



# Modified Lip Repositioning Technique for the Management of Excessive Gingival Display

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## Case Report

Volume 10 Issue 4

Received Date: January 21, 2025

Published Date: October 03, 2025

DOI: [10.23880/oajds-16000416](https://doi.org/10.23880/oajds-16000416)

## Abstract

Excessive gingival display, an esthetically concerning clinical situation is characterized by an excessive display of gums during a normal smile. Etiology of the condition is multifactorial involving altered passive eruption, vertical maxillary excess, hypermobile upper lip or short upper lip. Hypermobile upper lip is prevalent among north Americans and Asians. Management of the hypermobility may involve non-surgical or surgical methods. The use of botulinum toxin as a non-surgical approach is widely popular, although with the primary disadvantage of being short lived and requiring frequent reapplication. Surgical technique provides more stable results and may include myotomy that involves complete resection of muscles or the or lip repositioning surgery involving repositioning of the vestibular mucosa. Reducing the vestibule depth. Lip repositioning offers the primary advantage of being less invasive and is reversible. This article describes a case report of management of excessive gingival display due to hypermobile upper lip using a modified lip repositioning surgery where in the midline labial frenum is left intact, thus significantly improving the esthetic results.

**Keywords:** Excessive Gingival Display; Hypermobile Upper Lip; Lip Repositioning

## Abbreviations

EGD: Excessive Gingival Display; VME: Vertical Maxillary Excess.

## Introduction

Excessive gingival display (EGD) refers to overexposure of the gingiva during a normal smile [1]. However, in severe cases, this may be evident when the lips are in repose position. Excessive gingival display is more commonly seen in women between the age groups of 20-30 years [2]. With increasing age, the gingival display decreases due to the falling back of

the lip thus resulting in less exposure of the gingiva.

The etiology of excessive gingival display is multifactorial, and an accurate diagnosis is critical in successful management of the patient. Altered passive eruption characterized by the failure of the gingival tissue to recede apically resulting in short clinical crowns is one of the etiologies of EGD [3]. The alveolar bone may be at the level of CEJ or apical to it. A classification for altered passive eruption was suggested by Coslet JG, et al. [4], which also determines the treatment strategy (Table 1).

Classification	Clinical Feature	Treatment Protocol
IA	Excessive amount of keratinized gingiva with normal alveolar crest-to-CEJ relationship	Gingivectomy
IB	Excessive amount of keratinized gingiva with osseous crest at the CEJ level	Osseous contouring
2A	Normal amount of keratinized gingiva with normal alveolar crest-to-CEJ relationship	Apically positioned flap
2B	Normal amount of keratinized gingiva with osseous crest at the CEJ level	Apically positioned flap with Osseous contouring

**Table 1:** Altered Passive Eruption- Classification and treatment options.

Vertical maxillary excess, (VME) commonly seen in long face syndrome involves overgrowth of the maxilla in the vertical direction, especially the lower half of the face [5]. There is harmony in the occlusal plane between the anterior and posterior segments, however the occlusal plane is lower than normal and subjects with VME have the lower lip positioned on the incisal edges of the upper incisors and

an excessive display of the maxillary gingiva. Diagnosis is established by a clinical and cephalometric evaluation of the patient. The treatment approach for management of VME involves combination of periodontal, orthodontics or restorative treatment and is dictated by the amount of gingival display [6] (Table 2).

Degree	Gingival display (in mm)	Treatment Approach
I	02-Apr	Orthodontic intrusion
		Orthodontics and periodontics
		Periodontal and restorative therapy
II	04-Aug	Periodontal and restorative therapy
		Orthognathic surgery (Le Fort I osteotomy)
III	>8	Orthognathic surgery with or without adjunctive periodontal and restorative therapy

**Table 2:** Classification of vertical maxillary excess.

The length and muscular activity of the upper lip plays a significant role in the amount of gingival display. A short upper lip measuring less than 15mm from the subnasale to the philtrum may result in excessive gingival display [7]. Hyperactivity of the musculature of the upper lip, especially elevator muscles results in significant lip elevation of about 8 mm from rest. The prevalence of hypermobile upper lip among north Americans and Asians with gummy smile is more than 80%. In about 40% of these cases, they are present isolated and in another 35% they are present in conjunction with altered passive eruption [8,9].

The treatment approaches for management of hyperactive upper lip are focused on curbing the function of the elevator muscles or physical limitation of their movement. Both non-surgical and surgical techniques are employed. One of the common non-surgical methods is use of botulinum toxin which paralyses the muscles resulting in limited movement [10]. However, the effect is short lived lasting for about 3-6 months and usually needs reapplication at regular intervals [11]. Surgical techniques include invasive procedures such as the myotomy which may involve either

complete or partial resection of the levator labii superioris muscle [12] to the less invasive procedure such as the lip repositioning which reduces lip mobility through reduction of the vestibular mucosa. Myotomies can be done either via a nasal or an intra oral access and are very effective in reducing the mobility. Since the procedure involves transection or resection of the muscles, they are usually not reversible and may result in greater postoperative morbidity [13].

Lip repositioning surgery was first described in plastic surgery by Rubinstein AM, et al. [14]. However, this procedure was introduced to the dental and periodontal literature by Rosenblat A, et al. [15]. The initial technique involved removing a single band of tissue outlined by a coronal incision placed at the mucogingival junction, apical incision placed at the depth of vestibule or at a distance that is double the amount of gingival display (not more than 10-12 mm from the coronal incision) and vertical incisions positioned bilaterally at the region of second premolar or molar depending on the patient's smile. This procedure is associated with minor postoperative complications such as pain, swelling, tension during smiling and speaking, and

rarely ecchymosis, transient numbness and early relapse [16] and is usually reversible.

The original technique does not involve frenulum reconstruction which frequently was associated with distortion of the midline. A modification of the technique introduced by Silva CO, et al. [17] involves removal of 2 bands of mucosa instead of a single band thus preserving the midline maxillary frenum. Several other modifications introduced in the later years include altering the suturing technique [18], use of a physical spacer [19] to prevent relapse and the use of LASER [20].

Here we present in detail a case report of excessive gingival display due to hypermobility of upper lip, effectively managed by the Silva's modified lip repositioning technique.

## Case Report

A 20-year-old female presented with complaints of excessive display of gums during smiling and she was unhappy about it. Clinical examination revealed 7 mm of gingival display during smile (Figure 1). The central incisor measured 10 mm, with the CEJ at a mm subgingival to the gingival margin, and the alveolar bone about 2 mm from the CEJ. The harmonious relationship of the CEJ, gingival margin and the alveolar bone precluded the diagnosis of altered passive eruption. The upper lip measured 18 mm indicating normal upper lip length. The lip elevation from rest to a full smile was 7 mm. The increased exposure of the gingiva during wide smile led to the diagnosis of hypermobile upper lip and was planned for a modified lip repositioning surgery.

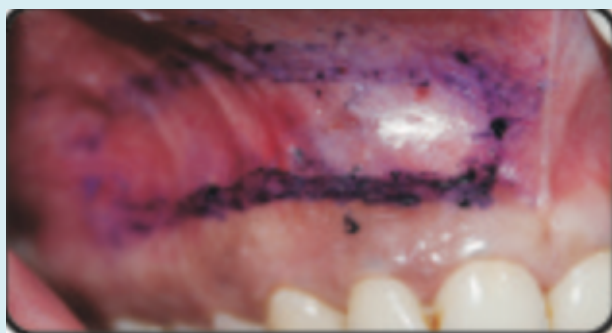


**Figure 1:** Preoperative view showing about 8 mm of gingival display.

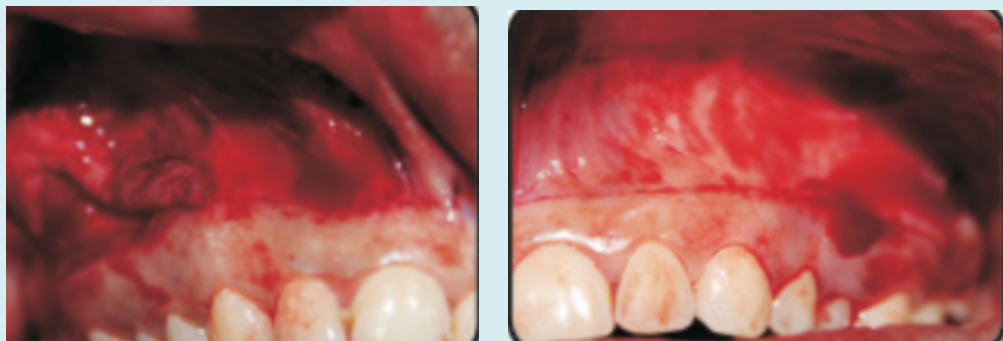
## Incision and Partial Thickness Dissection

Following pre surgical rinse with 0.12% chlorhexidine, adequate anaesthesia was established by bilateral infiltration in the vestibular mucosa and upper lip between the right and the left first molar. Incision lines were marked with a sterile pencil (Figure 2). The coronal incision, a partial thickness incision was placed at the mucogingival junction on either side of the frenum leaving the frenum intact. The horizontal apical incision was placed 10 mm from the coronal incision, again leaving the frenum intact. The two horizontal incisions

were connected by elliptical incisions at the mesial aspect of the right and left first molar (Figures 3a,3b). Since the patient had a very wide smile displaying the first molar, the elliptical incision lines were planned at the first molar region. Superficial partial thickness dissection was carried between the incision lines, removing 2 bands of tissue on either side of the frenum (Figure 4). Care was taken to avoid the minor salivary glands in the submucosa. Adequate hemostasis was achieved with compression.



**Figure 2:** Incisions demarcated with a sterile pencil.



**Figures 3a, 3b:** Coronal and apical incisions placed and connected by distal elliptical incisions.



**Figure 4:** Partial thickness tissue dissected with the frenum intact.

### Suturing

After careful dissection, suturing was carried out to approximate the coronal and the apical incision lines.

Continuous interlocking sutures were placed using 4-0 polyglactone sutures (Figure 5). Care was taken to maintain tension free closure.



**Figure 5:** Continuous interlocking sutures done.

### Post Operative Care

The patient was instructed to apply ice pack for several hours after the surgery. The patient was recommended soft diet for 1 week, to avoid brushing in the surgical site for about 2 weeks and to minimize lip movement during talking or smiling during the first 2 postoperative weeks. Analgesics (Ibuprofen 600 mg tid) was prescribed for managing post

operative pain. Post operative rinse with chlorhexidine was recommended for 2 weeks. The sutures were removed at 2 weeks. During the post operative period, healing was uneventful. The patient reported mild pain and swelling for the first 2 days after the surgery which gradually subsided. She mentioned the notable tightness she felt during lip movement. Clinical examination revealed minimal scarring (Figure 6). The amount of gingival display significantly

reduced to about 3 mm (Figure 7). The curvature of the upper lip remained unaffected with maintenance of the philtrum

giving an esthetically pleasing result.



**Figure 6:** 2 weeks post operative at suture removal shows minimal scarring.



**Figure 7:** Comparison of preoperative view (on the left) and 6 months postoperative on the right showing significant reduction in gingival display, and maintenance of philtrum.

## Discussion

Excessive gingival display is an esthetic concern to the patient as well as the clinician. While managing patients with EGD it is important to perform a thorough clinical and radiographic evaluation to identify the exact etiology of the gingival display which will help in the decision-making process of management thus ensuring long term success.

Lip repositioning surgery has shown to decrease gingival display and increases vermillion length during smile without altering the vertical dimensions of lip at rest in patients with hypermobile upper lip. Though a simple procedure, it has shown evidence of some partial relapse which is dictated by the surgical technique and the patient selection. Systematic review evaluating the efficacy of the lip repositioning surgery [21] have concluded that this procedure results in 3-4 mm of gingival display reduction when evaluated over a period of 36 months.

In this case, the modified technique resulted in about 5 mm of reduction of gingival display. The utilization of the modified technique preserved the frenum thus maintaining the curvature of the lip and helped to achieve good esthetic results.

## Conclusion

Surgical management of the hypermobility of upper lip using the modified lip repositioning surgery involves the suturing of the vestibular mucosa more coronal thus reducing the vestibular depth and reducing the excessive gingival display. The modified technique involves incisions on either side of the frenum leaving the frenum intact, thus maintaining the philtrum and achieve more esthetic results. As shown in this case report, this technique results in a significant reduction of the gingival display with less post operative morbidity.

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