New Surgical Approach for Labial Stabilization: A Long-Term Follow-up Case Series

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Lip repositioning surgery is a predictable surgical technique that provides a solution for patients with excessive gingival smile. This case series presents four patients with 6 to 8 mm of excessive gingival display who received a modified surgical technique using internal horizontal mattress sutures to immobilize the labial superior elevator muscle. None of the patients exhibited complications, and their healing was uneventful. All patients demonstrated predictable results and presented with stability over an average of 3.5 years of follow-up. The modified lip repositioning surgery with internal horizontal mattress sutures seems to provide reliable long-term results in patients with an excessive gingival display. Int J Periodontics Restorative Dent 2021;41:405–410. doi: 10.11607/prd.4668

Labial stabilization, first described by Rubinstein and Kostianovsky,¹ emerged at the beginning of 1973 to offer a solution for patients with excessive gingival display (EGD); since then, several modifications have been made to this technique to determine the best alternatives to reduce morbidity. EGD is caused by several etiologic factors, including labial hyper mobility, vertical excess of the maxilla, altered passive eruption, and others.¹ These conditions must be cautiously diagnosed before treatment planning. Importantly, this condition is found among 21% of the population, most of whom are young (20 to 30 years old) women.¹–⁴ At the microesthetic level, the smile is composed of the position of the lips, teeth, and gums. An esthetic smile is considered when maxillary gum exposure is 1 to 2 mm; when the distance between the edge of the upper lip and the gingival margin exceeds 4 mm, it is considered nonesthetic.⁵ Esthetic crown lengthening and orthognathic surgery are among the possible alternatives to solve this clinical condition, with lip stabilization as a less-invasive option for the patient.⁶–⁸

The lip repositioning surgery consists of removing a band of alveolar mucosa that is twice the length of the patient’s gingival display from the mucogingival junction to

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the deep sulcus through a partial-thickness flap. The soft tissue closure, stability, and possible long-term recurrence are factors determining the treatment predictability and success. This case series presents a modified surgical technique for labial stabilization among patients with excessive gingival smile over a long-term follow-up period.

Materials and Methods

Four healthy adult women (age range: 18 to 35 years) were treated between 2012 and 2019 for an EGD of 6 to 8 mm, induced by the hypermobility of the upper lip and maxillary vertical excess. The inclusion criteria were as follows: the presence of EGD, keratinized tissue ≥ 6 mm, absence of systemic diseases affecting healing, no current smoking habit, and good periodontal health. Patients were excluded if they met any of the following criteria: current pregnancy, attached gingiva ≤ 4 mm, exostosis, and altered passive eruption.

After all measurements of the gingival display length were recorded, a full-mouth clinical examination was performed for each participant, and extraoral and intraoral photographs were taken. Imaging studies were made for each case to complete the diagnosis (ie, evaluate the vertical excess of the maxilla). Of the patients who fulfilled the criteria for lip repositioning, the gingival smile measurements were taken from the lower edge of the upper lip to the gingival margin of the maxillary central incisors (Fig 1). All patients signed an informed consent document to participate and receive surgical treatment. Patients were followed up from 1 to 7 years with an average of 3.5 years.

Surgical Technique

Patients were treated using a new modified technique for labial stabilization with internal horizontal mattress sutures. All patients were bilaterally anesthetized in the vestibular mucosa of the maxillary anterior region with local infiltrative anesthesia (2% lidocaine with 1:100,000 epinephrine). Incision points were marked in the mucogingival line using a dual-wavelength Gemini 810 + 980 soft tissue diode laser (Ultra-dent); two horizontal incisions were made (1) at the mucogingival junction and (2) apically into the alveolar mucosa, separated by twice the size of the gingival exposure (Figs 2a and 2b). The partial-thickness mucosa band was removed (Figs 2c and 2d), and internal horizontal mattress sutures (resorbable Vicryl 5/0, Ethicon, Johnson & Johnson) were utilized to moderately block the elevator muscles of the upper lip (Figs 2e to 2g). The patient avoided smiling to their maximum extent during the first postoperative weeks. This technique aims to guarantee the stabilization of the soft tissue and lip, particularly during the first weeks of healing. Incision lines were then approximated with continuous sutures using 5-0 nylon (Ethicon, Johnson & Johnson; Fig 2h). Sutures were removed after 21 days, and the patients were evaluated monthly for the first 6 months.

Postoperative instructions were indicated to each patient, and ibuprofen (800 mg) was administered every 8 hours for 5 days. One tablet of meloxicam (15 mg) was prescribed as a daily anti-inflammatory for 5 days. In addition, one injection of dexamethasone (4 mg) was administered immediately after surgery. Patients were advised to take vitamin C (1-g tablet) daily for 1 month. As an antibiotic, all patients received amoxicillin with clavulanic.
Fig 2. Surgical procedure. (a) Points were marked in the mucogingival line with diode laser, measured with periodontal probe. (b) Partial-thickness surgical incision. (c) Removal of the mucosal band. (d) A mucosa band approximately 90 mm long and 14 to 16 mm wide was removed. (e and f) Internal mattress sutures were placed with vicryl absorbable sutures. (g) The internal horizontal mattress sutures blocked movement of the upper lip’s elevator muscles (new surgical approach). (h) Simple suturing was performed.
acid (875/125 mg) every 12 hours for 7 days. In addition, cold applications were prescribed during the first 3 days, and patients were asked to avoid smiling for 6 weeks. A follow-up examination was performed after 6 months and then annually thereafter.

Results

All patients showed successful long-term results, described as symmetrical and pleasant smiles with a stable, 3-mm gum exposure over the central incisors (Fig 3). The decrease in gingival exposure while smiling varied by case. At baseline, the first patient showed 8 mm of gingival exposure, and after 7 years of follow-up, a 5-mm decrease was evident. The second patient showed 7 mm of gingival exposure at baseline and a 5-mm reduction at the 3-year follow-up. The third and fourth patients both originally displayed 7 mm of gingival exposure, and 5-mm decreases were observed at 1 and 2 years of follow-up, respectively (Figs 4 and 5).

Discussion

The present article presented a new surgical approach to treat EGD using a lip repositioning technique. Rubinstein and Kostianovsky described the original technique in 1973 for patients with EGD. Kokich et al. et al considered a smile to be esthetic when the distance between the gingival margin and upper lip is shorter than 4 mm. In fact, numerous authors recommend lip stabilization in the presence of a gingival smile larger than 4 mm. The gingival smile of the four patients presented ranged between 6 to 8 mm. Therefore, a complete diagnosis should consider the identification of labial hypermobility, facial asymmetry, overgrowth or excessive vertical maxilla, and labial length, among other factors.

Different authors have described modifications to the conventional EGD technique that are primarily based on preventing re-
urrence, as it is considered one of the most common complications during lip stabilization. In 1979, Litton and Fournier redesigned the technique to create an upper lip elevator muscle detachment. Conversely, Miskinyar treated 27 patients using myomectomy and the resection of one or both elevator muscles without any recurrence in 1983. Ellenbogen and Swara implemented partial sectioning of the upper lip elevator muscle and added a silicone-based spacer.

Alammar et al conducted a comparative study of a modified surgical technique and the conventional technique for lip repositioning, showing significant differences (P ≤ .05) after 1.6 years of follow-up. Those results showed that the modified technique, consisting of a full-thickness flap with myotomy of lip elevator muscles, led to a success rate of 85.4% compared with the conventional procedure’s success rate of 61.9%. Another report on lip repositioning by Jacobs and Jacobs established that patients undergoing the procedure were satisfied with the results after 2.5 years of follow-up and achieved a favorable decrease in gingival exposure on smiling. Furthermore, in a study of 13 patients, Silva et al reported a 70% success rate and high level of satisfaction after 2.5 of years follow-up. In such cases, two mucosa bands were eliminated bilaterally from the labial frenum.

Other case series and reports have included results of labial repositioning over 6-month to 4-year postsurgical follow-up periods. The present case series followed the patients up to 7 years. The different surgical management presented herein represents a novel clinical approach to the original technique, one based on numerous horizontal internal mattress sutures before placing the external sutures to complete the surgical procedure. This technique considerably decreased muscle expansion of the upper lip elevator, preventing recurrence of EGD.

In the four surgical cases presented, a vertical mucosa band 14 to 16 mm wide was removed (from right first molar and the left first molar) to stabilize the internal upper lip muscles, which was double the size of the smiling gingival exposure of each patient. The decreases in gingival exposure after surgery were consistent, and all patients experienced a radical change upon smiling compared with their presurgical status. The new smiles were more harmonious, and all patients obtained gingival exposures of 1 to 3 mm, which are among the established esthetic parameters.

Conclusions

Implementing internal horizontal mattress sutures maintains initial stabilization of the upper lip muscles, significantly decreasing the chances of recurrence after an average of 3.5 years of follow-up. Randomized controlled trials are needed to verify these results.

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References


