

Correcting gingival smile through flapless osteotomy: Predictability with minimal morbidity

Abstract / *Esthetic crown lengthening might be a possible alternative to correct or minimize gingival smile or slight discrepancies in esthetic gingival margin. Traditionally, this procedure is performed using flap elevation and subsequent osteotomy/osteoplasty. However, in very specific cases, such procedure can be performed through the gingival sulcus with micro-chisels and without the need for flap elevation. This article demonstrates, indicates and discusses, based on a case report, the possibility of correction of gingival smile by means of the flapless osteotomy technique.*

Keywords: *Periodontics. Smile. Dental esthetics. Flaps.*

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» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

INTRODUCTION

An esthetically pleasing smile is attained by establishing a balanced relationship between lips, gingiva and teeth. It is estimated that 10% of the population has excessive gingival display and most of them are women.¹ The amount of exposure of upper incisor crowns and display of gingival tissue in relation to the upper lip classifies the smile as low, medium or high.² The most esthetically acceptable of the three seems to be the medium height smile in which all maxillary incisor crowns are exposed and there is display of about 1 mm of gingiva. Gingival display above 3 mm defines a gingival smile.^{3,4,5}

The etiology of this clinical condition has been attributed to several factors among which we highlight: Gingival hyperplasia, short or hyperactive upper lips, vertical excess of maxillary bone, short clinical crowns, altered passive eruption or a combination of all.^{6,7}

Treatment success is directly linked to careful diagnosis, proper determination of the causal agent and careful treatment plan that takes into account the biological distances.⁵ The presence of altered passive eruption is a clear indication of gingival smile through clinical crown lengthening (CCL), since in these cases, facial proportions, lip length and motility are normal, although there is substantial gingival display along with short clinical crowns.⁸

The usual surgical CCL technique is carried out by elevating a full-thickness flap aimed at exposing the bone crest, thus allowing surgeons to perform osteotomy/osteoplasty procedures.^{4,9,10} However, some cases allow a flapless procedure to be performed, i.e., via the gingival sulcus using micro chisels. This method preserves the periosteum and provides blood supply, consequently reducing early bone resorption while contributing to tissue healing. Moreover, because there is

no flap, there is no need for sutures, and the postoperative period becomes faster and more comfortable for the patient.^{11,12,13}

This study aimed to demonstrate and indicate the use of a technique for esthetic lengthening of the clinical crown by means of flapless osteotomy.

A CLINICAL CASE REPORT

Female patient in good systemic condition sought the clinic of the Federal University of Santa Catarina, Brazil, complaining of gingival smile. Clinical examination revealed that the patient had excessive gingival display and discrepancy in the gingival margins (Fig 1). Altered passive eruption was diagnosed in association with lip hypermobility.

In this case, the technique of choice was flapless esthetic clinical crown lengthening. The points for incision were marked according to the cemento-enamel junction (CEJ), which is identified with an exploratory probe and measured with a millimeter probe (Fig 2). After removing the gingival tissue collar (Fig 3), the millimeter probe was once again used to measure the distance from the gingival margin to the bone crest (Fig 4), which should ideally be 3 mm. In areas where this distance is shorter than recommended, one can proceed to perform an osteotomy via the gingival sulcus with the use of micro chisels (Fig 5). To check the distance between the new gingival margin and the alveolar crest the site was once again probed (Fig 6). In the last step of the procedure, it is essential to improve the contour of the new margin. To this end, tissue cutting pliers and Kirkland knives are used.

Finally, the region is compressed with gauze, and neither surgical sutures nor surgical cement (Fig 7) are required, which makes the postoperative period more comfortable and the results more predictable in terms of esthetics (Fig 8).

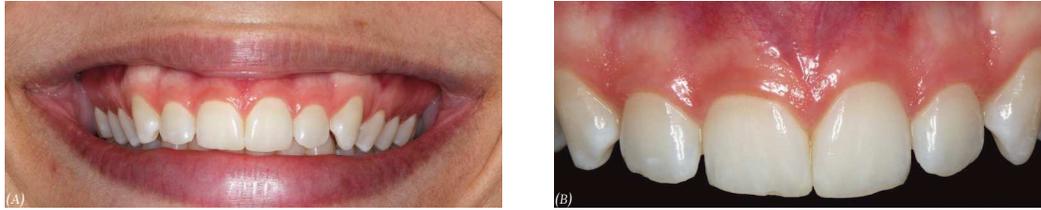


Figure 1. A) Initial smile; B) Intraoral view.



Figure 2. A) Location of the cemento enamel junction (CEJ); B) Probing from the gingival margin to the CEJ; C) Marking the incision points.

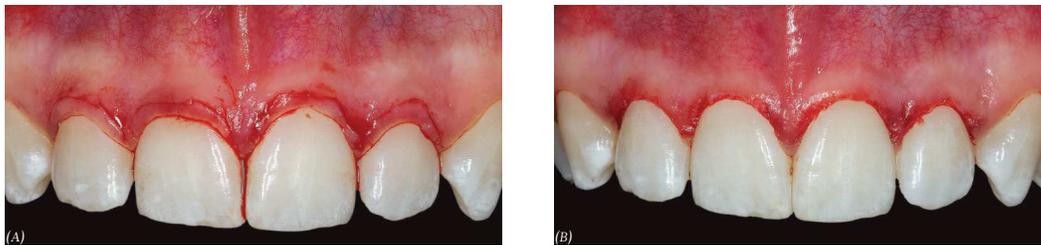


Figure 3. A) Incision; B) Removed tissue collar.



Figure 4. Probing from the gingival margin to the bone crest. Note that probing depth is approximately 1 mm.



Figure 5. Osteotomy with micro chisel.



Figure 6. Verification probing. Note that probing depth is approximately 3 mm.

Figure 7. Final aspect of the procedure.



Figure 8. A) 1-day postoperative; B) 7-days postoperative; C) 180-days postoperative; D) Final smile.

DISCUSSION

Flapless surgical procedures are widely used and studied in Dentistry. The regions where one chooses not to elevate the flap have greater vascularity and, as a result, the mucosa shows improved defense system. Additionally, in these areas, tissue healing is better and faster, thus decreasing the chances of scar formation.¹¹

Nevertheless, other studies^{12,14,15} further emphasize a reduction in postoperative inflammation and increased re-epithelialization and neovascularization of soft tissues. By preserving the periosteum, this technique optimizes the healing process. As a result, bone crest and mucosa health are preserved.

In flap surgeries, postoperative mobility has been found to reach up to 80% compared to preoperative conditions, whereas in cases in which only gingivectomy was performed, mobility was no more than 13% higher. These data confirm that effects of tissue invasion are increased when the flap is elevated.¹⁶

It is suggested that a circulatory failure occurs in the vascular plexus of the periosteum and periodontal ligament due to flap elevation, which causes tissue hypoxia and leads to angiogenesis. Resorption of the alveolar bone crest also takes place. However, after adequate recovery of these circulatory pathways, morphological homeostasis of the tissues is restored.^{17,18}

At the time of suturing – in a flap surgery – the flap should be well placed as the resulting clot will assist in stabilizing the tissue in place and providing tissue nutrition. When this precaution is not taken and wound dehiscence occurs, areas of persistent inflammation will appear as well as

bone and root resorption, and consequent late remodeling.¹⁹

Stabilization of new gingival margin and re-establishment of new biological distances occur between three and six months after flap surgery. In esthetic areas, it is advised that this period be extended from six to twelve months.^{9,10,19,20}

In the case described above there is no flap elevation and, for this reason, these mechanisms are not observed. This accelerates the healing process and consolidation of final tissue architecture, thus contributing to the advent of clinical advantages.²¹ Moreover, in the absence of flap there is no need for sutures, making results more predictable, a key factor when working in areas where good esthetic results are expected.

The main advantages over traditional apical flap techniques and collar removal with tissue repositioning are decreased surgical time, postoperative bone resorption, morbidity, bone resorption, and tissue repair optimization.⁸ In contrast, non-visualization of the bone crest requires great skill on the part of the surgeon. Furthermore, it is important to emphasize that this is an extremely delicate technique and should therefore be performed very carefully in order to avoid tears in the tissue and/or errors in defining the future gingival margin.

However, not all patients are suitable for this technique since there are different periodontia. For thick phenotypes, flap elevation is needed because in addition to osteotomy it is also necessary to reduce bone thickness (osteoplasty). Conversely, in thin or intermediate phenotypes osteoplasty is not necessary, making it possible

to carry out the procedure without the need for flap elevation, through the use of micro chisels.⁸ Patients with a small band of keratinized mucosa are also contraindicated because it is not recommended to remove the gingival collar. In this case, one should opt to preserve the mucosa.³

CONCLUSIONS

The use of a flapless surgical technique whereby the clinical crown is lengthened reduces tissue healing time, local inflammation and consequently postoperative discomfort. Besides, it yields esthetic, highly predictable outcomes.

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