

## Case Report

### Reestablishment of Biological Distance in a Gummy Smile: Case Report

Bianca Gonçalves Dias<sup>1\*</sup>, André Negraes Rotta<sup>2</sup>, Renata Persoli de Aguiar<sup>3</sup>, Cynthia Der Torossian Torres Neves Alves<sup>4</sup>

<sup>1</sup>Dental Surgeon Periodontist - Master in Dentistry department periodontics Rotta Odontology Institute, Brazil

<sup>2</sup>Department of buco-maxilo surgery Rotta Odontology Institute, Brazil

<sup>3</sup>Department of odontology University of West Paulista, Brazil

<sup>4</sup>Odonto Neves Diagnostic Imaging- Dental Radiology Clinic radiology, Brazil

\***Corresponding author:** Bianca Gonçalves Dias, Dental Surgeon Periodontist - Master in Dentistry department Rotta Odontology Institute periodontics, Brazil

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#### Abstract

The smile line it's determined with the exposure area of the periodontium, therefore smiling and exposing >3mm of gingiva is considered unsightly, one of the causes is the altered biological distance, it is necessary to know how to diagnose to propose the appropriate treatment. Case Report: Gingivectomy was performed to make the new gingival margin in order to remove excess tissues; osteotomy and osteoplasty for restoring supracrestal gingival tissues and preserving the case. Results: with this case report is expected to show the importance of reestablishing the biological distance in a gummy smile, in addition to providing the patient with the desired esthetic smile. Conclusion: In conclusion, after diagnostic exams and the correct indication of the technique to restore normal periodontal distances, it was possible restore function, aesthetics and self-esteem to the individual, in addition to maintaining the periodontium with stable, healthy tissues and with no recurrence, even after long periods.

**Keywords:** Bone regeneration; Dental esthetic; Gingivectomy; Osteotomy

#### Introduction

Smiling represents a way to socialize and demonstrate feelings [1]. It is natural that a search for beauty and harmony in the exposure of teeth and gums is constant, when this relationship does not correspond what is considered ideal, the entire socialization of the individual can be damaged, as well as the development of psychological disorders [2]. The smile line is what determines the exposure of the upper teeth, this proportion starts at the lower edge of the upper lip and the amount of gingival tissue and dental elements that are evident when smiling [3,4]. The upper lip line is considered low when the patient smiling and shows 75% or less of the height of the clinical crown of the upper anterior teeth; considered medium when the tooth can be fully observed or at least 75% of its incisal cervical height and considered high when, in addition to visualizing the entire dental crown, there is also exposure >3mm of the gingiva, this case is characterized as a gingival smile and considered proportionately unsightly [5,6]. The proportion in the exposure of teeth and periodontium is also influenced by the gender and age of each individual, with women having a higher incidence of having a high smile line

when compared to men [4], and, with advancing age, the smile line tends to decrease, due to decreased muscle tone and thus less dentogingival exposure [6]. There are surgical procedures capable of returning the harmony of the smile, however it is necessary that the dental surgeon knows the etiology for the treatment to be effective [7]. The etiologies of gingival smile stand out: altered passive eruption [5]. Excess vertical maxillary growth excessive alveolar extrusion [8]. Hyperactivity of the upper lip elevating muscles [9]. Gingival hyperplasia induced by bacterial plaque or medications [10].

The Altered Passive Eruption (APE) occurs during the dental eruption process, in this period the periodontium that should return to the apical position in relation to the crown remains close to the Cementum-enamel Junction (CEJ) Clinically it causes formation of periodontal tissue on the surface of the dental enamel, giving the appearance of short and square clinical crowns, such alteration may be related to genetics or poor development [11].

The etiologies of the gingival smile can be correlated or isolated, so the correct diagnosis is essential so that the final result of the treatment corresponds to the patient's expectations and there is no recurrence of the condition [2]. Among the surgical techniques described there are gingivectomy [12], periodontal plastic surgery

[3], upper teeth intrusion by skeletal anchorage [13], orthographic maxillary impaction and repositioning of the upper Lip [12].

Periodontal plastic surgery to correct the gingival smile is performed in cases of APE [5], where the biological distance is  $<3\text{mm}$ , that is, the beginning of the buccal maxillary bone board is with increased proximity to the CEJ, consequently, the groove gingival is positioned over the clinical crown [14]. When the biological distance is  $<3\text{mm}$  it means that the beginning of the bone board is closer to the CEJ than it should be, and therefore the clinical crown is not fully exposed [15]. Periodontology makes a fundamental role in both, diagnosis and treatment in cases of gingival smile to restore harmony in smile and health for periodontal tissues [16]. The dental surgeon must know and diagnose the different etiologies of the gingival smile to propose the appropriate treatment for each case. This clinical case report has the purpose of elucidating the importance of the correct diagnosis and treatment to restore the normal dimensions of the periodontal biological distance and consequent harmony in the smile.

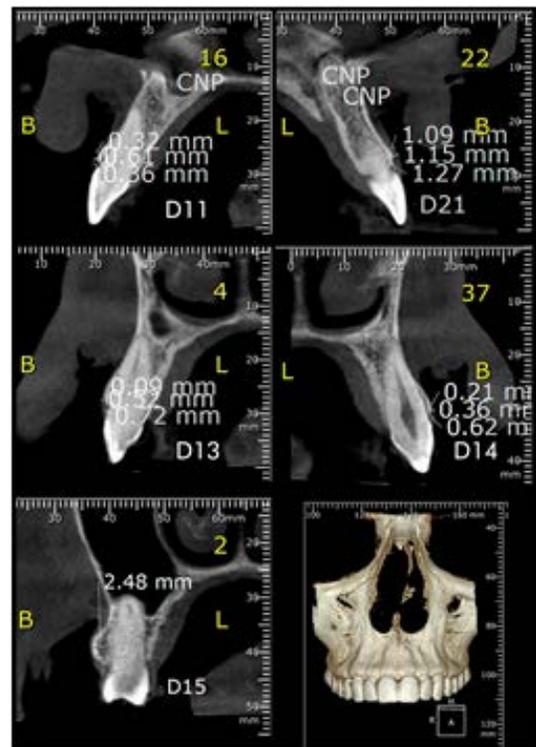
## Case Report

Female patient, leucoderma, 36 years old, without systemic manifestations, sought the specialty of periodontics to correct her gingival smile. Clinically, when smiling (Figure 4), he had periodontal exposure  $>3\text{mm}$ , gingival zeniths of teeth 13 to 23 at the same height and 2mm probing depth. In his tomographic exam it was verified that the periodontal biological distances were reduced, that is, the beginning of the bone board was very close to CEJ; maxillary bony exostoses  $>2,4\text{mm}$  thick in the region of bilateral upper molars (Figure 1). After diagnosing of APE, the patient underwent aesthetic periodontal surgical treatment in order to re-establish the biological distances that were reduced and causing her aesthetic dissatisfaction. Under sterile field and infiltrative anesthesia, first with a 15C blade (Swann Morton, ENG) the probing depth was removed with the gingivectomy technique, exposing the entire crown that was under the gingival tissue and thus creating the new gingival margin with the new characteristics aesthetic clinics, preserving anatomical dental and periodontal aspects such as the correct heights of each zenith.

After creating the new gingival margin, a new internal incision was made with a 15C blade and periodontal microbisturi (Scalpel micro surgery n°1, Thimon, BR) preserving papillary integrity, mucosal detachment with molt detacher (2-4, Quinelato, BR) and opening of the surgical flap with periodontal microbisturi (Scalpel micro surgery n°8, Thimon, BR) to expose the entire buccal bone plate of the maxilla, where it was possible to clinically evidence the tomographic findings of the decrease in biological distances and bone exostoses (Figure 2). Osteoplasty over the entire maxilla was performed with a truncated conical diamond tip drill (FG4138, KG Sorensen, BR), escape grooves were restored with a cylindrical diamond tip drill (3017HL, KG Sorensen, BR) and cervical osteotomy for restoring biological distances. Performed with the aid of a Williams periodontal probe (Quinelato, BR) and

a special diamond tip drill (2173, KG Sorensen, BR). After the entire periodontal bone remodeling process is completed (Figure 3), the verification of the new biological distances of teeth 13 to 23 it was carried out by means of a clinical probe from the beginning of the bone board to the CEJ, now 3mm apart. Cervical osteoplasty was not performed on the posterior teeth, as in these regions there were no changes in biological distances. The sutures were performed after the flap re-approach and correct positioning in its corresponding anatomical papillae. Initiated on the palate using the vertical mattress [17] technique, all sutures were performed only on papillae with monofilament black 5.0 nylon suture with reverse triangular 3/8 needle (Techsuture, BR).

Immediately after the surgical completion, it is possible to verify the preliminary aesthetic result. The postoperative return for suture removal was performed after 8 days. Follow-up consultations carried out with 30.90,120 days and one year after the postoperative period. In the follow-up of one year after the operation, it is possible to check periodontal health, tissue stability, absence of recurrence and patient satisfaction in being able to smile spontaneously (Figure 5).



**Figure 1:** Computed tomography of the maxilla - axial slices: proximity of the buccal cortical bone of the maxilla with the CEJ; gingival thickness in the buccal portion of the maxilla  $<1\text{mm}$  on average; maxillary vestibular bone growth  $>2\text{mm}$  in the region of tooth 15. - 3D image: proximity of the vestibular bone board with CEJ and bone exostoses.



**Figure 2:** Flap apically detached in the region of teeth 16 to 26, exposing the buccal bone plate. Proximity of the vestibular bone cortex with CEJ; bony escape grooves in little evidence and bony exostoses throughout the vestibular maxilla.



**Figure 3:** Flap apically detached after osteotomy and osteoplasty completed, well defined vestibular maxillary cortical bone with anatomical contour, bony escape grooves in evidence, absent bone exostoses and present periodontal biological distance.



**Figure 4:** Initial appearance before surgery. Bone exostoses evident in posterior portions, gingival zeniths with different shapes and at different heights from the anatomical normality of each tooth. Gingival exposure >3mm, clinical crowns with short and square appearance.



**Figure 5:** 12-month postoperative follow-up. Clinical aspect of periodontal health, tissue stability, gingival zeniths at anatomical heights corresponding to each dental crown, visible bone escape grooves, absent bone exostoses.

## Discussion

The proportions that define a gingival smile are directly linked to the amount of dental and / or gingival exposure [17,18]. Surgical technique is recommended to restore biological distances, when through clinical, image, analogue and digital exams it is diagnosed that the maxillary vestibular bone board is with increased proximity to the CEJ, <3mm [19-21]. The disposed case corroborates with the literature because, all the examinations indicated that the biological distances in the aesthetic region of the smile, that is, of the teeth 13 to 23 were with measures smaller than 1.27mm, besides presenting clinically disharmony of smile and exposure of the entire clinical crown and more than a third gingival smile. The gingival phenotype of each individual can influence the healing process of supracrestal [22,23]. Tissues after undergoing surgery to increase the clinical crown [24]. Patients with a thin phenotype (<1mm) [15]. Generally present a risk of unsatisfactory aesthetics after surgical treatments [23-25], while thicker phenotypes (> 1mm) [15] can cause recurrences and present the worst results [24]. Clinically and through imaging exams, such as computed tomography, it was possible to diagnose before the surgery, that the gingival phenotype of the reported case was considered thin, with measurements ranging from 0.32mm to 1.15mm of buccal gingival thickness.

Surgical crown augmentation surgery allows the removal of soft and hard tissues in order to resume the health conditions of periodontal support tissues [26]. The indication of the technique depends on the previous diagnosis, and may be through gingivectomy [27]. And periodontal plastic surgery [3], however in cases of APE, the best technique is periodontal plastic surgery [3,5]. The reported patient was diagnosed as the APE responsible for periodontal and aesthetic changes, due to this, gingivectomy,

osteotomy and osteoplasty were performed, to achieve the results of periodontal normality, restoration of biological distances, periodontal health and aesthetics in the smile. The harmonious and beautiful smile represents to the individual a better social interaction, a better way of expressing oneself and an improvement in self-esteem [28]. It was possible to observe favorable changes in patient satisfaction when smiling and communicating more spontaneously after the surgical procedure.

## Conclusion

It is concluded that after diagnostic exams and the correct indication of the technique to restore normal [29,30] periodontal distances, it is possible to restore function, aesthetics and self-esteem to the individual, in addition to maintaining the periodontium with stable, healthy tissues and with no recurrence, even after long periods.

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