

Surgical Lip Repositioning Procedure to Improve Facial Profile in a Patient with Excessive Gingival Display: A Case Report

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Abstract

Introduction: Excessive gingival display (EGD) is an esthetic concern for patients with gummy smile. The extent and etiology of gingival display, dictate what treatment is indicated. For patients with EGD and short or hypermobile lip, surgical lip repositioning is a viable treatment alternative to orthognathic surgery. Lip repositioning reduces gingival display by restricting the pull of elevator lip muscles and shortening the vestibule; thereby decreasing the lips range of motion and in turn decreases the amount gingival display. The EGD reduction also improves patient facial profile resulting in enhanced esthetic outcomes.

Case Presentation: The current report evaluates the esthetic results of surgical lip repositioning in a 27-year-old male exhibiting class I occlusion, high smile with hypermobile lip, incompetent lip closure and mouth breathing. Patient had class II vertical maxillary excess (VME) with 8 mm of EGD to the 2nd premolar region bilaterally. Cephalometric radiograph and orthodontic consultation revealed an inter-lip distance of 3.1 mm based on facial profile analysis. Surgical lip repositioning was recommended and consented to as the treatment of choice. The 12 months follow-up revealed improvement in inter-lip distances with competent lip closure and improvement in the patient's soft tissue profile.

Conclusion: This is the first case report objectively showing improvement in soft tissue profile based on cephalometric analysis post lip repositioning procedure. LP also improves esthetics for patients with VME reducing hypermobile lips and gummy smile without the need for orthognathic surgery.

Summary: Surgical lip repositioning is an effective treatment in reducing excessive gingival display and improving facial profile.

Keywords: *Gingiva; Lip; Tooth; Mouth; Tissue; Surgery*

Background

Excessive gingival display (EGD) is an esthetic concern for patients with gummy smile [1]. The extent and etiology of EGD, dictates what treatment is indicated. There are several factors cause EGD including altered passive eruption [2] vertical maxillary excess [3], gingival enlargement, short and hypermobile lip [4]. Treatment of these etiologic causes depends on the amount of gingival display which includes esthetic crown lengthening [5], orthodontic therapy [6], injection of botulinum toxin type A [7], orthognathic surgery [3] or surgical LRP [8]. Patients with EGD and short or hypermobile lip, surgical lip repositioning (LP) is a viable treatment. LP reduces EGD by restricting the elevator lip muscle pull thereby shortening the vestibule. LP is a less traumatic treatment option compared to orthognathic surgery in reducing gummy smile successfully [8,9]. The current report presents novel clinical finding of changing of soft tissue profile as outcome surgical LRP.

Case Presentation

26-year-old male with unremarkable health history presented to the Graduate periodontics clinic at the University of Detroit Mercy with CC: "I show a lot of gums when I smile". The clinical, radiographic examinations and smile analysis determined that the patient had class I occlusion, normal clinical crown dimensions [10], high smile with class II VME, hypermobile lip, incompetent lip closure and mouth breathing. Gingival display upon dynamic smiling was 8 mm displaying to the 2nd premolar region bilaterally (Figure 1).

Cephalometric radiograph and orthodontic consultation revealed an inter-lip distance of 3.1 mm based on facial profile analysis (Figure 2). Treatment options were presented and discussed with patient. Surgical lip repositioning was recommended and agreed upon as the treatment of choice.



Figure 1: Pre-operative clinical presentation of patient. lip contact, pose and normal smile.

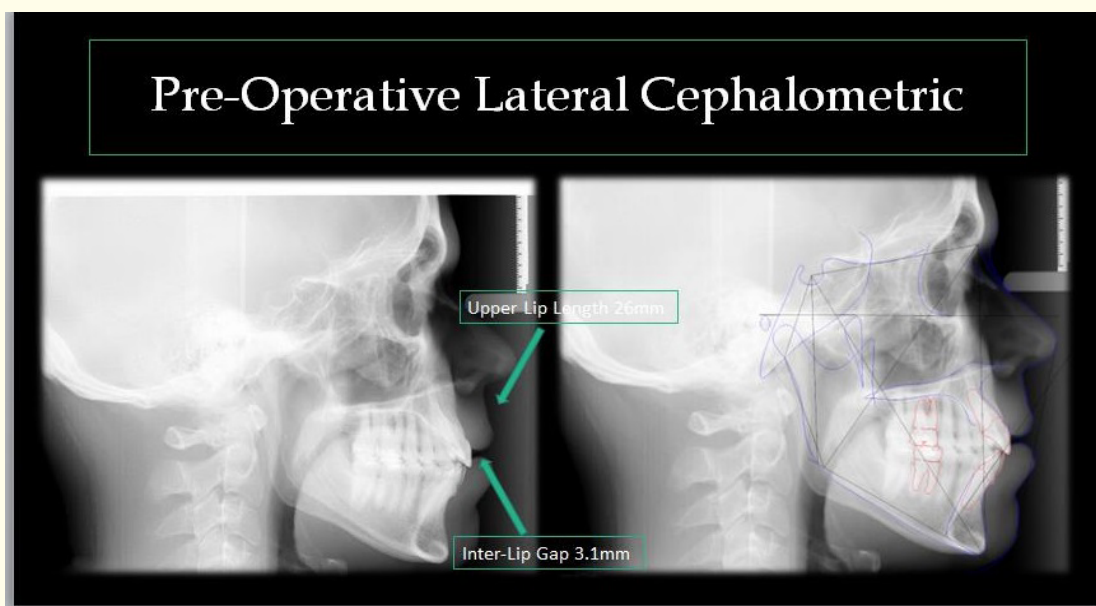


Figure 2: Cephalometric radiograph indicating the lip length and Inter-lip distance.

Case management

Reference points were marked at nose, philtrum, and interdental papilla between teeth number 8 and 9 with the surgical marker (Figure 3). To ensure correct re-approximation of facial midline, reference points must be marked before administration of local anesthesia [8]. First incision at (MGJ) extending to the distal of the 2nd premolars bilaterally. A second incision was marked at 12 mm apical to the first incision and the two incisions were connected [11] (Figure 3).

Split thickness flap was performed (Figure 4) and the alveolar mucosa band removed exposing the underlying connective tissue. Two incisions were then approximated and sutured using 6-0 non-resorbable sutures starting at the midline first, the corners by the premolars second and finally additional interrupted sutures for primary closure maintaining symmetry bilaterally (Figure 5).



Figure 3: Marking the reference point.



Figure 4: Flap Reflection



Figure 5: Wound closure.

The patients received NSAID for three days and an anti-microbial rinse[§]. The patient was given post-operative instructions to minimize lip movement for at least 6 weeks. All sutures were removed at the 6-week post-operative appointment.

Clinical outcome

The patient was followed at 2, 4, 6 weeks and 6 and 12 months. No post op complications were noticed. The patient was satisfied with improvement and reduction in his gummy smile. The results remained stable at 1 year follow up. Post-operative cephalometric revealed changing in both inter-lip distances (post op was 1.4) with competent lip closure and improvement in the patient’s soft tissue profile (Figure 6). Also, minor change at the repose position of upper lip and more relaxation of upper lip in the sub-nasal area that was attributed to LP and that helps in allowing upper lip elongation while smiling to provide less gingival exposure (Figure 7).

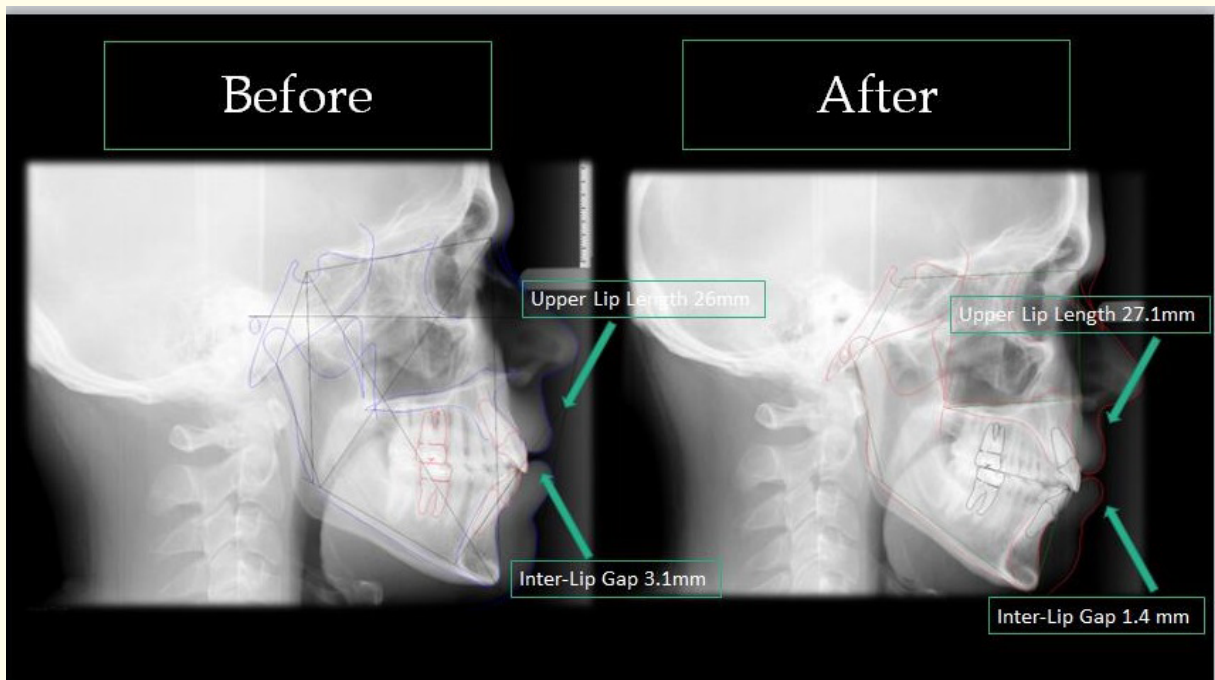


Figure 6: Pre and post-operative cephalometric radiograph indicating lip length and inter-lip distance.



Figure 7: Pre and post-operative clinical view showing less gingival display.

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[§]Hi-Tech Pharmacal Co., Inc. Amityville, NY, USA

Discussion

This case report presented how the LP procedure could treat EGD and change the soft tissue profile for patient with stable clinical results for 1 year. At the best of our knowledge, clinical outcome of changing soft tissue profile never was reported in literature. Treatment EGD in past was orthogenetic surgery. Orthogenetic surgery is associated with high morbidity and cost and requires hospital setting. In contrast, nowadays, several less invasive treatment modalities were implemented to treat EGD including: LRP [9], Botox [7] or both [12]. In our case report LRP was performed to reduce the labial retraction of the elevator smile muscle and minimizes gingival display [7].

LRP is associated with relapse starts at 6 months [13] and potential complete relapse at 12 months after surgery [14]. The most important predisposing factor for relapse is the presence of thin biotype [15,16]. Several techniques were reported in literature to reduce the LRP relapses and stabilize the final outcome of the procedure including detachment of upper lip muscles [16], placement of spacer between elevator muscles of lip and anterior spin [17], Botulinum toxin injection (Botox) in conjunction with LRP [12] and lip elongation (associated with rhinoplasty) [18]. Also, two contra-indication for this surgery were reported including Inadequate width of attached gingiva in maxillary anterior sextant and Severe vertical maxillary excess cases [15]. LRP is considered as minimal invasive procedure with less post-operative complication [19] few complication were reported. The most frequent complication was reported is mucocele formation [15]. In the current report, our patient did not experience any post-surgical complication or discomfort.

The patient was satisfied with the reduction in his gummy smile and improvement in his overall esthetics (Figures 6 and 7). The results were stable with minimal relapse at 12 and 24 months.

Conclusion

This is the first case report objectively showing improvement in soft tissue profile based on cephalometric analysis post lip repositioning procedure. LP also improves esthetics for patients with VME reducing hypermobile lips and gummy smile without the need for orthognathic surgery.

Conflict of Interest and Source of Funding Statement

The authors declare that they have no conflicts of interest. No author received any monetary compensation for this manuscript.

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