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Esthetic Management Of Gummy Smile Using Lip Repositioning Surgery: A Clinical Case Report

C.M. Shadiya Shareef[1], Jose Paul[2], Johnson Prakash D'Lima[3]
[1](Department Of Periodontics, Annoor Dental College And Hospital, Kerala)
[2](Department Of Periodontics, Annoor Dental College And Hospital, Kerala)
[3] (Department Of Periodontics, Annoor Dental College And Hospital, Kerala)

Abstract:
Background*: Excessive gingival display (EGD), or "gummy smile," can significantly impact facial esthetics and self-confidence. Lip repositioning surgery (LRS) is a minimally invasive procedure that offers a predictable solution, especially in cases involving a hypermobile upper lip. This case report presents a 30-year-old female patient with 6 mm of EGD. Following a thorough clinical evaluation, LRS was performed using the "twice the gingival display" rule, which necessitated excision of the labial frenulum. A partial-thickness flap was elevated and repositioned at the mucogingival junction, effectively limiting upper lip elevation. Postoperative healing was uneventful, and the patient reported high satisfaction with the esthetic outcome at the one-month follow-up. This case highlights the importance of accurate diagnosis, appropriate technique selection, and patient-specific planning to achieve long-lasting, satisfactory results with minimal morbidity.*
Key Word: *Lip repositioning, gummy smile, excessive gingival display, hypermobile upper lip, esthetic surgery*

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I. Introduction

Facial aesthetics and an appealing smile have a significant impact on one's self-confidence, social interactions, and overall psychological well-being. Smiling is a powerful non-verbal expression that fosters interpersonal relationships and reflects emotional states [1]. An attractive smile is determined by the balance between the teeth, gingiva, and lips, with excessive gingival display (EGD), commonly referred to as a "gummy smile" (GS), often disrupting this harmony [2]. Clinically, a gummy smile is diagnosed when more than 3 mm of gingival tissue is exposed during full smiling [3]. Studies report that approximately 14% of women and 7% of men are dissatisfied with their smile due to excessive gingival visibility [4], which negatively affects their facial attractiveness and perceived personality traits such as self-confidence [5,6].

The etiology of EGD is multifactorial, encompassing skeletal, dental, and soft tissue components. Common causes include altered passive eruption (APE), vertical maxillary excess (VME), hypermobile upper lip (HUL), short upper lip (SUL), dentoalveolar extrusion, and gingival hypertrophy [3,7]. Proper diagnosis of the underlying etiology is essential to formulate a tailored treatment plan. For example, VME may require orthognathic surgery, which, although effective, is invasive, costly, and associated with significant morbidity and hospitalization [8]. Similarly, APE can be managed by esthetic crown lengthening, but its use may be limited by biologic width concerns [9]. HUL, often seen in individuals with a normal maxillary lip length and facial proportions, can be addressed using less invasive interventions [10].

Among the available treatment modalities, botulinum toxin injection has gained popularity as a conservative option for HUL. By temporarily weakening the elevator muscles of the upper lip, thereby reducing gingival display. However, its effects last only 3–6 months, necessitating repeated applications, which may not be feasible or desirable for all patients [11]. Lip repositioning surgery (LRS) has emerged as a minimally invasive and more permanent solution, particularly in cases of HUL without significant skeletal discrepancies [12].

First described in the plastic surgery literature in the 1970s by Rubinstein and Kostianovsky, LRS involves excising a strip of mucosa from the maxillary buccal vestibule, typically between the mucogingival junction and an apical incision placed 10–12 mm above. The mucosa is then advanced coronally and sutured to the mucogingival line, thereby shortening the vestibule and limiting the retraction of the upper lip during smiling. This surgical intervention restricts the elevation of the upper lip, effectively reducing gingival display without altering skeletal structures or requiring general anesthesia [13]. Clinical studies have shown that LRS significantly decreases EGD and increases the upper lip length during smiling, making it a promising option for esthetic smile enhancement [14,15].

However, patient selection remains critical. LRS is contraindicated in cases with minimal attached gingiva, significant VME, or patients with unrealistic expectations [16]. Inappropriate case selection may lead to

complications such as scarring, relapse, or inadequate aesthetic improvement. Despite the potential for partial relapse over time, the simplicity, safety, and positive patient outcomes associated with LRS have led to its increased acceptance among clinicians and patients [17].

This case report presents a patient with EGD secondary to a hypermobile upper lip who underwent successful correction using the lip repositioning technique. The report emphasizes accurate diagnosis, clinical decision-making, surgical technique, and postoperative outcomes, highlighting the effectiveness of LRS as a minimally invasive alternative for managing gummy smile in carefully selected patients.

II. Case Report

A 30-year-old female patient presented to the Department of Periodontology at Annoor Dental College, Muvattupuzha, Kerala, with the chief complaint of an unattractive "gummy smile," which she reported was impacting her self-confidence and social comfort (FIGURE 1). Her dental history was non-contributory, with no significant systemic or local conditions reported. On extraoral examination, her smile analysis revealed approximately 6 mm of excessive gingival display during full smile, indicating a high lip line. Intraoral periodontal examination showed healthy gingival tissues with pale pink color and physiological pigmentation. The gingival contour was scalloped with knife-edged margins, firm consistency, and stippling was present, suggestive of clinically healthy periodontium. However, generalized calculus and extrinsic stains were noted on the tooth surfaces. Routine haematological investigations were within normal limits, indicating no contraindications for surgical intervention. Based on clinical findings and patient concern, a treatment plan was devised, including a non-surgical phase with oral prophylaxis and oral hygiene instructions, followed by a surgical phase involving lip repositioning surgery to correct the hypermobile upper lip. No restorative interventions were necessary. Verbal and written consent was obtained from the patient. The patient was then scheduled for a review in the maintenance phase after one month to evaluate healing, aesthetic improvement, and overall treatment satisfaction.

FIG 1: Pre operative view before Lip Repositioning surgery and after Scaling and Root plan

Surgical Procedure

After obtaining informed consent and confirming the patient's suitability for the procedure, lip repositioning surgery was planned to address the excessive gingival display due to hypermobility of the upper lip. The procedure was carried out under strict aseptic conditions. Preoperatively, the patient rinsed with 0.12% chlorhexidine gluconate for one minute. Local anesthesia was administered in the maxillary vestibule using 2% lidocaine with 1:100,000 epinephrine, extending bilaterally from the region of the right to the left second premolars.

Following the technique described by Rubinstein and Kostianovsky [13], a sterile indelible surgical pen was used to outline the incision lines on the mucosa (FIGURE 2). The first horizontal incision was placed at the mucogingival junction (MGJ), while the second incision was positioned approximately 10–12 mm apical to the first, extending bilaterally from the right to the left second premolars. These two horizontal incisions were joined at the mesial line angles in an elliptical fashion (FIGURE 3). A partial-thickness mucosal flap was then excised, exposing the underlying connective tissue (FIGURE 4).

Fig 2: Mucogingival junction marked extending bilaterally from 15 to 25

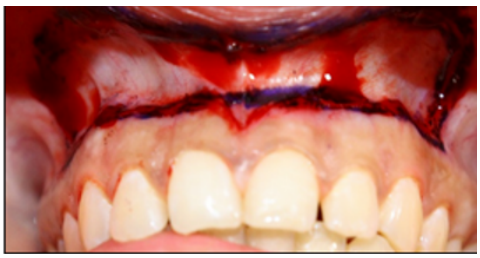

Fig 3: Initial Elliptical incision placed

Fig 4: Epithelium removed and connective tissue exposed

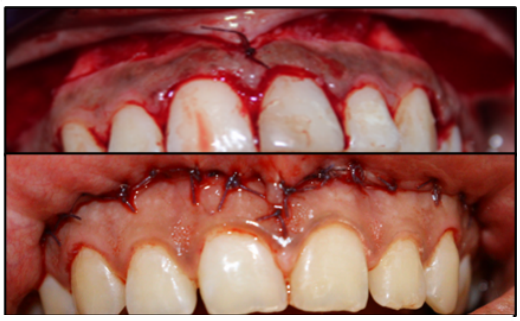

Fig 5: Sutures placed from midline, proceeding bilaterally

The initial suture was placed at the midline to ensure proper alignment of the flap. The lip mucosa was then advanced coronally and sutured to the MGJ using resorbable 5-0 vicrly sutures in an interrupted pattern, effectively reducing the depth of the vestibule and limiting the upward pull of the elevator muscles (FIGURE 5). Care was taken to avoid damage to the minor salivary glands within the submucosa during the dissection, and any bleeding encountered was controlled.

Postoperatively, the patient was prescribed Amoxiclav 625 mg three times daily for five days, along with Ketorol DT three times daily for pain and inflammation control for three days. Chlorhexidine mouth rinse (0.12%) was advised twice daily for 10 days. Detailed postoperative instructions were given verbally and in written form, including recommendations to avoid excessive lip movement, spitting, or rinsing on the first day. The patient was advised to maintain good oral hygiene and avoid hot foods and beverages for 24 hours.

Healing was uneventful, and the patient was reviewed at two-week (FIGURE 6), three-month (FIGURE 7), and six-month intervals (FIGURE 8). At the one-month follow-up, a significant reduction in gingival display was noted with high patient satisfaction and no evidence of complications or relapse.

Fig 6: 2-week post-operative view

Fig 7: Three-months post-operative view

Fig 8: Six-months post-operative view

III. Discussion

After Excessive gingival display (EGD), commonly referred to as a "gummy smile," is an esthetic concern that can significantly impact an individual's psychosocial well-being. Various treatment modalities have been explored to address this condition, including botulinum toxin injections, crown lengthening, orthognathic surgery, and lip repositioning surgery (LRS) [2]. Among these, LRS has gained popularity for its minimally invasive nature, especially in cases involving hypermobile upper lips or mild vertical maxillary excess (VME) [12].

In the present case, the patient presented with 6 mm of EGD attributed to upper lip hypermobility. Based on the etiology and clinical assessment, LRS was selected as the preferred modality. The procedure followed the technique originally described by Rubinstein and Kostianovsky [13] and later modified by Rosenblatt and Simon [18], involving partial-thickness flap excision and advancement of the labial mucosa to the mucogingival junction. This resulted in the restriction of upper lip elevator muscle activity and significant gingival display reduction.

Studies have also highlighted that combining LRS with gingivectomy may enhance outcomes in cases of EGD exceeding 4 mm [15,16,19]. While our patient exhibited 6 mm of gingival exposure, lip repositioning alone yielded a satisfactory reduction. Tawfik et al. reported an average improvement of 3–4 mm with LRS, supporting our postoperative observations [19].

A significant limitation of LRS is relapse, which can occur due to factors such as muscle memory, healing dynamics, or technique-related variability. Al Jasser et al., noted that placing periosteal sutures can help mitigate this issue and improve stability [20]. Dos Santos-Pereira et al. estimated a relapse rate of approximately 25% within one year [21]. While the addition of myotomy has been proposed to minimize muscle rebound, its benefit remains controversial. Some studies found no significant difference in outcomes at three months [14], but more favourable stability at six months when myotomy was included [22].

Patient selection is key to long-term success. Cases with inadequate attached gingiva or severe VME are generally poor candidates for LRS alone [7,23]. In our case, periodontal parameters were ideal, with healthy gingiva and sufficient vestibular depth, allowing for a predictable outcome.

While botulinum toxin is an alternative for treating hypermobile lips, it requires repeated applications due to its temporary effects, limiting its appeal for long-term results [11,24]. LRS, on the other hand, offers a more permanent improvement with less morbidity compared to orthognathic surgery [25].

Patient satisfaction is a critical measure of success. A systematic review by Dos Santos-Pereira et al. found that 77% of patients reported esthetic satisfaction even after minor relapse at one year [21]. In our case, the patient similarly reported high satisfaction and improved confidence during follow-up.

In conclusion, LRS is a simple, conservative, and effective treatment option for managing EGD in properly selected patients. Although mild relapse may occur, the esthetic and psychological benefits, coupled with high patient satisfaction, justify its continued use. Future research, especially randomized controlled trials with longer follow-ups, is necessary to optimize technique modifications and outcomes.

IV. Conclusion

Lip repositioning surgery presents a minimally invasive, effective, and aesthetically satisfying solution for patients presenting with excessive gingival display due to a hypermobile upper lip or mild vertical maxillary excess. In this case, careful diagnosis and application of the "twice the gingival display" rule enabled precise surgical planning and optimal results. The decision to include the labial frenulum within the excision zone contributed to a more controlled lip movement and enhanced treatment outcome. Postoperative healing was uneventful, and the patient expressed high satisfaction with the improved smile aesthetics and boost in self-confidence. While some degree of relapse may be anticipated over time, proper case selection, patient education, and meticulous surgical technique are key to ensuring stable and long-lasting results. Continued follow-up and larger-scale studies are warranted to further validate the long-term predictability of this technique.

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VI. Competing Interests

The authors declare that there are no competing interests related to this case report.

VII. Authors' Contributions

The first author performed the surgical procedure and was involved in clinical management of the patient. The second and third authors reviewed the case, contributed to critical revision of the manuscript, and approved the final version for submission.

VIII. Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying clinical photographs. A copy of the consent is available with the authors.

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