



## LIP REPOSITIONING TECHNIQUE FOR THE REDUCTION OF EXCESSIVE GUMMY SMILE: MINI REVIEW & CASE REPORT

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### ABSTRACT

Excessive gingival display EGD is a condition in which there is overexposure of the maxillary gingiva during smiling. It can be a source of embarrassment for some patients. It occurs because of various intraoral and extra-oral etiologies. The proper diagnosis and determination of its etiology are essential for the selection of the right treatment modality. This report introduces a mini review about the etiologic factors and treatment modalities of EGD and presents a case in which the surgical technique of "lip repositioning" was used to reduce gingival display.

### INTRODUCTION

Excessive gingival display (EGD), commonly termed gummy smile, is a condition in which there is an overexposure of the maxillary gingiva during smiling (Allen EP, 1988). Patients with excessive gingival display usually experience dissatisfaction with their clinical appearance (Kassagani SK *et al*, 2012).

It can affect about 10.5% of the population, (Tjan AH *et al*, 1984) with a female predominance (2:1) (Peck S *et al*, 1992). According to different investigators a normal gingival display between the inferior border of the upper lip and the gingival margin of the anterior central incisors during a normal smile is 1-3 mm (McGuire MK, 1998. Chiche GJ *et al*, 1994. Vig RG *et al*, 1978).

In contrast, an excessive gingivae-to-lip distance of 4 mm or more is classified as unattractive (Kokich VO Jr *et al*, 1999). It is important to identify the exact etiologic factor responsible for the excessive gingival display to establish the proper treatment modality and to achieve the desired results.

The objective of this article is to introduce review about the etiologies and treatment modalities of EGD and to present a case in which the surgical technique of "lip repositioning" was used to reduce gingival display.

### Etiologies of EGD

Excessive gingival display (EGD) is a frequent cause of patient dissatisfaction that occurs because of various etiologies:

1. Short upper lip, measured from sub nasal to inferior border of upper lip. The average length of maxillary lip is 20-22 mm in young adult females and 22-24 mm in young adult males (Peck Set *et al*, 1992)
2. Hypermobile upper lip which lead to expose the dentition and un desired gingiva in a smile,
3. Vertical maxillary excess in which there is an enlarged vertical dimension of the midface and incompetent lips.
4. Delayed eruption in which the gingiva fail to complete the apical migration over the maxillary teeth to a position that is 1mm coronal to the cement-enamel junctions (Garguilo A *et al*, 1961).
5. Compensatory eruption of the maxillary teeth with concomitant coronal migration of the attachment apparatus, which includes the gingival margins.
6. Other causes include short clinical crown length, Plaque-or drug-induced gingival enlargement or a combination of multiple causes.

### Management of EGD

Variety of methods have been proposed for management of gummy smile. Orthognathic surgery is the treatment of choice to restore normal occlusal relationships and to reduce the gingival display in case of anterior dentoalveolar extrusion and vertical maxillary excess, but this involves hospitalization and significant side effects for patients (Silberberg N *et al*, 2009).

Orthodontic leveling of the gingival margins of the maxillary teeth may be considered in case of compensatory eruption due to attrition (Kokich VG, 1996).

Periodontal surgery in case of Plaque-or drug-induced gingival enlargement, altered or delayed passive eruption and short clinical crown length to restore the normal dento gingival relationships .The procedure involves moving the gingival margins apically through soft and possibly hard tissue resection (Lee EA, 2004).

Surgical and non-surgical procedures have been suggested to manage EGD in hyperactive upper lip cases. Nonsurgical procedures include the use of botulinum toxin A (botox), it causes muscle paralysis by inhibiting acetylcholine release at the neuromuscular junction. This results in the inhibition of the exocytosis of acetylcholine, causing a neuromuscular blocking effect. The use of therapeutic doses allows partial paralysis of the muscles. The limitation of this technique is that it's not permanent, it needs frequent application every several months (Polo M, 2005).

Surgical procedures include lip elongation associated with rhinoplasty (Ezquerria F *et al*,1999),detachment of lip muscles (Litton Cet *al* ,1979), myotomy (Ishida LH *et al*,2010) and lip repositioning (LR) (Silva CO *et al*,2013).

LR is an alternative treatment for the Excessive gingival Display, the procedure is accomplished by removing a strip of mucosa from the maxillary buccal vestibule and creating a partial thickness flap between the mucogingival junction and the upper lip musculature, the lip mucosa is then sutured to the muco-gingival line, resulting in an arrower vestibule and restricted musclepull, which reduces the gummy smile (Maynard JG Jr *et al*,1979).

### Case Report

A 28 year old female patient reported to the Department of oral surgery, at Al Andalus university for medical science with a chief complaint of excessive display of gum on smiling. There was no significant medical or family history and the patient was medically sound and fit for the surgical procedure. Informed consent prior to the surgical procedure for a lip repositioning technique was obtained (fig 1)



Figure 1 (A) Preoperative face profile view, (B) Preoperative smile with excessive gingival display

### Surgical Procedure

Povidoneiodine was used as an extraoral antiseptis, intraoral antiseptis was performed with 0.12% chlorhexidine rinse for 1

minute. Initial anesthesia consisted of bilateral infraorbital blocks (2% lidocaine with 1:200,000 epinephrine). The local infiltration is administered in the buccal vestibule with additional infiltration for hemostasis purposes. The incision outline is marked with a sterile pencil on the dried tissues. A partial-thickness incision is made along the mucogingival junction. A second parallel incision is made at the labial mucosa at approximately 10-12 mm distance from the first incision. The two incisions are connected at the mesial line angles of the right maxillary first molar and the left maxillary first molar to create an elliptical outline. The epithelium is removed in the incision outline, leaving the underlying submucosa exposed The parallel incisions were sutured with 4.0 Silk and an extraoral plaster was used to prevent swelling (fig 2)



Figure 2 (A) Retracted view with digitally created incision outline.(B) Exposed submucosa after removal of the epithelial discard.

### Post-Operative Management

Nonsteroidal anti-inflammatory medications and an antimicrobial mouth rinse (0.12% chlorhexidine) were administered postoperatively. Patient is instructed to use ice compresses for several hours and to minimize lip movement for one week, Sutures were removed at 14 days following surgery.

### RESULTS

Postoperative healing was uneventful with minimal discomfort for few days. The patient reported "tension" on the upper lip and "slight pain" when smiling and talking during the first week after surgery. After several weeks of healing, a scar formation can be observed The gingival display at baseline was 6 mm and decreased significantly to 3 mm and there was mild asymmetry on the right side upon smiling (fig 3).

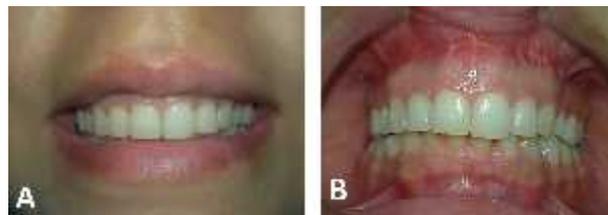


Figure 3 (A) Postoperative smile six month, (B) Postoperative retracted view showing scar formation.

### DISCUSSION

This case report aimed to present the 6 month outcome for a gummy smile treated with lip repositioning surgery which demonstrated hyperactive upper lip. In this case, 10-12 mm of mucosa was removed as the other investigators (Ishida LH *et al*, 2010).This technique was first described in the literature of plastic surgery in 1973 by Rubinstein and Kostianovsky (Rubinstein AM *et al*, 1973) later, it considered an excellent alternative to more costly procedures with higher morbidity rates (Ezquerria F *et al*,1999).

To prevent the relapses some modifications such as detachment of the elevator muscle in cases of a short upper lip (Litton *Cet al*, 1979), and myectomies or partial resection of 1 or 2 levatorlabii superiormuscles (Miskinyar SA,1983), have been suggested.

However Contraindications of this technique include, Inadequate width of attached gingiva in maxillary anterior segment, insufficient amount of tissue which poses difficulty in flap reflection, stabilization and suturing and Patients with severe vertical maxillary excess (Rosenblatt A *et al*, 2006)

It has been shown that the amount of tissue excision should be double the amount of gingival display that needs to be reduced with a maximum of 10 to 12 mm of tissue (Simon Z *et al*,2014) In the present study, the amount gingival display was 6 mm, so the width of the tissue strip removed was 12 mm, the postoperative gingival display 6 month after surgery was 3 mm. Riberio- Junior *et al.*, have already reported that no correlation existed between the amount of tissue removed and reduction of gingival display (Riberio-Junior NV *et al*,2013).

The postoperative period healing of the operation area was uneventful. Our patient experienced little discomfort (tension and swelling) upon smiling and talking which lasted 2 weeks. In literature, similar post-operative symptoms during the first week were also reported by the other clinicians (Silva CO *et al*,2013, Simon Z *et al*,2014, Riberio-Junior N *Vet al*, 2013). A mild asymmetry upon smiling were observed in the right side. This complication could be avoid by keeping labial frenulum intact at midline during the surgical procedure (Riberio-Junior NV *et al*, 2013).

## CONCLUSION

Surgical lip repositioning is an effective procedure to reduce gingival display by coronally positioning the upper lip, This technique is an easy and cost-effective technique to produce a satisfactory result for the patient.

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