

# Flapless aesthetic crown lengthening: A new therapeutic approach

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## Abstract

Aesthetic crown lengthening is one important chapter in contemporary periodontology. Traditionally, this procedure is performed using a flap elevation to a full exposure of the underling bone to allow for osteotomy/osteoplasty. However, in well-indicated cases, it is possible to meet that purpose using a flapless approach; i.e. without a flap elevation, in which the osteotomy is performed through the gingival sulcus using proper micro-chisels. To do this, it is important to have an adequate width of keratinized tissue and a bone crest not considered thick (thin and intermediate tissue biotypes). Among the benefits of this breaking-through procedure are low morbidity with no sutures, less bleeding, greater patient acceptance, and immediate outcome. As long as the indications are respected and the learning curve is left behind, predictable outcomes are expected. Flapless aesthetic crown lengthening is one alternative minimally invasive approach which, when indicated, offers realistic clinical benefits to our patients.

**Key words:** Gummy smile, periodontal plastic surgery, aesthetic, flapless crown lengthening.

## Resumen

El alargamiento coronario estético es un concepto importante en la periodontología contemporánea. Tradicionalmente, en este procedimiento se hace elevación de colgajos para poder realizar osteomía/osteoplastia en el hueso subyacente. Sin embargo, en casos específicos este propósito es alcanzado utilizando un abordaje sin elevación de colgajos (Flap-less approach). La osteotomía es realizada a través del surco gingival utilizando microcinceles. Para efectuar esta técnica es importante contar con un adecuado ancho de tejido queratinizado y una cresta delgada o intermedia evitando las crestas gruesas. Entre los beneficios de este procedimiento de ruptura a través del surco gingival están la baja morbilidad, el prescindir de suturas, un menor sangrado, una mayor aceptación del paciente y los resultados son inmediatos. Siempre y cuando se respeten las indicaciones y la curva de aprendizaje quede atrás, los resultados predecibles son esperados.

**Palabras clave:** Sonrisa gingival, cirugía plástica periodontal, cirugía estética periodontal, cirugía sin colgajo.

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## INTRODUCTION

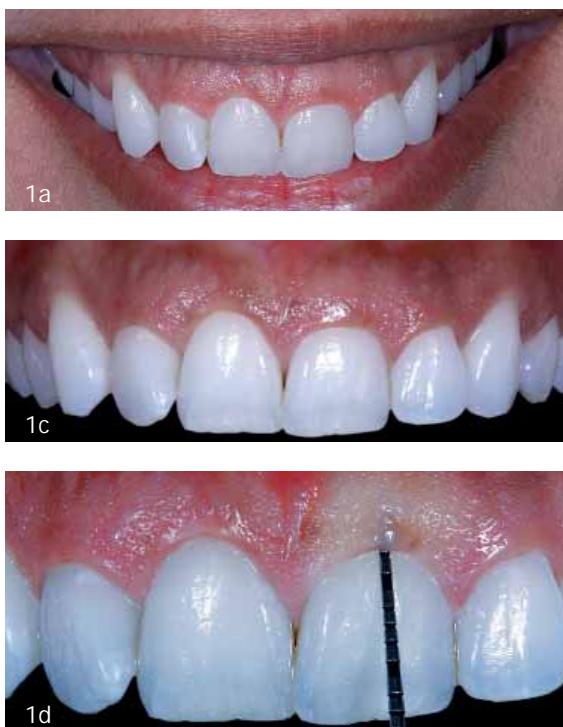
It seems that there is no «ideal recipe» for an attractive and beautiful smile. However, the harmony and symmetry of its elements (facial, labial and dental elements) are very important.<sup>1</sup> Several factors should be evaluated in the esthetic planning towards smile optimization, particularly those periodontal aspects related to tissue color, contour, symmetry, zenith and position of the gingival margins.<sup>2</sup>

During a spontaneous smile, the position of the inferior border of the upper lip determines three different conditions of exposure of the teeth and gingival tissues (high, average and low lip-lines).<sup>3</sup> In this moment, it is very important to distinguish two frequent terms that are very used in clinical practice that can sometimes cause confusion: gummy smile and high lip-line. Gummy smile refers to conditions when patients expose 3.0 mm or more of gingiva during speech or smile,<sup>4</sup> so while every patient harboring a gummy smile appearance has a high lip-line, the contrary is not necessarily true. Understanding the correct diagnosis of gummy smile is essential to indicate proper treatment.<sup>5,6</sup> It can be related to vertical bone excess, den-to-alveolar extrusion, labial muscle hypermobility, altered passive eruption, and combinations of these.

The precise indication calling for intervention by a periodontist is the altered passive eruption.<sup>5</sup> In these cases, the facial proportions and length/motility of the upper lips are normal; however, there is an extensive exposure of the gingiva and short clinical crowns. Tooth eruption is determined by the crown emerging from the bony housing, and is finished when teeth reach the occlusal plane and occlude. During this process, the soft tissues are also moved in the coronal direction and start to physiologically recede in the apical direction to the level of the cement-enamel junction –CEJ– (passive eruption). When for any reason the soft tissues don't migrate apically, it is called altered passive eruption, and is characterized by excess of coverage of the crown by the soft tissues. It can be sub-classified related to the position of the CEJ and the bony crest (BC).<sup>5,6</sup>

## TECHNIQUE DESCRIPTION

In flapless aesthetic crown lengthening, it is imperative to meet the precise indications to fully benefit the patients: abundant keratinized tissue and thin bone (thin or intermediate biotypes). The incision is positioned on the CEJ level when pristine teeth are treated (intact, without restorative needs) (*Figures 1 a-k*), or at the desired gingival margin when restorative procedures are indicated (*Figures 2 a-m*).



**Figures 1 (a-d).** **a-c.** Different views of a patient with excessive gingival display associated with smile disharmony; observe the great amount of keratinized tissue and an intermediate biotype. **d.** Probing to identify the sulcus depth, CEJ and bone crest.



**Figures 1 (e-k).** **e.** Gingival recontour using an internal besel. **f.** Osteotomy without flap elevation using the micro-chisel. **g-h.** Gingival outline refinement, using a curved micro-scizor. **i-k.** Clinical appearance 3 years after surgery, in which can be observed a good balance of the zenith of the teeth and gingival arquitecture and less exposure of the tissues during smile.



**Figures 2 (a-m).** **a-b.** Gummy smile appearance associated to passive altered eruption and short/hypermobile upper lip (combined etiology). **c-d.** Mock-up in place suggesting case resolution, observe in figure d the comparison between the sides with and without the resin suggesting the clinical improvement of both crown lengthening and restorations. **e.** Internal bevel incision performed. **f.** Bone sounding. **g.** It defines the necessity to do an osteotomy. **h.** Clinical view 4 months after the surgery depicting soft tissue maturation and allowing for the prosthetic rehabilitation. **i-j.** Tooth preparation for veneers and provisionals' delivery.



**k-m.** Clinical aspect of the condition 9 months after the surgery and the crown/venners in position. Observe the harmony and simetry of the patient smile improving the overall appearance.

Following incision, the tissue collar is removed using regular scalers and contours of the gingival margin are refined using curved micro-scissors. The next step is the bone sounding, in which a periodontal probe is positioned parallel to the crown through the gingival sulcus until it stops at the bone crest. On average, the biologic width (disregarding the gingival sulcus) is around 2.0 mm; i.e., the vertical distance necessary to establish the biological seal at the supra-bony area and below the CEJ. When that distance is less than 2.0 mm it means we have to promote

an osteotomy, on the other hand if the distance found is greater than or equal to 2.0 mm; in most the cases the gingival margin is stable in that position following healing. Of course, in cases with restorative needs, the CEJ is not used as a reference for the incision and landmark for the eventual need for osteotomy. In those instances, our reference is the future prosthetic margin. The osteotomy, when indicated, is performed through the gingival sulcus using proper and delicate micro-chisels in small movements to establish the vertical distance to accommodate the structures of that biologic width. We accept 2.0-3.0 mm as an ideal distance between the bone crest and CJE/future prosthetic margin. In those cases, since the indication is strictly for thin or moderate tissue biotypes, the bone is generally thin and there is no need for any osteoplasty. During all the procedures, a thorough irrigation using cold saline solution is performed, and at the end of the surgery gauze compression is done to stop any bleeding. No sutures or dressing are necessary.

## DISCUSSION

The treatment planning for aesthetic crown lengthening has to take into account the necessity or otherwise of associated prosthetic rehabilitation. In clinical situations, where veneers or crowns are anticipated, the determination of the future prosthetic margin should match the gingival margin contours and will eventually orient the extent of osteotomy. In these cases, exposure of the roots is not a problem since restorations will cover those areas. There should be sufficient time for healing of the soft tissues before the final tooth preparation and impression. The gingival sulcus seems to be completely established after 3 months, but complete healing of the tissues can take up to a year depending of characteristics of the initial surgery;<sup>7</sup> i.e., the amount of osteotomy and osteoplasty. When no restorations are anticipated the reference for eventual osteotomy is the CEJ.

In clinical situations related to altered passive eruption, the amount of keratinized tissue determines what incision should be performed; i.e., if there is a good amount of tissue, an internal bezel can be easily used. On the other hand, if minimal keratinized tissues are observed, an intrasulcular incision is generally performed associated with an apically positioned flap.<sup>8</sup> This is important because although there is no minimum amount of tissues considered adequate for establishing health, the keratinized tissue is considered a nobel structure related to esthetics and to stabilization of the gingival sulcus. For this reason, we believe that we should always maintain at least 3.0 mm of keratinized tissue.

The distance between the CEJ and bone crest determines the need or otherwise for osteotomies to establish the spa-

ce for the adaptation of the periodontal structures of the biologic seal (biologic width). Traditionally, osteotomy and osteoplasty are performed after a flap elevation for full exposure of the bone. In our understanding, this is valid for thick tissue biotype in which osteoplasty (thickness removal) is recommended to improve the bone architecture and the adaptation of the tissues.<sup>8</sup>

In our practice, we have seen more cases of thin and intermediate tissue biotypes, especially in the pre-maxilla and therefore, in most clinical situations, osteoplasty is not necessary.<sup>9</sup> This means flap elevation in such cases is not strictly necessary. Obviously, the so-called flapless procedure is technically sensitive, so a course of learning is necessary to master it without tearing the soft tissues. Besides this, without elevating the flap it is more difficult to orient the shape of the osteotomy. The use of the probe to measure the distance of the CEJ and the bone crest through the sulcus along the margin is essential to evaluate the accuracy of those structures.

## CONCLUSION

The flapless approach is a safe, easy and predictable procedure with considerable clinical advantages (no sutures, less bleeding and morbidity, and shorter healing time), but the proper indications of this procedure have to be respected (thin or intermediate biotypes/ abundant keratinized tissue) in order to achieve stable and aesthetic outcomes.

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