

BIBLIOGRAPHIC INFORMATION SYSTEM

JOURNAL FULL TITLE: Journal of Biomedical Research & Environmental Sciences

ABBREVIATION (NLM): J Biomed Res Environ Sci **ISSN:** 2766-2276 **WEBSITE:** <https://www.jelsciences.com>

SCOPE & COVERAGE

- ▶ **Sections Covered:** 34 specialized sections spanning 143 topics across Medicine, Biology, Environmental Sciences, and General Science
- ▶ Ensures broad interdisciplinary visibility for high-impact research.

PUBLICATION FEATURES

- ▶ **Review Process:** Double-blind peer review ensuring transparency and quality
- ▶ **Time to Publication:** Rapid 21-day review-to-publication cycle
- ▶ **Frequency:** Published monthly
- ▶ **Plagiarism Screening:** All submissions checked with iThenticate

INDEXING & RECOGNITION

- ▶ **Indexed in:** [Google Scholar](#), IndexCopernicus (**ICV 2022: 88.03**)
- ▶ **DOI:** Registered with CrossRef (**10.37871**) for long-term discoverability
- ▶ **Visibility:** Articles accessible worldwide across universities, research institutions, and libraries

OPEN ACCESS POLICY

- ▶ Fully Open Access journal under Creative Commons Attribution 4.0 License (CC BY 4.0)
- ▶ Free, unrestricted access to all articles globally

GLOBAL ENGAGEMENT

- ▶ **Research Reach:** Welcomes contributions worldwide
- ▶ **Managing Entity:** SciRes Literature LLC, USA
- ▶ **Language of Publication:** English

SUBMISSION DETAILS

- ▶ Manuscripts in Word (.doc/.docx) format accepted

SUBMISSION OPTIONS

- ▶ **Online:** <https://www.jelsciences.com/submit-your-paper.php>
- ▶ **Email:** support@jelsciences.com, support@jbresonline.com

[HOME](#)[ABOUT](#)[ARCHIVE](#)[SUBMIT MANUSCRIPT](#)[APC](#)

 **Vision:** The Journal of Biomedical Research & Environmental Sciences (JBRES) is dedicated to advancing science and technology by providing a global platform for innovation, knowledge exchange, and collaboration. Our vision is to empower researchers and scientists worldwide, offering equal opportunities to share ideas, expand careers, and contribute to discoveries that shape a healthier, sustainable future for humanity.

CASE REPORT

Long-Term Clinical Outcomes of Conventional Lip Repositioning Surgery Combined with Maxillary Labial Frenectomy for the Management of Hyperactive Upper Lip-Associated Excessive Gingival Display: An 18-Month Case Report

Ramazan Ağırağaç

Department of Periodontology, Faculty of Dentistry, Dicle University, Diyarbakir, Turkey

Abstract

Excessive Gingival Display (EGD), commonly known as a gummy smile, is an esthetic condition that may negatively affect patients' self-confidence and quality of life. Lip repositioning surgery has emerged as a minimally invasive treatment option for patients with hyperactive upper lips, although long-term stability remains a concern. This case report describes the clinical management and 18-month follow-up of a 32-year-old medically healthy female presenting with approximately 5 mm of gingival display during smiling associated with a hyperactive upper lip. Because the patient exhibited normal clinical crown dimensions, altered passive eruption was excluded and esthetic crown lengthening was not indicated. Conventional lip repositioning surgery combined with maxillary labial frenectomy was performed under local anesthesia. Postoperative healing was uneventful, and no complications were observed throughout the follow-up period. Complete elimination of gingival display was achieved at the 2-month follow-up. A mild partial relapse of approximately 2 mm was observed at the 9-month follow-up and remained stable at the 18-month evaluation. Despite the relapse, the esthetic improvement was maintained, and the patient remained highly satisfied with the treatment outcome. This report provides long-term clinical documentation supporting conventional lip repositioning surgery combined with maxillary labial frenectomy as a predictable and minimally invasive treatment option for hyperactive upper lip-associated excessive gingival display.

*Corresponding author(s)

Ramazan Ağırağaç, Department of Periodontology, Faculty of Dentistry, Dicle University, Diyarbakir, Turkey

Email: rmznagiragac@gmail.com

DOI: 10.37871/jbres2320

Submitted: 24 July 2026

Accepted: 01 August 2026

Published: 03 August 2026

Copyright: © 2026 Agiragac R.

Distributed under Creative Commons CC-BY 4.0 ©

OPEN ACCESS

Keywords

- Gummy smile
- Lip repositioning surgery
- Hyperactive upper lip

Introduction

Smile esthetics play a crucial role in facial attractiveness and have a significant impact on an individual's self-confidence and

VOLUME: 7 ISSUE: 8 - AUGUST, 2026



How to cite this article: Ağırağaç R. Long-Term Clinical Outcomes of Conventional Lip Repositioning Surgery Combined with Maxillary Labial Frenectomy for the Management of Hyperactive Upper Lip-Associated Excessive Gingival Display: An 18-Month Case Report. J Biomed Res Environ Sci. 2026 August 03; 7(8): 11. Doi: 10.37872/jbres2320

social interactions. Excessive Gingival Display (EGD), commonly referred to as a gummy smile, is generally defined as the exposure of more than 2–3 mm of maxillary gingiva during smiling and represents a common esthetic concern, particularly among young adults and women. Although EGD is not considered a pathological condition, it may adversely affect patients' psychological well-being and quality of life, prompting many individuals to seek esthetic treatment [1,2]. The etiology of EGD is multifactorial and may include altered passive eruption, vertical maxillary excess, dentoalveolar extrusion, gingival enlargement, a short upper lip, or hyperactivity of the upper lip elevator muscles. Therefore, accurate diagnosis is essential to identify the underlying cause and select the most appropriate treatment approach [1].

Treatment of EGD should be individualized according to its etiology. Esthetic crown lengthening is primarily indicated for altered passive eruption, orthodontic treatment may be appropriate for dentoalveolar extrusion, and orthognathic surgery remains the treatment of choice for severe vertical maxillary excess. Botulinum toxin injections offer a minimally invasive but temporary option for patients with hyperactive upper lips. Among the available surgical approaches, lip repositioning surgery has gained increasing acceptance as a conservative technique for reducing gingival display associated with upper lip hypermobility. Compared with orthognathic surgery, it is less invasive, can be performed under local anesthesia, and is associated with lower postoperative morbidity and high patient satisfaction. Nevertheless, postoperative relapse remains one of the principal concerns, leading to the development of several modified surgical techniques intended to improve long-term stability [2–4].

Recent systematic reviews and meta-analyses have confirmed that both conventional

lip repositioning surgery and its modifications produce clinically significant reductions in gingival display with favorable esthetic outcomes. However, the current evidence is largely based on case reports and small case series, and relatively few studies have documented outcomes beyond 12 months. Furthermore, reports describing conventional lip repositioning surgery combined with maxillary labial frenectomy with extended follow-up remain limited [5]. Therefore, the present case report describes the clinical management of hyperactive upper lip–associated excessive gingival display using conventional lip repositioning surgery combined with maxillary labial frenectomy and presents the clinical and esthetic outcomes after an 18-month follow-up. The extended follow-up and detailed serial clinical documentation provide additional evidence regarding the long-term stability and clinical applicability of this conservative surgical approach.

Case Presentation

A 32-year-old female presented to the Department of Periodontology with the chief complaint of excessive gingival display during smiling, which had negatively affected her smile esthetics for several years. The patient expressed dissatisfaction with the appearance of her smile and sought a minimally invasive treatment to reduce gingival exposure. She was medically healthy, reported no history of systemic disease, was not taking any medications, and was a non-smoker.



Figure 1 Preoperative clinical appearance showing excessive gingival display during smiling.



Figure 2 Parallel partial-thickness incision lines marked for lip repositioning surgery.

A comprehensive extraoral and intraoral examination was performed. Periodontal evaluation revealed healthy periodontal tissues without signs of inflammation, bleeding on probing, or periodontal pocket formation. During a full smile, the vertical distance between the gingival margin of the maxillary central incisors and the inferior border of the upper lip was approximately 5 mm, confirming excessive gingival display. Clinical examination demonstrated normal clinical crown dimensions of the maxillary anterior teeth, excluding altered passive eruption as the primary etiologic factor. In addition, no clinical features suggestive of vertical maxillary excess, dentoalveolar extrusion, or gingival enlargement were identified. The excessive gingival display was primarily observed during smiling, and together with the overall clinical findings, was considered consistent with a diagnosis of hyperactive upper lip. Therefore, conventional lip repositioning surgery combined with maxillary labial frenectomy was selected as the treatment of choice to improve smile esthetics (Figure 1).

The patient was informed about the diagnosis, available treatment options, expected benefits, possible complications, and the potential for partial relapse during long-term follow-up. Written informed consent for both the surgical procedure and the publication of the clinical photographs was obtained before treatment.

Surgical procedure

Following written informed consent, the surgical procedure was performed under local anesthesia using 2% lidocaine containing 1:100,000 epinephrine. After antiseptic preparation of the surgical field, the maxillary labial mucosa was gently dried, and the planned incision lines were outlined using a sterile surgical marker.

Conventional lip repositioning surgery was selected because the patient presented with excessive gingival display primarily associated with a hyperactive upper lip without clinical evidence of severe vertical maxillary excess or other conditions requiring more extensive surgical intervention. A conventional partial-thickness approach was preferred to preserve the underlying connective tissue, reduce surgical morbidity, and provide a predictable esthetic outcome. More invasive modifications, such as myotomy, muscle containment, or



Figure 3 Excised partial-thickness mucosal strips following lip repositioning surgery.



Figure 4 Immediate postoperative appearance after primary wound closure with continuous locking sutures.

periosteal stabilization techniques, were not considered necessary because the patient's clinical presentation was considered suitable for the conventional approach.

A partial-thickness horizontal incision was made with a No. 15 scalpel blade at the level of the mucogingival junction, extending from the right maxillary first premolar to the left maxillary first premolar. A second parallel partial-thickness incision was created approximately 8–10 mm apical to the first incision within the labial mucosa. The two horizontal incisions were then connected bilaterally with elliptical incisions, creating an elliptical surgical outline (Figure 2).

This incision design allowed adequate reduction of the vestibular depth while preserving the underlying connective tissue, thereby facilitating coronal repositioning of the upper lip with minimal surgical trauma.

The epithelial strip between the two incisions was carefully excised while preserving the underlying connective tissue (Figure 3). Following meticulous hemostasis, the wound margins were approximated using 5-0 absorbable monofilament continuous locking sutures, thereby repositioning the upper lip in a more coronal position and limiting its superior displacement during smiling (Figure 4).

A conventional maxillary labial frenectomy was performed during the same surgical session using a No. 15 scalpel blade to eliminate the high frenal attachment and facilitate passive adaptation of the repositioned lip during the healing phase. The total surgical time was approximately 60 minutes.

Postoperatively, the patient was prescribed amoxicillin/clavulanic acid (1 g), etodolac (400 mg), and benzydamine hydrochloride mouthwash. Cold compresses were recommended during the first 24 hours to minimize postoperative swelling. The patient was also instructed to avoid exaggerated

smiling, excessive lip movement, and prolonged speaking for one week in order to reduce tension at the surgical site and promote uneventful wound healing.

The patient was evaluated 14 days after surgery. Healing was uneventful, and the exposed portions of the absorbable monofilament sutures that had not yet resorbed were removed. No signs of infection, wound dehiscence, excessive scarring, or other postoperative complications were observed.

The surgical technique was designed to preserve the underlying connective tissue while reducing the depth of the maxillary vestibule and limiting excessive superior movement of the upper lip during smiling. Preservation of the connective tissue was considered essential for maintaining tissue integrity and promoting favorable healing, whereas vestibular shortening was intended to reduce upper lip mobility and consequently decrease gingival exposure during smiling. The concomitant frenectomy was performed to eliminate the restrictive influence of the maxillary labial frenum and enhance passive adaptation of the repositioned lip during the healing process.

To ensure consistent clinical documentation, standardized photographs were obtained preoperatively, immediately after surgery, before suture removal (14 days), at the 2-month, 9-month, and at the 18-month follow-up using comparable patient positioning and smile



Figure 5 Early postoperative healing following suture removal.



Figure 6 Clinical outcome at the 2-month follow-up demonstrating reduced gingival display.

reproduction whenever possible. These serial photographs facilitated qualitative assessment of postoperative healing, smile esthetics, and long-term treatment stability.

Clinical outcomes and follow-up

The immediate postoperative period was uneventful. No excessive bleeding, hematoma formation, infection, wound dehiscence, or other postoperative complications were observed. Mild postoperative edema developed during the first few days and resolved spontaneously without additional intervention.

Clinical evaluation performed 14 days after surgery demonstrated satisfactory soft tissue healing. The surgical site showed appropriate tissue adaptation without signs of infection or delayed wound healing. Clinical photographs obtained before suture removal confirmed favorable healing and satisfactory early postoperative tissue appearance (Figure 5).

At the 2-month follow-up, complete soft tissue healing had been achieved. During full smiling, the gingival margins of the maxillary central incisors were completely covered by the upper lip, resulting in complete elimination of the preoperative excessive gingival display. The patient reported a marked improvement in smile esthetics and expressed a high level of satisfaction with the treatment outcome. No functional limitations related to smiling, speech, or lip mobility were observed (Figure 6).

At the 9-month follow-up, approximately 2 mm of gingival display was observed during full smiling, indicating a mild partial relapse compared with the 2-month evaluation. Nevertheless, gingival exposure remained substantially lower than the preoperative value of 5 mm, and the patient continued to report satisfaction with the esthetic outcome. No postoperative complications or functional impairment were detected (Figure 7).

At the 15-month follow-up, the patient underwent conservative porcelain laminate veneer restorations on the maxillary central incisors to address pre-existing minor tooth shape disharmony and further optimize the micro-esthetics of her smile. This restorative procedure did not alter the measured vertical gingival display or influence the assessment of treatment outcomes, as gingival display was evaluated based on the vertical relationship between the upper lip and the gingival margin during smiling. Although the veneer restorations may have contributed to the patient's overall smile esthetics and satisfaction, they did not affect the clinical evaluation of gingival display or the assessment of the stability of the lip repositioning procedure. Clinical findings at the 18-month follow-up were comparable to those observed at the 9-month evaluation. Approximately 2 mm of gingival display was maintained, with no evidence of additional relapse or deterioration of the esthetic outcome. The patient remained satisfied with her smile and did not request any further treatment (Figure 8).

Throughout the entire follow-up period, no infection, hypertrophic scar formation, sensory disturbances, or impairment of upper lip function was observed. Serial standardized clinical photographs obtained preoperatively, immediately after surgery, before suture removal (14 days), and at the 2-, 9-, and 18-month follow-up visits demonstrated favorable wound healing, sustained esthetic improvement, and



Figure 7 Clinical outcome at the 9-month follow-up demonstrating stable postoperative results.



Figure 8 Clinical outcome at the 18-month follow-up demonstrating long-term stability of the esthetic outcome (the patient underwent porcelain laminate veneer restoration of the maxillary central incisors during the follow-up period).

stabilization of the postoperative result after the initial mild relapse (Table 1).

Discussion

Excessive Gingival Display (EGD), commonly referred to as a gummy smile, is a multifactorial esthetic condition that may result from altered passive eruption, vertical maxillary excess, dentoalveolar extrusion, a short upper lip, or hyperactivity of the upper lip elevator muscles. Since each etiologic factor requires a different therapeutic approach, accurate diagnosis is essential for selecting the most appropriate treatment modality. Recent systematic reviews have emphasized that individualized treatment planning based on the underlying etiology results in more predictable esthetic outcomes

than a standardized therapeutic approach [2,6].

In the present case, the patient exhibited normal clinical crown dimensions and healthy periodontal tissues, excluding altered passive eruption as the primary etiologic factor. Likewise, no clinical findings suggested vertical maxillary excess or dentoalveolar extrusion. Therefore, esthetic crown lengthening was not indicated, and the excessive gingival display was attributed mainly to upper lip hypermobility. Based on these findings, lip repositioning surgery was selected because it directly addressed the underlying cause while avoiding more invasive treatment alternatives [7].

Lip repositioning surgery has become an increasingly accepted treatment option because it is less invasive than orthognathic surgery and provides longer-lasting results than botulinum toxin injections. Nevertheless, relapse remains one of the major concerns associated with this procedure. Several systematic reviews have demonstrated that although gingival display is significantly reduced after surgery, the amount of relapse varies considerably depending on patient selection, surgical technique, muscle activity, tissue elasticity, and follow-up duration [5,6].

In the present case, gingival display was reduced from 5 mm preoperatively to complete elimination at the 2-month follow-up. Mild partial relapse (2 mm) became evident at the 9-month evaluation but remained unchanged at the 18-month follow-up.

Table 2 summarizes the findings of previously published clinical reports together with the present case. Although favorable esthetic outcomes have been consistently reported following lip repositioning surgery, considerable variability exists regarding follow-up duration, relapse rates, and surgical modifications. Most published case reports include follow-up periods of 6–12 months, whereas studies with longer observation

TABLE 1: CLINICAL OUTCOMES DURING THE FOLLOW-UP PERIOD.

TIME POINT	Gingival display	Clinical findings	Patient satisfaction
PREOPERATIVE	5 mm	Hyperactive upper lip	Unsatisfied
IMMEDIATE POSTOPERATIVE	0 mm*	Mild edema	—
14 DAYS	Healing phase	Uneventful healing	Satisfied
2 MONTHS	0 mm	Complete elimination of gingival display	Very satisfied
9 MONTHS	2 mm	Mild partial relapse	Satisfied
18 MONTHS	2 mm	Stable clinical outcome; no further relapse	Satisfied

periods remain limited. In comparison, the present case provides an 18-month follow-up with serial clinical documentation, enabling a more comprehensive assessment of long-term treatment stability (Table 2).

As shown in table 2, mild relapse has been reported even in successfully treated patients, particularly following conventional lip repositioning techniques. In the present case, a mild partial relapse became evident at the 9-month follow-up; however, no additional increase in gingival display was observed at the 18-month evaluation. This finding suggests that postoperative tissue remodeling may reach a relatively stable phase after the initial healing period, allowing maintenance of the achieved esthetic improvement. Similar observations have been reported in previous studies, in which relapse was generally attributed to scar remodeling, soft-tissue elasticity, and persistent activity of the upper lip elevator muscles. More recently, modified surgical approaches incorporating periosteal stabilization sutures, muscle containment, or myotomy have been proposed to improve long-term stability. Nevertheless, current evidence remains insufficient to establish the superiority of any specific modification over conventional lip repositioning surgery [3,18].

Conventional lip repositioning surgery offers several advantages, including technical simplicity, reduced surgical time, lower morbidity, and satisfactory esthetic outcomes in appropriately selected patients [3,18]. However,

because it does not directly address the activity of the upper lip elevator muscles, a certain degree of postoperative relapse may occur over time. Modified techniques, such as periosteal stabilization sutures, muscle containment, or myotomy, have been proposed to improve long-term stability by reducing lip mobility. Nevertheless, these approaches are generally more surgically demanding and may increase operative complexity. Moreover, current evidence remains limited and heterogeneous, and no modified technique has been conclusively demonstrated to provide superior long-term outcomes compared with the conventional approach [3,18].

An additional feature of the present case was the simultaneous performance of a maxillary labial frenectomy. Although evidence regarding the influence of frenectomy on the long-term stability of lip repositioning surgery remains limited, elimination of a prominent labial frenum may reduce tension across the surgical site and facilitate passive adaptation of the repositioned upper lip during healing. Nevertheless, the contribution of this combined approach to minimizing postoperative relapse has not yet been established and should be investigated in well-designed prospective controlled clinical studies.

One of the major strengths of the present report is the relatively long follow-up period of 18 months, accompanied by serial standardized clinical documentation obtained preoperatively, immediately after surgery, before suture



TABLE 2: COMPARISON OF SELECTED CLINICAL REPORTS AND STUDIES ON LIP REPOSITIONING SURGERY.

STUDY	Design / Sample	Surgical approach	Baseline gingival display	Follow-up	Final outcome / relapse
Silva. et al. [8]	Case series, 2 patients	Modified lip repositioning with preservation of the midline frenum	NR	6 months	Gingival display was reduced to approximately 1 mm; patients reported esthetic satisfaction.
Dayakar, et al. [9]	Case report, 1 patient	Conventional partial-thickness lip repositioning	NR	6 months	Clinically satisfactory reduction was maintained; no major postoperative complication was reported.
Jananni, et al. [10]	Case report, 1 patient	Mucosal-strip lip repositioning for Class I vertical maxillary excess	NR	18 months	The authors reported stable clinical results without adverse events throughout follow-up.
Rao, et al. [11]	Case report, 1 patient	Modified lip repositioning with preservation of the labial frenum	NR	6 months	Marked reduction in gingival display and satisfactory smile esthetics were reported.
Ambrosio, et al. [12]	Case report, identical twins	Lip repositioning with long-term stabilization sutures	NR	12 months	The technique was designed to reduce the risk of relapse; the article notes that conventional approaches may show minor relapse at 6 months and potentially complete relapse by 12 months.
Martinez-martinez, et al. [13]	Case report, 1 patient	Diode-laser-assisted LipStaT® technique	4 mm	12 months	Reduced gingival exposure and satisfactory clinical stability were reported during follow-up.
Saleem, et al. [14]	Two case reports	Unified lip repositioning technique for short upper lip	NR	18 months	Long-term clinical photographs demonstrated maintenance of the corrected lip position and esthetic improvement.



Aljasser [15]	Randomized clinical trial	Conventional LipStaT® versus modified technique with periosteal stabilization sutures	Patient-level values varied	12 months	Both techniques reduced gingival display; the periosteal-suture modification produced significantly lower gingival display and less relapse than the conventional technique.
Arruda, et al. [16]	Case report, 1 patient	Modified lip repositioning using deep horizontal mattress sutures	5 mm	6 months	Gingival display decreased to approximately 1.5 mm at 1 month and remained reduced at 6 months; the patient was satisfied.
Angulo-manzaneque, et al. [17]	Cohort study	Lip repositioning surgery	Mean values reported for the cohort	12 months	Mean initial reduction was approximately 2.5 mm; about 40% of the original exposure returned by 6 months, and complete recovery toward baseline was observed at 12 months, although satisfaction remained high.
Present Case	Case report, 1 patient	Conventional lip repositioning combined with maxillary labial frenectomy	5 mm	18 months	0 mm at 2 months; 2 mm gingival display at 18 months, corresponding to mild partial relapse. Esthetic improvement and patient satisfaction were maintained.

removal, and at the 2-, 9-, and 18-month follow-up visits. These sequential clinical records enabled comprehensive evaluation of wound healing, esthetic outcomes, and the progression of postoperative relapse over time. Notably, although mild relapse became evident at the 9-month follow-up, no further increase in gingival display was observed at the 18-month evaluation, suggesting stabilization of the

postoperative result after the initial healing and remodeling phase. Furthermore, comparison with previously published reports demonstrated that the clinical outcome of the present case is consistent with the current evidence supporting lip repositioning surgery as a predictable treatment option for carefully selected patients with hyperactive upper lip–associated excessive gingival display.

An additional consideration in the present case is that porcelain laminate veneer restorations were placed on the maxillary central incisors at the 15-month follow-up to improve tooth morphology. Although these restorations may have enhanced the patient's overall smile esthetics and satisfaction, they did not influence the clinical assessment of the lip repositioning procedure, because treatment outcomes were evaluated according to gingival display and the relationship between the upper lip and the gingival margin during smiling. Therefore, the postoperative stability observed at the 18-month follow-up and the mild relapse documented after surgery were considered to reflect the outcome of the surgical procedure rather than the restorative intervention.

Although this report describes a single patient, it contributes to the limited body of evidence regarding the long-term outcomes of conventional lip repositioning surgery combined with maxillary labial frenectomy. The 18-month follow-up with serial clinical documentation provides valuable information on postoperative stability and the pattern of relapse, supporting the clinical applicability of this conservative approach in carefully selected patients with hyperactive upper lip–associated excessive gingival display.

Despite these favorable outcomes, several limitations should be acknowledged. First, this report describes the clinical outcome of a single patient and therefore cannot establish treatment predictability or allow generalization of the findings. In addition, objective digital smile analysis, electromyographic assessment of upper lip muscle activity, and validated patient-reported outcome measures were not performed. Therefore, larger prospective controlled clinical studies with standardized outcome assessment methods and extended follow-up are required to confirm the long-term effectiveness, stability, and reproducibility of conventional lip repositioning surgery performed with or without maxillary labial frenectomy.

References

1. Younespour S, Yaghobee S, Aslroosta H, Moslemi N, Pourheydar E, Ghafary ES. Effectiveness of different modalities of lip repositioning surgery for management of patients complaining of excessive gingival display: A systematic review and meta-analysis. *Biomed Res Int.* 2021;2021:9476013.
2. Inchingolo AD, Inchingolo AM, Viapiano F, Netti A, Ciocia AM, Ferrara I, et al. Effectiveness and personalized approaches in the correction of gummy smile: A systematic review of orthodontic and surgical treatments. *J Clin Med.* 2024;13(22):7002.
3. Ardakani MT, Moscowchi A, Valian NK, Zakerzadeh E. Lip repositioning with or without myotomy: A systematic review. *J Korean Assoc Oral Maxillofac Surg.* 2021;47(1):3-11.
4. Mendoza-Geng A, Gonzales-Medina K, Meza-Mauricio J, Muniz FWMG, Vergara-Buenaventura A. Clinical efficacy of lip repositioning technique and its modifications for the treatment of gummy smile: Systematic review and meta-analysis. *Clin Oral Investig.* 2022;26(6):4243-61.
5. Siano M, Costa R, Relvas M, Vinhas AS, Reis C, Cabral C. Gummy smile: Comparison between botulinum toxin, lip repositioning surgery and combined techniques in cases of lip hypermobility-a systematic review. *Oral.* 2026;6(2):49.
6. Salihu B, Agani Z, Demiri AS. Lip repositioning surgery: A simple smile and life transformation procedure. *Case Rep Dent.* 2024;2024:6156806.
7. Adel N. Modified lip repositioning surgery with and without dual-layered suturing for treatment of gummy smile patients. *Plast Reconstr Surg Glob Open.* 2024;12(1):e5521.
8. Ribeiro-Júnior NV, de Souza Campos TV, Rodrigues JG, Martins TMA, Silva CO. Treatment of excessive gingival display using a modified lip repositioning technique. *Int J Periodontics Restorative Dent.* 2013;33(3):309-15.
9. Dayakar MM, Gupta S, Shivananda H. Lip repositioning: An alternative cosmetic treatment for gummy smile. *J Indian Soc Periodontol.* 2014;18(4):520-3.
10. Jananni M. Surgical correction of excessive gingival display in Class I vertical maxillary excess: Mucosal strip technique. *J Nat Sci Biol Med.* 2014;5(2):494-8.
11. Rao AG, Koganti VP, Prabhakar AK, Soni S. Modified lip repositioning: A surgical approach to treat the gummy smile. *J Indian Soc Periodontol.* 2015;19(3):356-9.



12. Ambrosio F, Gadalla H, Kapoor N, Neely AL, Kinaia BM. Surgical lip repositioning procedure to correct excessive gingival display: A case report of identical twins. *Compend Contin Educ Dent*. 2018;39(7):e9-e13.
13. Martinez-Martinez A, Molinares-Villa C, Diaz-Caballero A. Use of diode laser for lip repositioning, evolution of the conventional technique: A case report. *Niger J Clin Pract*. 2022;25(1):110-3.
14. Saleem R, Kukreja BJ, Goyal M, Kumar M. Treating short upper lip with unified lip repositioning technique: Two case reports. *J Indian Soc Periodontol*. 2022;26(1):89-93.
15. Inchingolo F, Li C, Chen C, Aljasser RN, et al. A modified approach in lip repositioning surgery for excessive gingival display to minimize post-surgical relapse: A randomized controlled clinical trial. *Diagnostics (Basel)*. 2023;13(4):716.
16. Arruda CAS, Sousa FP, Alves RC. Modified lip repositioning surgery in the treatment of gummy smile. *Appl Sci*. 2024;14(13):5580.
17. Angulo-Manzaneque G, Baus-Domínguez M, Ruiz-de-León-Hernández G, Serrera-Figallo MÁ, Torres-Lagares D, Aguilera FS. Evaluation of a new technique of gingival smile reduction after hyaluronic acid infiltration: A cohort study focusing on gingival exposure and patient-oriented outcomes. *Dent J (Basel)*. 2024;12(10):329.
18. Tatakis DN. Lip repositioning techniques and modifications. *Dent Clin North Am*. 2022;66(3):373-84.