

Management of class 2 gingival display by lip repositioning surgery- A case report

Abstract:

Background: Success of any surgery in the anterior teeth region is guided by patient related outcomes and surgical skill of the operator. Patient related aesthetics is governed by many factors involving soft tissues and teeth. Gummy smile or excessive gingival display may be caused due to various reasons and causes a serious aesthetic concern.

Case report: This case report presents a 26-year-old female patient with gummy smile due to lip hypermobility treated with lip repositioning surgery. A Class 2 gingival display of about 5mm extending from maxillary right second premolar to left second premolar was noted. The patient was recalled after every 6 months for follow-up. The gingival display was approximately 2mm at 6 months. The patient was highly pleased and satisfied with the aesthetic outcome.

Conclusion: The lip repositioning surgery seems to be a predictable option for correction of gummy smile. The success rate of the procedure depends on the case criteria.

Key-words: Gummy smile, Excessive gingival display, Lip repositioning surgery

Introduction:

Facial aesthetics comprises of balance between pink (gingiva) and white (tooth) components. Pink aesthetics is an interplay of gingival colour, contour, position, size, shape and thickness whereas size, shape, colour, alignment and position of the teeth constitute white aesthetics. Overall aesthetics depends on harmony amongst these components[1]. Any imbalance in these two components poses an aesthetic challenge.

An ideal smile line covers two-thirds of central incisors but a high smile line is associated with gingival display which is known as gummy smile or excessive gingival display.

The possible aetiologies for EGD according to Bhola et al (2015)[2] are altered passive eruption (APE), bony maxillary excess, conditions causing gingival enlargement, deficient maxillary lip length, excessive mobility of maxillary lip (Table 1)

Table 1. Classification of excessive gingival display (EGD) based on etiology (Bhola et al 2015)

EGD (A)	EGD (B)	EGD (C)	EGD (D)	EGD (E)
Altered passive eruption	Bony maxillary excess	Conditions causing gingival enlargement	Deficient maxillary lip length	Excessive mobility of maxillary lip

Various treatment modalities have been suggested to correct excessive gingival display (EGD) such as lip stabilisation, orthodontic intrusion, crown lengthening procedure, Botox injection, orthognathic surgery or combination of these. For short and hypermobile upper lip, lip repositioning surgery is


¹RUCHI BANTHIA, ²ANTUSH MITTAL,
³SUCHETA ENDAW, ⁴BEAUTY RANI

¹⁻⁴Department of Periodontics, Modern Dental College and Research Centre, Indore

Address for Correspondence: Dr. Sucheta Endaw
BDS, MDS Student
Department of Periodontics, Modern Dental College and Research Centre, Indore, Madhya Pradesh, India
Email: sucheta2endaw@gmail.com

Received : 11 April, 2025, **Published :** 30 June, 2025

How to cite this article: Bantia, R., Mittal, A., Endaw, S., & Rani, B. (2025). Management of class 2 gingival display by lip repositioning surgery- A case report. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 11(2).

Access this article online	
Website: www.ujds.in	Quick Response Code
DOI: https://doi.org/10.21276/ujds.2025.v11.i2.20	

the treatment of choice [2]. This case report presents a case where EGD was corrected using this technique.

Case report:

A systemically healthy 26-year-old female patient reported to the outpatient department of Periodontics, Modern Dental College and Research Centre, Indore, Madhya Pradesh with the chief complaint of gummy smile. Embarrassment due to compromised aesthetics was her chief concern. On oral examination patient had good oral hygiene (OHI-S score 1.0) with incompetent lip seal, Angle's class 1 malocclusion with no signs of altered passive eruption, vertical maxillary excess, conditions causing gingival enlargement and short maxillary lip length. Patient had thick gingival biotype (evaluated by probe transparency method) with adequate width of attached gingiva. A sub class 2 gingival display of about 5mm (**Figure 1a**) extending from maxillary right second premolar to left second premolar was noted based on the classification by Bhola et al (2015) who proposed three subclasses for EGD in the dynamic smile due to excessive mobility of maxillary lip and proposed their management (**Table 2**).

Table 2. Excessive gingival display (EGD [E]) classification and management by Bhola et al (2015)

Classification	Management
Class 1 1-3 mm of gingiva visible	Lip stabilisation with removal of 2-5 mm of mucosa, botulinum type A toxin
Class 2 4-6 mm of gingiva visible	Lip stabilisation with removal of 8-12 mm of mucosa
Class 3 ≥7mm of gingiva visible	Lip stabilisation with removal of 10-15 mm of mucosa

The upper lip length measured from subnasale to inferior border of upper lip was 21 mm (**Figure 1b**) which is considered normal for females. She had hypermobility of the upper lip elevator muscles during smiling which led to gummy smile.

Examinations were carried out using UNC-15 periodontal probe (Hu-Friedy) and vernier callipers (digital). Non-surgical periodontal treatment consisted of scaling and root planing followed by oral hygiene instructions on the day of examination.

The treatment plan was to minimize gingival display in her smile surgically as the patient was unwilling for orthodontic treatment. She was then scheduled to receive a lip repositioning surgery (LRS).

Surgical protocol:

A written informed consent was taken after explaining the procedure to the patient. Surgical technique was performed after following complete aseptic precautions. Standard skin preparation was carried out by scrubbing the surgical site with 5% povidone-iodine solution and surgical draping was done. Local infiltration was done using local anaesthetic solution Lignox (2% Lignocaine with 1:80000 Adrenaline) in the vestibular mucosa and lip extending from right first molar to left first molar bilaterally.

A modified approach was taken up for this procedure (Silva et al 2013)[3]. The incision was marked with indelible pencil. Number 15 surgical blade was used to give a partial thickness incision along the mucogingival junction starting on either side of the frenum and extending to the right and left first molars. Parallel to the first incision, a horizontal incision was made at a distance of 10 mm onto the labial mucosa. These two incisions were connected at each end by vertical incisions creating an elliptical pattern. The partial-thickness flap was excised leaving the underlying connective tissue exposed to the oral cavity (**Figure 2a**). No incision was given at the midline to maintain a proper midline.

The frenum was removed at the end of the surgery. No separate attempt was made to contain the levator labii superioris, orbicularis oris and zygomaticus minor muscles[4]. After complete hemostasis was achieved, the first interrupted suture using 5-0 silk suture was made on the midline followed by the distal most ends to avoid the displacement of the flap. Multiple interrupted sutures at a distance of 2 mm were taken on either side of midline (**Figure 2b**).

Non-steroidal anti-inflammatory drugs (Tablet Aceclofenac 100mg+ paracetamol 325mg+ serratiopeptidase 15mg) twice a day for 5 days along with chlorhexidine mouthwash twice a day for 15 days. Patient was instructed to use ice packs immediately post-operatively for few hours with intermittent application on the upper lip and to minimize lip movement while smiling and talking. Patient was asked to commence warm saline rinses from the following day 3-4 times a day. Patient was recalled for follow-up after a week. No immediate complications were reported.

At one-week, post-operative symptoms included mild discomfort (Visual analogue score 3 on scale of 1-10) and swelling with feeling of tension on the upper lip while

smiling. No display of gingiva was seen at one week. Patient was satisfied with results. Sutures were removed after 2 weeks. The site healed uneventfully with mild scar formation at the suture line with Wachtel score 3. The suture line was concealed under the lip and was not apparent when the patient smiled (**Figure 1c**). The patient was recalled after 6 months for follow-up. The gingival display was approximately 2mm at 6 months (**Figure 1d**). The patient was highly pleased and satisfied with the aesthetic outcome.

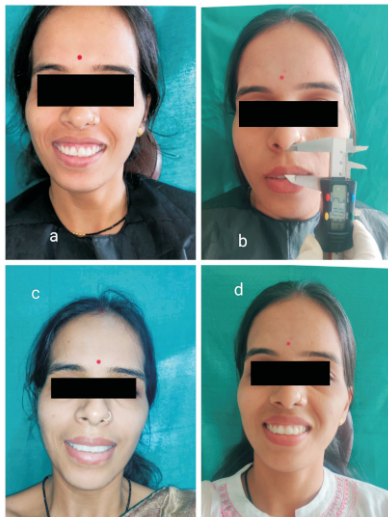


Figure 1



Figure 2

Discussion:

The smile line is defined as the position of the lower border of the upper lip during smile and thereby, determines the display of tooth or gingiva at this hard and soft tissue interface.

Different classification systems have been used for smile line analysis. Liebert et al (2004) [5], classified smile line into the following basic categories: Very high smile line in which more than 2 mm of marginal gingiva is visible. High smile line where 0- 2 mm of marginal gingiva is visible. Average smile line in which gingival embrasures are only visible. Low smile line in which gingival embrasures and cemento-enamel junctions are not visible.

When there is >2 mm of gingival display, it is considered as excessive gingival display (EGD) and is also known as “gummy smile”, which usually poses aesthetic complications[6].

The worldwide prevalence of excessive gingival display is 10.5%–29% and it is less common in men than women, with a 2:1 female tendency [6]. In our case also, the patient was female.

In this case, the patient was diagnosed with excessive mobility of maxillary lip and was classified as Class E of excessive gingival display.

Class A i.e. APE can be corrected with clinical crown lengthening procedure and apically positioned flap with or without osseous reduction based on the amount of attached gingiva and location of mucogingival junction in relation to alveolar crest. Class B i.e. Vertical maxillary excess is corrected based on its severity with procedures like botulinum type A toxin, lip repositioning, orthodontic intrusion, crown lengthening procedures and orthognathic surgery. Class C of excessive gingival display is caused by gingival enlargements which can be corrected by oral hygiene modification, initial periodontal therapy, management of plaque retentive factors, modification of medication regimen, gingivectomy, and gingivoplasty. Class D i.e. short maxillary lip is managed with training exercises and Class E i.e. hypermobile maxillary lip is managed with lip repositioning surgery with removal of band of mucosa[2].

In the present case, during static smile, the patient's gingival display was less compared to dynamic/forced smile in which the gingival display was >2mm. Her chief concern was gingival visibility while smiling. Since the tooth length of maxillary anterior teeth was normal, clinical crown lengthening procedure was not required. Correction of gummy smile was done by lip stabilisation or repositioning surgery.

Surgical lip repositioning procedure was first described in the literature of plastic surgery in 1973 by Rubinstein AM^[7]. This technique consisted of the removal of a partial-thickness mucosal strip from the labial aspect of the alveolar mucosa including the frenum. Lip repositioning surgery was introduced to the periodontal and dental cosmetic literature in 2006 and 2007 by Rosenblatt and Simon^[8] who described the original technique, without frenum reconstruction. This technique was later modified by Silva et al (2013)^[3] to reduce the post-operative morbidity and to maintain the maxillary labial midline. This modification encompassed the preservation of the frenum initially and removal of bilateral bands of mucosa followed by removal of the frenum at the end. In this case, this modified technique (Silva et al 2013) was performed for easy manoeuvrability and maintenance of lip line. Suturing was started at midline followed by the right and left sides.

The amount of partial-thickness flap excised should be either double the amount of gingival display that needs to be reduced or a maximum of 10-12 mm tissue excision^[7] to prevent relapse because of scar formation and wound contraction due to involvement of muscles in incision.

No effort was made to contain levator labii superioris, orbicularis oris and zygomaticus minor muscles^[4] as supporting existing evidences are insufficient.

Some post-operative complications, such as discomfort, bruising, ecchymoses, double lip, suture loss and edema of the upper lip post-surgery have been mentioned in literature. Mild discomfort and oedema attributed to surgical trauma were observed in our patient too which resolved after two weeks of surgery. Other rare complications reported in the literature include paresthesia and transient paralysis which were not observed in our case.

A less frequent complication may be the formation of a mucocele^[7] due to the inadvertent excision of the minor salivary glands in the upper lip, which arises in the post-operative period. In our case, minor salivary glands were seen but were not included in the incision, hence no mucocele was seen. Patient is still under observation.

Approximately 3 mm reduction in gingival display was seen at 6 months follow up. dos Santos-Pereira (2020)^[9] in their systematic review and meta-analysis found LRS to be an

effective approach for EGD management. A mean reduction of around 2.71 mm has been reported in EGD. The results were found to be stable up to six months.

Haddadi et al (2021)^[10] reported three cases of LRS with similar technique and concluded that proper case selection is critical for long term success.

Conclusion:

The lip repositioning surgery seems to be a predictable option for correction of gummy smile with hyperactive lip muscles. The success rate of the procedure depends on the proper case selection and stringent adherence to proper surgical protocol.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This case received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References:

1. Patil AS, Ranganath V, Yerawadekar SA, Kumar CN, Sarode GS. Pink esthetics: A study on significant gingival parameters. *J Contemp Dent Pract* 2020;21(2):207–10.
2. Bhola M, Fairbairn PJ, Kolhatkar S, Chu SJ, Morris T, de Campos M. Lipstat: The Lip stabilization technique-indications and guidelines for case selection and classification of excessive gingival display. *Int J Periodontics Restor Dent* 2015;35(4):549-59.
3. Silva CO, Ribeiro-Júnior NV, Campos TVS, Rodrigues JG, Tatakis DN. Excessive gingival display: treatment by a modified lip repositioning technique. *J Clin Periodontol* 2012;40(3):260–5.
4. Arruda CAS, Sousa FP, Alves RC. Modified lip repositioning surgery in the treatment of gummy smile. *Appl Sci* 2024;14:5580-94.
5. Liebart MF, Fouque DC, Santini A. Smile line and periodontium visibility. *Perio 2000* 2004;1:17-25.
6. Sarfi D, Bouzoubaa SM, Yahya IBI. Lip repositioning technique. A simple surgical procedure to improve the harmony and symmetry of the smile: A case report. *Adv Oral Maxillofac Surg* 2022;6:100260.
7. DN. Lip repositioning techniques and modifications. *Dent Clin N Am* 2022; 66(3): 373-84.
8. Rosenblatt A and Simon Z. Lip repositioning for reduction of excessive gingival display: a clinical report. *Int J Periodontics Restorative Dent* 2006;26(5):433-7.

9. dos Santos-Pereira SA, Cicareli AJ, Idalgo FA, Nunes AG, Kassis EN, Nunes AG et al. Effectiveness of lip repositioning surgeries in the treatment of excessive gingival display: A systematic review and meta-analysis. *J Esthet Restor Dent* 2020;33(3):1-12.
10. Haddadi P, Zare H, Azadikhah A. Lip repositioning, a solution for gummy smile. *Front Dent* 2021;18(15):1-5.