

Lip Repositioning: A Boon for Gummy Smile

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ABSTRACT

'Gummy smile' caused by excessive gingival display (EGD) can lower the self-esteem in many individuals. For the right treatment modality; proper diagnosis and determining its etiology is crucial. There are various techniques like botulinum toxin injections, lip elongations with rhinoplasties, myotomies, lip muscle detachments and lip repositioning to treat gummy smile. In this case report, we discussed a case of young woman with an EGD caused by vertical maxillary excess, hyperactive upper lip and altered passive eruption which was treated by lip repositioning along with gingivectomy. In this instance, a novel method is suggested: a reversible trial that can be accomplished by merely suturing the edges of the eventual split-thickness flap before making the incision.

By this method, the patient and the surgeon can preview the final result of the surgery. This was very beneficial for the patient to have the realistic goals of surgical outcomes. This technique can be a minimally invasive, viable substitute for orthognathic surgery.

Keywords: *excessive gingival display, gingivectomy, altered passive eruption, vertical maxillary excess, orthognathic surgery.*

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CASE REPORT

A 19 years old patient presented to the Department of Orthodontics 1 year back with the chief complaint of malaligned teeth. After orthodontic treatment, the patient still had an asymmetrical gummy smile and was concerned about the same. But, unwilling for orthognathic surgery.

Then she was referred to the department of Periodontology. There was no significant medical history. On clinical examination, patient was diagnosed with short upper lip, (it was measured in rest position from subnasale to the most inferior portion of the upper lip at the midline in the rest position and was 11 mm, which was considered to be short) 5-6 mm excessive gingival display (EGD) (measured from the marginal gingiva) supported by maxillary vertical excess, hyperactive upper lip and altered passive eruption [Table/Fig-1]. The lip repositioning was the proposed to her as a treatment option. 'Gummy smile' is a word used to describe excessive gingival display (EGD).

In gummy smile maxillary gingiva is overexposed while smile; in severe cases overexposure is present in repositioning of the mouth and the lip.¹ While gingival display may be perceived as indicative of a young smile, a display beyond 3 mm is deemed undesirable.² According to different investigators, 2 to 3 mm exposure of gingiva can be considered as gummy smile.^{3,4}

The etiology of EGD can be varied from vertical maxillary excess, anterior dentoalveolar extrusion, altered or delayed passive eruption, short or hyperactive upper lip or a combination of these causes. Depending upon etiology, treatment modalities vary. Periodontal surgery is employed to address gingival enlargement and passive eruption. Orthodontic intrusion is used to treat anterior dentoalveolar extrusion. Orthognathic surgery is used to alleviate vertical maxillary excess⁵. Treatment options for hyperactive upper lips include botulinum toxin injections⁶, lip elongation related to rhinoplasty⁷, lip muscle detachment⁸, myotomy and partial muscle excision⁹, and lip repositioning¹⁰.

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This report presents the case of young female having gummy smile and was not ready for orthognathic surgery treated with lip repositioning. The procedure, potential benefits, risks, treatment alternatives and feasible partial or full relapse were explained to her. Informed written consent was obtained for the procedure.

SURGICAL PROCEDURE

Asepsis was attained by applying 5% povidone-iodine solution (Betadine, Win Medicare, India) extraorally and gargling with 10 ml of 0.12% chlorhexidine mouthwash (Hexidine 0.2%, ICPA, India) for 1 minute intraorally.

The surgical area was anaesthetized by giving infra orbital block bilaterally. (2% lignocaine with 1:200,000 epinephrine Zinocaine-A, Laborate Pharmaceuticals, India)

To give the patient a more accurate picture of the anticipated outcome, a reversible trial was conducted. Marking with autoclaved hematoxylin stain pencil (Apsara, H.P.P. LTD, India) was done on future incision lines [Table/Fig-2]. The mucogingival connection from the mesial aspect of the first molar on both sides delineated the inferior border. Superior border was defined by the line 10 mm (2 times the display) superior to inferior border tapering in molar region to join to inferior border forming a moustache-like shape. Then the interrupted sutures using non-resorbable 3-0 silk (Mersilk, Ethicon, India) were placed at molar region, canine region bilaterally and in the midline [Table/Fig-3]. The tissue desired for excision, tucked in to view the after surgery potential look [Table/Fig-4]. At this stage photographs were taken and showed it to patient.

After patient agreed; lip repositioning procedure was carried out. Before going to the lip repositioning procedure, crown lengthening was done from canine to canine using scalpel. The initial partial thickness incision was made at the mucogingival junction, which runs from the right first molar to the left first molar on the inferior border, in order to realign the lips. A second partial thickness incision was executed along the superior border, linking to the first incision in the first molar region bilaterally. Two strips approximately 1 mm in thickness of outlined mucosa were removed by a superficial split-thickness dissection exposing the underlying connective tissue [Table/Fig-5,6] and not damaging minor salivary gland in submucosa. Haemostasis was achieved. Wound closure was achieved by continuous interlocking sutures [Table/Fig-7,8] using non-resorbable 3-0 silk and new mucosal margin to the gingiva was stabilized. To maintain the symmetry suturing was started from midline to each side.

Postoperatively, oral antibiotics (Amoxicillin 500 mg three times daily for 5 days) and a mild analgesic (Ibuprofen 400 mg three times daily for 3 days) were recommended. Patient was advised to restrict the activities (smiling,

talking) that cause lip movements, intermittent ice pack application over site, gentle brushing and consumption of soft food. After 10 days [Table/Fig-9], the patient was summoned back for suture removal, and a month later, the gingival display was evaluated. [Table/Fig-10].

Healing was satisfactory. Mild pain and discomfort (measured by VAS scale score: 3) was present after surgery for 2-3 days and gradually reduced.

No pain (score 0) was there after 10 days. Other parameters like gingival display and upper lip length also recorded at 10 days and 1 month [Table/Fig-11]. The patient was happy with the achieved result.

DISCUSSION

Gingival display is reduced during the lip repositioning procedure by removing a strip of mucosa and reducing the vestibular depth. This limited the muscle pull of elevator muscles (zygomaticus minor, orbicularis oris, levator anguli oris and levator labii superioris). Rubenstein and Kostianovsky originally introduced lip repositioning technique as part of plastic reconstructive surgery in the medical field for the correction of gummy smile associated with a hypermobile lip.¹¹ With time various modifications were tested by introducing detachment of elevator muscle in short upper lip cases,⁸ Myectomies/ partial resection of 1 or 2 levator labii superioris muscle.⁹ All these modifications were introduced to prevent relapse. Then botulinum toxin injections as minimally invasive alternative to surgical procedures were introduced.⁶

Then Rosenblatt and Simon modified this procedure for better use in dentistry.¹² Some investigators reported the cases by doing some changes in the technique like keeping the frenum intact which helps in maintaining the position of labial midline, prevents changes in lip symmetry and decreased the morbidity.^{13, 14}

Reversible trial is another novel addition in this technique.¹⁵ Proposal of reversible trial can simulate the final outcome of the surgery. Lip repositioning surgery is an elective procedure. Therefore, trial modification can be used as a tool for better communication with the patient and the surgeon.

Hence, reversible trial was done prior to procedure in this case report. Lip repositioning procedure was carried out by removing two strips of labial mucosa from each side keeping the frenum intact. The wound was sutured back while maintaining the symmetry.

Rare complications of lip repositioning can be included as discomfort, bruising and swelling of upper lip.¹³

CONCLUSION

Proposed reversible trial is a favourable tool for communication and realistic expectation about the

final result for patient and surgeon. This case suggests that a minimally invasive, workable alternative treatment option for excessive gingival display may be lip repositioning surgery combined with gingivectomy.

This procedure provides ease, excellent patient acceptability and satisfying treatment outcome despite having relapse tendency.

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CONFLICT OF INTEREST- No.

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[Table/Fig-1]:Pre-operative gingival display during smile



[Table/Fig-2]: Marking for surgical incision lines



[Table/Fig-3]: Interrupted sutures placed during Reversible trial



[Table/Fig-4]: Potential result after reversible trial



[Table/Fig-5]: Superficial split-thickness dissection with gingivectomy from 13-23



[Table/Fig-6]: Strips of excised mucosa



[Table/Fig-7]: Continuous interlocking sutures placed



[Table/Fig-8]: Immediate Post-operative view



[Table/Fig-9]: Intra-oral view after 10 days



[Table/Fig-10]: Reduced gingival display after 1 month

[Table/Fig-11]: Clinical parameters at baseline, 10 days and 1 month

Parameters	Baseline			10 days			1 month		
	1 st Molar	R	L	1 st Molar	R	L	1 st Molar	R	L
Gingival display (mm)		4	4		2	2		2	2
	Canine	6	5	Canine	5	5	Canine	4	4
	midline	6		midline	5		midline	4	
Upper lip length (mm)	19			21			23		
R- Right side, L- Left side									