

# REPOSICIONAMIENTO LABIAL PARA EL TRATAMIENTO DE LA SONRISA GINGIVAL. REVISIÓN DE LA LITERATURA

## LABIAL REPOSITIONING FOR THE TREATMENT OF THE GUMMY SMILE. A REVIEW OF THE LITERATURE

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### RESUMEN

Los pacientes de hoy exigen una sonrisa atractiva o agradable que no sea motivo de vergüenza al expresarla. Actualmente, las personas le dan gran importancia a la belleza física, ya que es el reflejo de la identidad propia. Diferentes factores afectan la sonrisa y la estética, incluido el color, la forma y la posición del diente, especialmente los dientes anteriores. La sonrisa gingival excesiva es considerada dentro de la clasificación de la Academia Americana de Periodoncia (AAP) como una condición clínica en la que la encía está expuesta (> 2 mm) cuando se sonríe.

La manifestación de la sonrisa gingival tiene diferentes etiologías, entre ellas los factores dentales, esqueléticos, de tejidos blandos y la combinación de ellos. Para su manejo, se debe establecer un buen diagnóstico y etiología a fin de determinar la mejor opción de tratamiento entre las diversas técnicas descritas en la literatura.

La técnica de reposicionamiento labial parece ser una buena alternativa, ya que el tratamiento ha demostrado resultados estables. Se logra cuando se retira una tira de mucosa del labial maxilar y luego se sutura la mucosa labial a la línea mucogingival. Es menos traumática, con pocas complicaciones posoperatorias y recuperación rápida, por lo cual logra satisfacer los requerimientos estéticos del paciente.

El objetivo principal de este artículo es conocer las consideraciones actuales para la técnica de reposicionamiento labial utilizada como tratamiento de la sonrisa gingival y analizar el resultado que genera en pacientes que sufren un cambio para mejorar su estética y autoestima.

**Palabras clave:** sonrisa gingival, técnica de reposicionamiento labial, exceso de encía

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## ABSTRACT

Patients today demand an attractive or pleasant smile that is not a cause of shame. Nowadays, people give great importance to physical beauty as it is the reflection of one's identity. Different factors can affect smiling and aesthetics, including the color, shape and position of the teeth, especially the anterior teeth. The Classification of the American Academy of Periodontics (AAP) describes an excessive gingival smile as a clinical condition in which the gum is exposed (or 2mm) when smiling.

The etiology of a gingival smile involves many factors, including dental, skeletal, and soft tissue factors and a combination of the three. To achieve adequate management of a gingival smile, the diagnosis and etiology of the condition should be established in order to determine the best treatment option from among the various techniques described in the literature.

The main objective of this article is to describe the lip repositioning technique for the treatment of the gingival smile and analyze the results in patients who undergo this procedure to improve their aesthetics and self-esteem.

The lip repositioning technique seems to be a good alternative as stable results have been reported. The procedure involves the removal of a strip of mucosa from the maxillary oral lobe and suturing of the lip mucosa to the mucogingival line. This technique induces less trauma, few postoperative complications and rapid recovery, and fulfills the aesthetic requirements of the patient.

**Keywords:** Gummy smile, technique of labial repositioning, excess gingival display

## INTRODUCTION

Smiling is a common expression in human beings. [1] Nowadays, people give great importance to physical beauty. [2,3] In one study, Tjan and Miller [1,4] divided the smile line into three types. The diagnosis of gingival excess also known as the "gummy smile" [5,6] is described in the Periodontogram classification. [7-10]

Peck *et al.* [11] also described the gingival smile as exposing the gum over the upper central incisors during a broad smile. A gummy smile is considered when gum exposure is greater than 2 mm. [12-14]

The etiology of the gummy smile involves extraoral and intraoral factors such as dental, skeletal, and soft tissues or a combination of the three. [15-18] At present, lip repositioning is the most appropriate procedure for lessening gum exposure, providing satisfactory results for patients. [19,20] The most ideal occlusion should be the functional objective of dentists, but the aesthetic results are also critical to fulfill patient expectations [21,22] Treatment of the gummy smile may be challenging and often requires complex approaches. [18,20]

## MATERIAL AND METHODS

The electronic search for information was carried out using the health databases: Medline, Pubmed, SciELO using the following descriptors: MeSH: Medical Subject Headings: "Gummy Smile" or "Lip Repositioning Technique" and "Excess Gingival Display".

Studies in the English language, preferably published in the previous 5 years and containing photographs were taken into account and included research articles, pilot studies, controlled randomized studies and case reports. The number of

participants, without limitations in terms of age, gender or race were also considered. With regard to the type of intervention, we focused on studies describing the labial repositioning technique, including a total of 51 articles.

## ETIOLOGICAL FACTORS OF THE GUMMY SMILE

A gingival smile is considered when there is gingival exposure greater than 2 mm, and it is classified in 3 degrees according to the exposure of its defect. [12-14] The causes of the gingival smile, can be intraoral as extraoral, is associated with different etiologies [15-18] vertical maxillary excess, anterior dentoalveolar extrusion, altered passive rash, short or hyperactive upper lip, or their combinations, are between the possible causes. [23] The causes of the gingival smile may be intraoral or extraoral and are associated with different etiologies [15-18] including vertical maxillary excess, anterior dentoalveolar extrusion, altered passive eruption, short or hyperactive upper lip, or combinations of these etiologies. [23]

- **Vertical maxillary excess:** is the result of skeletal dysplasia, such as a hyperplastic growth of the skeletal base of the maxilla, resulting in teeth located farther from the skeletal base of the maxilla and a gingival excess below the edge of the lower lip. [23]
- **Altered Passive Eruption:** The concept of passive eruption was first introduced by Coslet *et al.* [24] This occurs when the gingival tissue does not migrate apically until it is positioned near the cemento-enamel junction. The tooth eruption process consists of two phases: active and passive eruption.

The process of active eruption occurs when the tooth emerges in the oral cavity, moving in the occlusal direction as the tooth erupts from its osseous crypt

until it makes contact with the opposing tooth. This action can be divided into two phases: active prefucional and functional eruption [25].

In contrast, the process of passive eruption involves the migration of apical soft tissue that covers the crown of the tooth. This is divided into four phases depending on the willingness of the European Dent-gingival [25,26].

Possible treatment options include gingivectomy, apical flap plus respective bone surgery, and in cases with excessive growth of the maxillary process, a multidisciplinary treatment plan is usually required including prosthetics, orthodontics and periodontal surgery. [27,28]

- **Anterior dentoalveolar extrusion:** This involves the compensatory eruption of the maxillary teeth with frontal migration caused by a deep bite. It is possible to correct orthodontically for intrusion and resection surgery may also be performed [23,29].
- **Short or hyperactive upper lip:** This is when the upper lip moves in an apical direction greater than 8 mm and exposes the teeth and excess gum. Surgical repositioning of the lip can be used to reduce and minimize gingival visualization. [29,30]

## DEVELOPMENT OF THE LIP REPOSITIONING TECHNIQUE

Several characteristics must first be analyzed, including the symmetry of the lips and face when smiling, gum exposure, the level of gingival margins; alignment of the gingival margins (size of teeth and proportions) and smile line to determine the most adequate treatment to perform. [31,32]

For the correction of the gummy smile have used various approaches to treatment, with results highly variable. Different approaches have been used to correct the gummy smile with highly variable results. [5] Lip repositioning is an innovative technique for gingival smile correction, [33] Rubinstein and Kostianovsky first described this procedure in 1973. [17, 34] Numerous modifications have been made since then, including the preservation of the maxillary lip brace, reducing morbidity. [35] Detachment of the lip muscles was described by Litton & Fournier in 1979 [36], and myotomy and partial lip removal reported by Miskinyar in 1983 [37] and Ishida *et al.* in 2010 [38] found that longer upper lip length could be gained with myotomy and frenectomy.

Other treatment approaches such as the use of botulinum toxin [39] and lip elongation associated with rhinoplasty [40, 23] have also been described.

Lip repositioning surgery involves removing a strip of mucosa from the maxillary vestibule and suturing the mucosa of the lip to the mucogingival line with a partial thickness flap. [5, 23]

## PRE-SURGERY INSTRUCTIONS

- a. The following measurements are made: the length of the upper lip (from the nasal base to the upper edge of the vermilion of the upper lip); b. The upper lip vermilion length, and c. gingival excess (from the lower edge of the vermilion of the upper lip with the gingival margin of the central incisor). Figures 1-3.

## SURGICAL PROCEDURE

Extra- and intraoral oral disinfection is performed followed by infiltration with local anesthesia. Subsequently, the surgical area to be operated is marked with an indelible pen. [41, 42]



FIGURE. 1 THE LENGTH OF THE UPPER LIP (FROM THE NASAL BASE TO THE UPPER EDGE OF THE VERMILION OF THE UPPER LIP) WILL BE MEASURED.

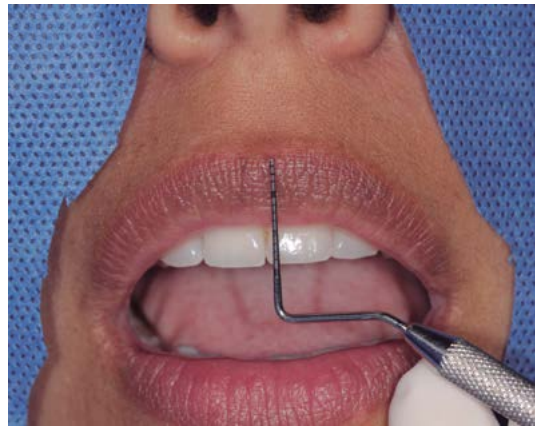


FIGURE. 2 THE UPPER LIP VERMILION LENGTH.



FIGURE. 3 GINGIVAL EXCESS (FROM THE LOWER EDGE OF THE VERMILION OF THE UPPER LIP WITH THE GINGIVAL MARGIN OF THE CENTRAL INCISOR).



The surgical area begins at the muco-gingival junction that extends 10-12 mm above the vestibule. The incisions and the partial thickness flap are made from the first right upper molar to the first upper left molar. The incisions are then joined and the epithelium is removed. [43,44] Figures 4 - 5.



**FIGURE. 4** THE INCISIONS AND THE PARTIAL THICKNESS FLAP ARE MADE FROM THE FIRST RIGHT UPPER MOLAR TO THE FIRST UPPER LEFT MOLAR.



**FIGURE. 5** THE INCISIONS ARE JOINED AND THEN THE EPITHELIUM IS REMOVED.

Parallel incision lines are made with interrupted stabilization sutures in the midline and along the edges of the incision to ensure proper alignment of the midline of the lip with the midline of the teeth. [41, 42] Figure 6.



**FIGURE. 6** PARALLEL INCISION LINES WERE APPROACHED WITH INTERRUPTED STABILIZATION SUTURES IN THE MIDLINE AND ALONG THE EDGES OF THE INCISION TO ENSURE PROPER ALIGNMENT OF THE MIDLINE OF THE LIP WITH THE MIDLINE OF THE TEETH.

## POST SURGERY INSTRUCTIONS

Analgesia with ibuprofen 400 mg every 8 hours as needed and 0.12% chlorhexidine gluconate (gentle rinse in the surgical area twice daily for 2 weeks) is administered. The patient should be instructed to apply ice packs at 20-minute intervals for 24 hours and have a soft diet during the first postoperative week. Oral hygiene can be reinstated after 48 hours. Additional instructions include avoiding any mechanical manipulation or trauma from surgery and minimizing lip movements when smiling or speaking during the first 2 weeks following surgery. [44-45]

## RESULTS OF LABIAL REPOSITIONING SURGERY

Lip repositioning surgery is presented as a less invasive procedure as an alternative to orthognathic surgery. Lip repositioning surgery is an alternative to orthognathic surgery due to its reduced invasiveness. It is important to determine the etiology of the gingival smile. The following factors should be evaluated: The length and width of the teeth, the hypermobility of the upper lip, the amount of gingival excess and if the patient refuses orthognathic surgery. To evaluate the most adequate approach to modifying excess gingival

display, it is important to determine the etiology of the gingival smile evaluating factors such as the length and width of the teeth, the hypermobility of the upper lip, the amount of gingival excess as well as whether the patient provides consent to undergo orthognathic surgery. [46]

The demand for aesthetics has significantly increased in the search for an ideal smile. Creating the perfect smile is a complex process that requires a multidisciplinary approach, and lip repositioning offers a comparatively simple solution to this problem. [47]

Silva *et al.* [5] described the results achieved at 6 months after performing a modified lip repositioning technique which preserved the labial frenulum compared to baseline, with a reduction of 4.7 mm at 3 months and 4.5 mm at six months. Ishida *et al.* [38] described a surgical technique involving myotomy, resulting in a mean gingival reduction of 3.31 mm at six months and concluded that this technique was effective in reducing the amount of gum exposed during smiling. Despite the short follow-up of these two studies (6 months), the reduction in gum exposure was significant. [48] In both studies, one of the inclusion criterion was that the patient should not present vertical maxillary excess / altered passive eruption.

In 2017, Omnia *et al.* [49] performed a randomized clinical trial to evaluate the lip repositioning technique to determine the efficacy and the resulting stability, concluding that lip repositioning was an effective method. However, compared to the classical technique, muscle separation provides a more stable result at 12 months. Nonetheless, more studies are needed to fully evaluate this procedure.

Lip repositioning can be used as an alternative treatment modality with minimal risk or side effects. To date, three case

reports with a follow-up of 2 years have described an improvement in the aesthetics of smiling in patients following multi-disciplinary treatments (orthodontics and periodontics) demonstrating the predictability of the technique. [50]

In certain cases this procedure can be used as an easier and less complicated alternative to the main surgical methods, providing satisfactory and pleasant effects with less morbidity. The case report below describes the preparatory process and surgical steps carried out in a patient in whom satisfactory results were achieved and have remained stable for 4 years. Although the literature on this subject is limited, statistical analysis of the studies collected shows that an estimated average improvement of 3.4 mm can be achieved. [47,49]

## CASE REPORT

A 30-year-old female attended the Specialty Clinic in Periodontics of the Científica del Sur University because of her dissatisfaction with her smile with excessive gum display. Figure 7.



FIGURE. 7 GINGIVAL EXCESS

The lip repositioning technique was suggested to remove and soften excess gum. The first follow-up visit following surgery was performed at 30 days, showing an improvement in excess gum

display. Figure 8 This aesthetic result was maintained at a follow-up visit at 5 years. Figure 9.



FIGURE. 8 THE FIRST CONTROL OF THE SURGERY WAS PERFORMED AT 30 DAYS.



FIGURE. 9 RESULT WAS MAINTAINED DURING A FOLLOW-UP OF 5 YEARS

## CONCLUSIONS

- Lip repositioning is an effective procedure to reduce excess gingival display, placing the upper lip in a more coronal location.
- It is a good treatment alternative to improve the gingival smile, provided that adequate presurgical evaluation is made. This procedure is less traumatic, with few postoperative complications and patient recovery is rapid, successfully fulfilling the aesthetic requirements of the patient.
- The long-term stability of the results remains to be determined, but it is a promising alternative modality of treatment in aesthetic rehabilitation.
- Although the literature on this subject is limited, statistical analysis of the studies collected shows that an estimated average improvement of 3.4 mm can be achieved.

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