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RESEARCH ARTICLE

"SURGICAL LIP REPOSITIONING AS A CONSERVATIVE APPROACH FOR THE CORRECTION OF EXCESSIVE GINGIVAL DISPLAY: A REPORT OF 2 CASES"

Shivangi Singh[1], Reshama Bansal[2], Madhu Singh Ratre[3] and Shaleen Khetarpal[4]

1. PG student, Department of Periodontology, Government College of Dentistry, Indore, Madhya Pradesh, India.
2. Senior Resident, Department of Dentistry, Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, M.P., India.
3. Professor and Head, Department of Periodontology, Government College of Dentistry, Indore, Madhya Pradesh, India.
4. Reader, Department of Periodontology, Government College of Dentistry, Indore, Madhya Pradesh, India.

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Excessive gingival display; Gummy smile; Lip repositioning surgery; Hypermobile upper lip; Altered passive eruption; Esthetic dentistry.

Abstract

Background: Excessive gingival display (EGD), commonly known as gummy smile, is a frequent esthetic concern with multiple etiological factors. Lip repositioning surgery has been advocated as a conservative and minimally invasive treatment option for selected cases.

Case Presentation: This clinical case series describes two female patients presenting with excessive gingival display. Case 1 presented with gingival display of 6mm during static smileand was associated with altered passive eruption and was managed with esthetic crown lengthening followed by lip repositioning. Case 2 was primarily related to hyperactive upper lip and was treated using a modified frenum-preserving lip repositioning technique.

Results: Both cases demonstrated satisfactory healing and improved smile esthetics. In Case 1, EGD was reduced from 6 mm preoperatively to 3 mm postoperatively. In Case 2, gingival display decreased from 3–4 mm to 1 mm. Stable outcomes with improved smile esthetics were observed during follow-up without major complications.

Conclusion: Lip repositioning surgery may be an effective, and conservative approach for the management of excessive gingival display when proper diagnosis and case selection are ensured.

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Corresponding Author: -Reshama Bansal
Address: -Senior Resident, Department of Dentistry, Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, M.P., India.

Introduction: -

The smile is a key determinant of facialexpression and esthetics, greatly influencing perceived attractiveness and self-confidence. Beyond the teeth, lip position, gingival contours, and the health of surrounding oral tissues collectively contribute to a balanced and pleasing smile.A gummy smile, clinically referred to as excessive gingival display (EGD), is characterized by the exposure of more than 1.5–2 mm of gingival tissue during smiling.[1]EGD may compromise smile esthetics by creating excessive gingival exposure relative to the teeth. Perception of unattractiveness varies among dental professionals, laypersons, and different populations; however, gingival display exceeding 3 mm is generally considered unaesthetic worldwide.[2,3]The literature describes multiple etiologic factors for excessive gingival display, including vertical maxillary excess, reduced philtrum height, hyperactivity of the upper lip elevator muscles, altered passive eruption, gingival enlargement, and retroclination or supra-eruption of the maxillary incisors.[4]Vertical maxillary excess (VME) is a skeletal discrepancy characterized by excessive vertical growth of the maxilla, often associated with an increased lower facial height.

Bhola et al.[5] classified the various dental, skeletal and soft tissue etiologic factors resulting in EGD into five major categories as illustrated in Figure 1.

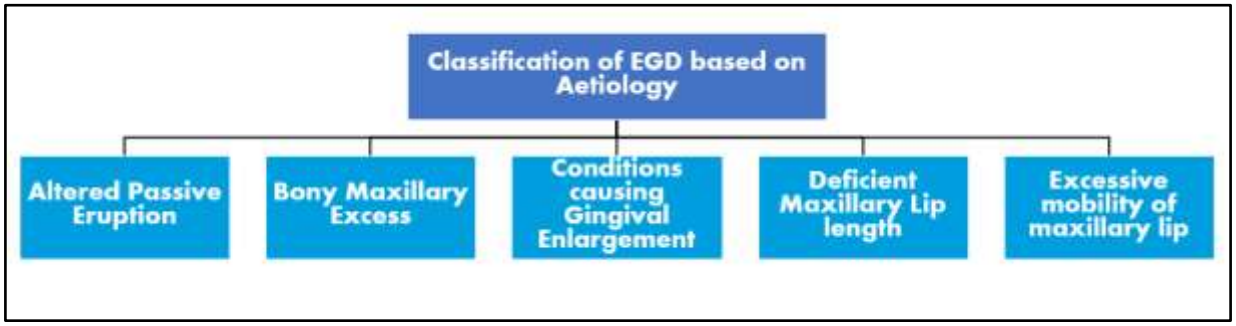

Figure 1: Classification of excessive gingival display based on aetiology[5]

Management of excessive gingival display includes both surgical and nonsurgical approaches. Surgical options comprise orthognathic surgery (with or without V-Yplasty)[6], lip repositioning, esthetic crown lengthening, and gingivectomy, whereas nonsurgical modalities include botulinum toxin injections and orthodontic intrusion of the maxillary teeth.[7]Lip repositioning has been introduced as a conservative and comparatively less invasive surgical option for the correction of excessive gingival display. The technique was first described by Rubinstein and Kostianovsky in 1973.[8]The technique involves excision of a strip of mucosa from the maxillary labial vestibule to restrict superior lip elevation and thereby decrease gingival display during smiling. Since its introduction, several modifications have been proposed to enhance clinical outcomes. Modified lip repositioning[9],however,does not include the maxillary labial frenum. Preservation of the maxillary labial frenum helps maintain the dental midline, enhances smile symmetry, and avoids morbidity associated with frenum excision.

However, limited clinical evidence is available comparing the effectiveness of conventional and modified lip repositioning techniques across different etiologic presentations of excessive gingival display, thereby warranting further case-based documentation.Lip repositioning is a conservative, minimally invasive, and cost-effective option for managing excessive gingival display, particularly in patients with hyperactive upper lip or mild vertical maxillary excess. It offers rapid esthetic improvement, can be performed under local anesthesia, and is associated with relatively low morbidity and short recovery time. However, its success is highly dependent on accurate case selection and precise surgical execution.Limitations include the possibility of relapse over time, reduced effectiveness in severe skeletal discrepancies, temporary postoperative discomfort or restricted lip movement, and the lack of robust long-term comparative evidence. Therefore, lip repositioning should be considered a valuable but case-sensitive treatment modality rather than a universal solution for gummy smile correction.The presented case report evaluates the clinical effectiveness of lip repositioning surgery for the management of excessive gingival display in selected patients.

Material and Methods: -

CASE 1

A 25-year-old female patient presented to the Department of Periodontology with the chief complaint of excessive gingival display during smiling. Her medical and family history was non-contributory. Extraoral examination showed a bilaterally symmetrical face with lip incompetence. On smiling, marked gingival exposure was noted from the maxillary right first molar to the maxillary left first molar (Figure 2). Intraoral examination revealed short clinical crowns without incisal wear, and gingival display measured approximately 6 mm using a UNC-15 periodontal probe (from lower border of upper lip to zenith of gingival margin). Based on clinical findings, along with features consistent with altered passive eruption; a diagnosis of moderate vertical maxillary excess accompanied by hypermobility of the upper lip was established. Esthetic crown lengthening was indicated to achieve optimal tooth proportions. The patient exhibited a thick gingival biotype with an adequate width of attached gingiva. As the patient preferred a minimally invasive approach, informed consent was obtained after discussing alternative treatment options, expected benefits, and possible complications of lip repositioning surgery.

Treatment Plan: Based on the clinical findings, esthetic crown lengthening followed by lip repositioning surgery was planned to reduce gingival exposure by restricting superior lip movement during smiling and thereby enhance smile esthetics. Ethical clearance and written informed consent were obtained.

Figure 2: Clinical photographs of Case 1: A,B showing preoperative excessive gingival display (6mm); C,D show intraoperative stages of esthetic crown lengthening and gingivectomy, E showing marking forincision for lip repositioning surgery; F showing de-epithelialization, G, suturing;H, I showpostoperative smile esthetics at follow-up.

CASE 2

A 26-year-old female patient presented to the Department of Periodontology with the chief complaint of excessive gingival display during smiling. Intraoral examination revealed healthy attached gingiva. The upper lip length measured 14 mm from the base of the nose to the superior border of the vermilion, and gingival visibility during smiling was approximately 3–4 mm in the maxillary central incisor region. The etiology was primarily attributed to

a hyperactive upper lip with a mild component of vertical maxillary excess. As the patient declined orthognathic surgery, lip repositioning surgerywas planned after obtaining verbal and written informed consent.Treatment Plan: The surgical protocol was similar to that of the previous case, with the exception that the superior incision was positioned at a distance equal to twice the gingival display, in accordance with the technique described by Rosenblatt and Simon (2006)[10]; exclusion of midline tissue dissection and omission of gingivectomy procedure.

Surgical Procedure

Following phase I therapy, the surgical site was prepared under aseptic conditions and local anesthesia (2% xylocaine with epinephrine 1:80,000) was administered in the maxillary vestibular mucosa from the right to left first molar region. In Case 1, gingivectomy was performed prior to lip repositioning to correct gingival excess. Incision outlines were marked with a sterile indelible pencil according to the technique of Rosenblatt and Simon[10], with the inferior incision placed at the mucogingival junction and the superior incision positioned 10–12 mm apical to it, extending from the right second premolar to the left second premolar. A partial-thickness flap was excised, exposing the underlying connective tissue. Initial interrupted suturing was performed at the midline to ensure proper alignment, followed by continuous interlocking sutures to approximate the flaps. The lip mucosa was secured to the mucogingival junction bilaterally using 4-0 polyamide sutures. Postoperatively, the patient was prescribed ibuprofen 400 mg three times daily for 3 days, amoxicillin 500 mg three times daily for 5 days, and advised to rinse gently with 0.12% chlorhexidine gluconate twice daily for 2 weeks. Patients were instructed to apply ice packs, restrict excessive facial movements for 1 week, avoid brushing near the surgical site for 14 days.

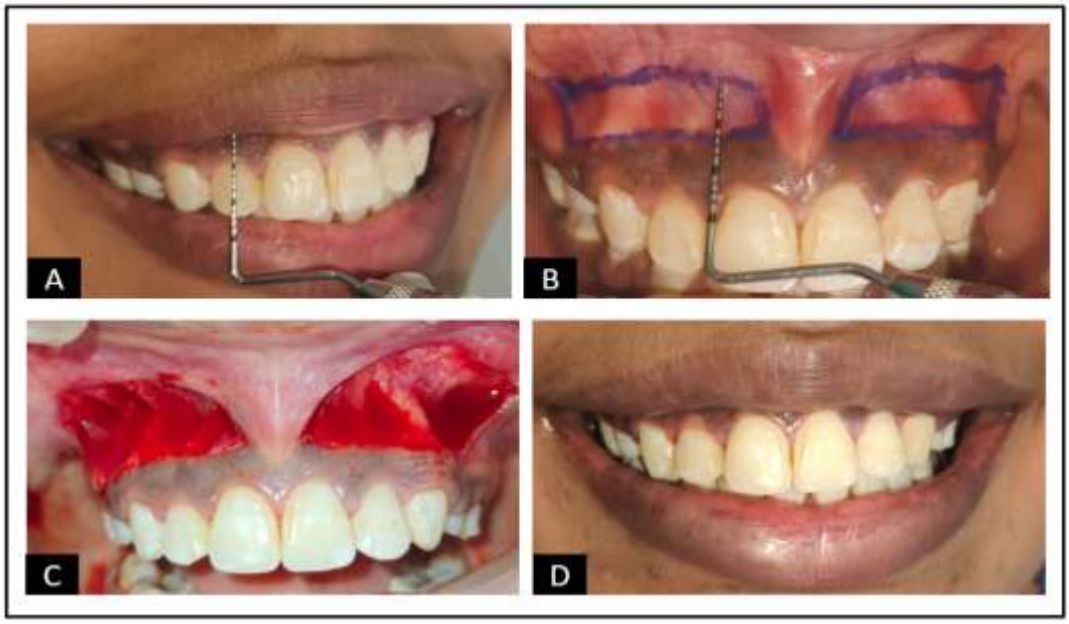

Figure 3: Clinical photographs of Case 2 showing: A, preoperative EGD of 3mm; B, incision marking with distance between upper and lower borders equal to double the EGD i.e. 6mm; C,modified frenum-preserving lip repositioning surgery; D, postoperative smile esthetics at 1 week follow-up.

CASE 2 Modified lip repositioning surgery[9,11]a partial-thickness incision was placed at the mucogingival junction from the mesial line angle of the right central incisor to the mesial line angle of the right first molar, followed by a parallel incision 10–12 mm apical in the labial mucosa. The incisions were joined laterally and in the central incisor region without involving the maxillary labial frenum, creating a quadrilateral outline. The enclosed epithelium was carefully excised, leaving the underlying connective tissue exposed. The same procedure was repeated on the left side, with no incision placed across the midline to preserve proper alignment. Care was taken to avoid injury to minor salivary glands within the submucosa. The wound margins were approximated using interrupted stabilization sutures with 4-0 polyamide suture. Postoperatively, the patient was advised to apply extraoral cold packs to minimize swelling, and was prescribed post operative medications, along with routine postoperative instructions as in case 1.

Results: -

At the 1-week postoperative review, both patients reported only mild discomfort with minimal extraoral swelling, and healing was satisfactory. Subsequent follow-up at 1, 3, and 6 months demonstrated reduced gingival display with stable clinical outcomes.The percentage reduction in gingival display was 50% in Case 1 and approximately 66.7–75% in Case 2 (mean reduction: 71.4%).

Discussion: -

The smile line refers to the position of the lower border of the upper lip during smiling and determines the extent of tooth and gingival display at the dentogingival interface. Gingival exposure exceeding 2 mm is generally regarded as excessive gingival display (EGD) or a gummy smile, which may present esthetic concerns. The reported global prevalence of EGD ranges from 10.5% to 29%, with a higher occurrence in females than males at an approximate ratio of 2:1.[12]Excessive gingival display may be classified according to its etiology, with each category requiring a tailored treatment approach. Class A (altered passive eruption) is managed by clinical crown lengthening or an apically positioned flap, with or without osseous resection, depending on the attached gingiva and the position of the mucogingival junction. Class B (vertical maxillary excess) is treated according to severity using botulinum toxin injections, lip repositioning, orthodontic intrusion, crown lengthening, or orthognathic surgery. Class C (gingival enlargement) is managed through plaque control, periodontal therapy, medication modification, gingivectomy, or gingivoplasty. Class D (short maxillary lip) may be treated with lip training exercises, whereas Class E (hypermobile upper lip) is commonly corrected by lip repositioning with excision of a mucosal strip.[5]

Lip repositioning was first described by Rubinstein and Kostianovsky in 1973.[13]The objective of lip repositioning surgery is to limit superior lip movement by restricting the activity of the elevator muscles, thereby reducing excessive gingival display. Since its introduction, several modifications have been proposed. In 1979, Litton and Fournier described a technique involving detachment of the elevator muscles for cases with a short upper lip, which was subsequently modified by Rosenblatt and Simon in 2006.[10] Silva et al.[9]proposed preservation of the maxillary labial frenum as a modification of the original Rubinstein and Kostianovsky technique. Maintaining the frenum helps preserve the dental midline, improves smile symmetry, and avoids morbidity associated with frenum excision.The extent of partial-thickness tissue excision should correspond to approximately twice the gingival display requiring correction, or be limited to a maximum of 10–12 mm. Adhering to these dimensions may help minimize relapse associated with scar contraction and muscular involvement within the incision area.[14]

In both cases, gingival display was more pronounced during dynamic smiling than at rest, and the primary concern was excessive gingival visibility while smiling (6mm and 3mm respectively). In Case 1,shortened maxillary anterior clinical crowns due to altered passive eruption, along with adequate attached gingiva; were managed by external bevel gingivectomy followed by lip repositioning. Case 2 presented with Class I EGD (3 mm) according to Bhola et al.[5] and was treated using the modified frenum-preserving technique described by Silva et al.[9], which facilitated lip-line maintenance and surgical handling. Suturing was initiated at the midline and completed bilaterally.

Figure 4: ***Comparison of pre-op and 6 months post-operative gingival display after surgical lip repositioning***

The procedure produced favourable esthetic outcomes with marked reduction in gingival display and stable results at the 6-month follow-up. The patients' chief complaint was effectively resolved, resulting in improved satisfaction and confidence, with no major complications observed. Although postoperative discomfort, bruising, edema, double lip, and suture loss have been reported in the literature, our patients experienced only mild transient discomfort and swelling that resolved within 7–10 days. Contraindications for lip repositioning include an inadequate zone of attached gingiva, which may compromise flap design and suturing, as well as severe vertical maxillary excess.[10]

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.

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