Comparing this procedure to orthognathic surgery, it was intended to be shorter, less forceful, and to have less postoperative consequences.¹³

The first step in choosing the appropriate treatment plan is to accurately diagnose the etiological causes. EGD's etiology is uncertain. It might have both intra oral and extraoral elements. This approach is contraindicated in cases where there is a minimal zone of connected gingiva, as this can cause problems with suturing, stability, and flap design. A few vertical maxillary excesses (VME) are another contraindication.

Facial proportions should be symmetric in the three horizontal thirds, with no higher proportion in the inferior third. The distance between the gingival margin and CEJ should be less than 1.5 mm, as greater distances indicate excessive gingival

tissue. The crown length-height relation should be 80% maxillary central incisor width and 70% maxillary lateral incisors.¹⁴

Originally used as a plastic surgery procedure, lip repositioning has since been the subject of reports of variations. Following flap reflection, the muscle attachment was not severed in the original approach.¹⁵

The method utilized in the current examples is a variation of the original method developed by Rubinstein and Kostianovsky, which was first applied in medical plastic surgery before being modified for use in dentistry. Two mucosal strips, one at each side of the maxillary labial frenulum, are excised using a modified approach while the frenulum itself is preserved.¹⁴ By leaving the frenulum intact, the procedure's morbidity is reduced, abnormalities in lip symmetry are avoided, and the labial midline is maintained.¹⁶

The mucosal flap was advanced and sutured at the mucogingival junction. First, interrupted suture was placed at the midline to ensure proper alignment of the lip midline with the midline of the teeth, then continuous interlocking sutures were used to approximate both flaps.

Pressure pack was applied for hemostasis [Figure]. Postoperative instructions included placing ice packs over the upper lip for several hours, limited facial movements for 1-week, no brushing around the surgical site for 14 days. The patient was advised to rinse gently with 0.12% chlorhexidine gluconate twice daily for 2 weeks. Postoperative pain was managed with analgesics. At 1-week post operative, uneventful healing pattern was seen [Figure]. After 2 months of healing, a scar formation was observed [Figure]. Follow-up examinations revealed reduced gingival display [Figures].

CONCLUSION

Surgical lip repositioning is an effective procedure to reduce gingival display by positioning the upper lip in a more coronal location. However, it is important to make a proper diagnosis in order to propose the appropriate treatment plan.

To optimize technique selection, an individualized approach is necessary. Several authors support the use of muscle severance to prevent the smile muscle from returning to its original position. In contrast, others use adjuvant products to prevent muscle movement during the healing process and minimize potential morbidity. The frenulum section's choice and the extension of the horizontal incision should be customized to the individual patient's needs.

The combination with other approaches may ensure more predictable and stable results. Finally, clinicians should know the techniques, advantages, and possible complications to ensure better outcomes.

In a long-term evaluation, other studies will be necessary to assess the stability and effectiveness of this technique.

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