

# Periodontal esthetic surgery to improve a natural smile: Report case with 2-year follow-up

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## Abstract

The objective in this case report is to present a correction of excessive gingival exposure performed through periodontal esthetic surgery, using clinical crown lengthening and lip repositioning. The patient reported discomfort when smiling due to excessive gingival exposure, and clinical and photographic examinations of the patient showed vertical maxillary growth as the main diagnosis. In the digital smile design, the possibility of crown lengthening observed for teeth – upper left and right central incisors and upper left lateral incisor. A lip-repositioning procedure was also planned. An incision was performed at the mucogingival junction, and a parallel incision was realized at the top of the alveolar mucosa. Afterward, the incised gingival band was removed through vertical incisions in the planned border area. The muscular area was preserved. A simple suture was made, with the approach of the gingival margins around the surgical area. The crown-lengthening procedure was performed with the flapless technique. After 2-year follow-up, the periodontal esthetic surgery, comprising crown lengthening and lip repositioning, was noninvasive and can thus serve as an interesting alternative treatment for excessive exposure of the gingival smile, as it results in a harmonious and natural smile.

**Key words:** Crown lengthening, esthetic, oral surgery, oral surgical procedure, periodontic

## INTRODUCTION

The smile is an important component in social interaction and bodily expression, and it is one of the key factors in a first impression.[1] A disharmony in the smile can negatively affect the quality of life and cause psychological discomfort as well as functional and social disadvantage. [2] To achieve esthetic facial appearance, the lips, teeth, and gums must be in harmony, presenting proportional and balanced shapes.[3] Excessive exposure of the gums can interfere with the esthetics of the smile.[4]

In smile, a relationship must be established between the esthetics (color, shape, position, and symmetry) of the white parts of the smile (the dental elements) and the red parts (the gingiva, mucosa, and lips).[1,5] Excessive gingival exposure affects periodontal health, and it is one of several developmental or acquired deformities that can directly interfere with the esthetics of the smile. This excessive exposure affects approximately 10% of the population between the ages of 20 and 30, and it is prevalent in women within this age group.[1,6,7]

The etiologies related to excessive gingival exposure are altered passive eruption, anterior tooth extrusion, vertical maxillary excess, short and hyperactive upper lip, or a combination of these factors.[8] It is fundamental to know these etiologies, as the correct etiological identification is essential for the establishment of a structured and adequate treatment plan for each case.[9] For the correction of cases in which the patient presents with an altered passive eruption, a periodontal surgical intervention is required; this can include gingivectomy or crown lengthening, with or without bone resection.[10,11] For a tooth extrusion, orthodontic intrusion is usually indicated, and for a maxillary vertical excess, orthognathic surgery is typically performed.[12,13] In the treatment of excessive gingival exposure due to a hyperactive upper lip, various techniques and treatment approaches are used; the correct diagnosis leads to the most appropriate technique for each case.[14] For the treatment of hyperactivity in the upper lip, botulinum toxin injection may be a palliative solution, although this has a short time of effectiveness and requires other interventions.[15] Others treatment may be used, kind of, upper-lip stretching combined with rhinoplasty,[16] and lip repositioning are treatment alternatives.[14,17,18,19]

Plastic surgeons first described the technique of lip repositioning,[20] and the technique was later adapted for use in dentistry.[5,18] The diagnosis for lip repositioning consists of identifying the type of labial line, which is classified as low when only the incisal line is visible below the upper lip, medium when there is exposure of 1–3 mm of marginal gingiva during the smile, and high when more than 3 mm of marginal gingiva is exposed during the smile. In cases classified as having high labial lines, the use of the lip-repositioning technique is indicated.[1,21] The facial thirds should also be evaluated for proportionality. Cases in which the lower third is greater than the middle and upper thirds can be indicative of a bone discrepancy. Finally, it is important to measure the upper lip. Extending from the nasal base to the upper border of the vermilion of the upper lip is the linear horizontal form, whose continuity across the gingival extension, the teeth, and the upper lip is a parameter of harmony in a smile.[9,8,22] The technique of repositioning the upper lip comprises the removal of a small strip of the maxillary alveolar mucosa and the suture of the labial mucosa along the incision line next to the mucogingival junction.[5,20] The objective in this case report is to present a correction of excessive gingival exposure, which after correct diagnosis and planning was conducted through the technique of lip repositioning.

## CASE REPORT

This case report was written following the CARE guidelines.[23] The female patient, 22 years old, Brazilian, Caucasian, reported discomfort when smiling due to excessive gingival exposure [Figures 1 and 2]. Clinical and photographic examinations of the patient showed vertical

maxillary growth as the main diagnosis of excessive gingival exposure. When analyzing the digital smile design [Figure 3], the possibility of crown lengthening in elements – upper left and right central incisors and upper left lateral incisor – was observed, due to minimally altered passive eruption in these elements. A lip-repositioning procedure was planned [Figure 3] for the region of the esthetic area until region at second premolars. The patient was informed of the procedures and gave her consent authorizing the use of her images and other clinical information to be reported.



Figure 1

Initial appearance showing vertical maxillary growth as the main diagnosis of excessive gingival exposure from (a) the front distant view and (b) the approximate view



Figure 2

Initial appearance showing vertical maxillary growth as the main diagnosis of excessive gingival exposure from (a) the right view and (b) the left view



Figure 3

Planning (a) digital smile design showing an indication of crown lengthening for teeth – upper left and right central incisors and upper left lateral incisor, due to minimally altered passive eruption in these elements and (b) for lip-repositioning ...

The lip repositioning was performed after anesthesia through blockage of the regional infraorbital nerve using the anesthetic mepivacaine hydrochloride 36 mg (2%) combined with epinephrine 1:100,000 (DFL Ind. E Com. Ltda., Rio de Janeiro, Brazil). After anesthesia, an incision was performed at the mucogingival junction [Figure 4], and another parallel incision was realized at the top of the alveolar mucosa. Afterward, the incised gingival band was removed with vertical incisions in the planned border area (upper right and left second premolars). The muscular area was preserved. After this procedure, a simple suture was made with nylon 5.0 (Ethicon, Somerville, United States) suture wire to connect the approach of the gingival margins around the surgical area.



Figure 4

(a) An incision at the mucogingival junction, (b) a parallel incision at the top of the alveolar mucosa, and (c) a simple suture using nylon 5.0 (Ethicon, Somerville, United States) suture wire

The crown-lengthening procedure with the flapless technique was performed on teeth – upper left and right central incisors and upper left lateral incisor; an internal bevel incision was made with a 15C scalpel blade (Swann-Morton, Sheffield, England) under an approximate angulation of 45°. After this demarcation and the removal of gingival tissue, osteotomy was performed through the gingival sulcus until the biological space was restructured by 3 mm. This technique did not require the use of a suture.

In the postoperative period [Figure 5], the patient was medicated with 750 mg paracetamol (for pain control) every 6 h for 4 days and 100 mg nimesulide (for anti-inflammatory effect) every 12 h for 3 days. For the chemical control of the biofilm, 0.12% chlorhexidine was prescribed. The suture was removed 7 days after the procedure. There were no interurrences during the postoperative period.



Figure 5

The appearance after 24 h, no significant edema or bleeding was observed, and the patient reported not being in pain

After 6 months [Figure 6], it is possible to observe an expected outcome for the case than before to procedure, without the presence of asymmetries, the esthetics of the optimized and functional smile. With 2 years of follow-up [Figure 7], it was observed, both at rest and in function that the esthetic remains favored.



Figure 6

(a) The initial appearance and (b) the final appearance after 6 months, right, front, and left views

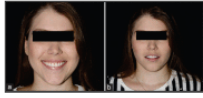


Figure 7

(a) The final appearance in smile after 2-year follow-up and (b) the final appearance with the lip at rest, a 2-year follow-up

## DISCUSSION

This case report showed integral planning; the goal was to maintain oral health and correct a disharmony that caused discomfort to the patient and that directly interfered in her quality of life. It is extremely important to perform a detailed and comprehensive clinical examination (so as to arrive at the correct diagnosis) and to think about the best treatment plan for each case. Other tools, such as digital smile design and photograph protocols, were important in the planning in this case, and other researchers have demonstrated the relevance of these tools,[3,6,9,24,25] providing predictability to the treatments and improving communication with patients.

Rubinstein and Kostianovsky 1973 described the lip-repositioning technique as a plastic surgery procedure based on the excision of a mucosa strip from the labial surface of the upper alveolar process. To close the wound, it sutured to the lower border of that incision, thus sealing the raw surface between the upper alveolar periosteum and the upper lip muscles.[19] Only in 2006, after a technical modification by Rosenblatt and Simon, It was introduced in dentistry surgery. As Rosenblatt and Simon described, the technique consists of performing two partial-thickness, horizontal, and parallel incisions. The first incision occurs at the level of the mucogingival junction, and the second is at the level of the labial mucosa; these two incisions are joined to the mesial level of the first maxillary molars. Then, the epithelial tissue is removed, leaving the connective tissue exposed. The procedure is finished by attaching the edges of the incisions with single-point sutures, taking care to align the midline of the lip with the midline of the teeth.[5,18,26]

Another modification of the technique that can be seen in the literature is the preservation of the lip brake, where instead of removing only one epithelium band, two bands are removed, one on each side of the lip brake; this technique is intended to decrease the risk of asymmetries at the moment of suturing.[27] Postoperative care includes analgesia measures and control of inflammation, and in some cases, the patient requires antibiotic therapy or other measures such as the application of elastic bands to limit (as much as possible) the contraction of the lip-lifting muscles.[27]

Dayakar *et al.*, 2014, in a case report for a patient with 5–6 mm of gingival exposure who underwent treatment with the lip-repositioning technique showed that result was a reduction of gingival exposure. At 3 and 6 months, the exposure was 3 mm; however, after 12 months, there was an almost complete recurrence, with the return of the upper lip to its position from before the surgical intervention.[28]

Some researchers have described the use of botulinum toxin for the management of excessive gingival display in the presence of hypermobility of the upper lip and vertical maxillary excess. When this toxin injected intramuscularly at therapeutic doses, it produces partial chemical denervation of the muscle, resulting in a localized reduction in muscle activity.[29,30] After the injection of botulinum toxin on both sides, a reduction of gingival excess was observed, with a maximal effect after 2 weeks.[31]

Another alternative for the treatment of excessive gingival exposure is corrective orthognathic surgery, through Le Fort I osteotomy for maxillary repositioning. The lip-repositioning technique is promising as an alternative treatment modality in esthetic rehabilitation.[5] This surgical procedure was designed to be shorter and less aggressive, and it was thought to have fewer postoperative complications when compared to orthognathic surgery, which is more invasive and can cause congestion of the nasal airway.[32]

Recently, researchers have used many techniques to correct gingival smiles; however, it is essential to first make a correct diagnosis to ensure that the choice is made using the most appropriate technique for each etiology or when necessary using two or more techniques to achieve the expected result.

This periodontal esthetic surgery, which comprised crown lengthening associated with lip repositioning, is an interesting, noninvasive alternative for the treatment of excessive exposure of the gingival smile.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## Article information

J Indian Soc Periodontol. 2020 Jan-Feb; 24(1): 87–91.

Published online 2019 Jul 24. doi: [10.4103/jisp.jisp\\_477\\_18](https://doi.org/10.4103/jisp.jisp_477_18)

PMCID: PMC6961458

PMID: [31983852](https://pubmed.ncbi.nlm.nih.gov/31983852/)

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Received 2018 Jul 26; Revised 2019 Apr 25; Accepted 2019 May 4.

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