

Case Report Article

Different managements for surgical approaches in the aesthetic and functional treatment of type IB altered passive eruption

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Abstract

Introduction: Aesthetics has been one of the most discussed and explored subjects in today's dentistry. Therefore, the search for procedures aimed at facial harmonization has been more frequent in dental offices. The gingival smile is characterized by excessive gingival exposure to the smile being one of the main complaints of the patients who seek a dental surgeon in order to obtain facial aesthetics, being able to present different causes. It is extremely important to correctly diagnose each case so that the correct etiology is stable and successful in the treatment to be performed. **Objective:** In the present paper, two clinical cases of patients with complaints of gingival smile and short teeth were reported in which the etiology of both was type IB altered passive eruption. **Case report:** Due to the individual characteristics of each patient, each case was solved with different surgical approaches. In the first case, the patient had a thick periodontium and therefore the clinical crown lengthening procedure was performed through the internal bevel gingivoplasty with osteotomy and osteoplasty. In the second case, the patient had a thin periodontium, and it was possible to perform a clinical crown lengthening using the flapless technique. **Conclusion:** Therefore, although both cases present the same etiology, different periodontal surgical techniques were used, which allowed for satisfactory results for the patients.

Introduction

Dental aesthetics is a subjective concept, considering the wide variability between individuals. Patients have sought dental treatments to improve the aesthetic appearance of their smiles [11]. This fact may be related to the impact that the smile's appearance generates in social life, justifying the concern about dental and gingival relations. In response to this demand, dentistry has evolved from the development of different techniques to resolve these complaints [8].

Periodontics is one of the working areas for dentists, setting an essential role in achieving facial esthetics [3, 9]. Through surgical techniques, periodontics allows patients to have a pleasant smile. Although, there is no ideal formula for a perfect smile, considering the harmony of the lower facial third is established by the relation between the lips, teeth, and gums [13, 14].

In light of this, excessive gingival display (EGD), commonly referred to as a “gummy smile”, can set an unsightly scenario for patients [3, 16]. This condition represents a challenge to dental surgeons, since the treatment planning must consider not only dental parameters but also gingival aspects. A gingival exposure of approximately 1 to 2 mm is considered ideal for composing a natural and aesthetic smile, however, this exposure may be naturally greater or lower in some patients [13, 17].

Although EGD is not considered a pathology, this condition can produce an unpleasant effect. Excessive gingival exposure may be a consequence of a short upper lip, vertical excess of the maxilla, dentoalveolar extrusion, hyperactivity of the upper lip, and altered passive eruption [3, 4, 10]. Thus, the role of the periodontist is essential in the correct diagnosis of the reason for EGD [4].

Altered passive eruption (APE) can be characterized as an alteration during the dental eruption, in which the gingival margin does not reach and stabilize at the level of the cemento-enamel junction (CEJ), hiding cervical portions of anatomical crown [9, 12]. This involvement occurs, on average, in 12% of the general population, and it is important to assess its etiology and explore different treatment options [3, 4, 10]. Therefore, in most cases, the treatment for the gingival smile is indicated and can be performed from small surgical corrections, with low invasive procedures [3, 4, 9, 10, 12].

APE can be classified into four groups, according to the relationship and position of the cemento-enamel junction and the alveolar bone crest. The classification is presented as follows [1, 4, 12]: Type I: mucogingival junction apically positioned in relation to the CEJ and alveolar bone crest and type II: mucogingival junction at the level of the alveolar bone crest. The classification still accepts a new subdivision, adopting the following categories [1, 4, 12, 16]: Type A: Bone crest located more than 2 mm from the CEJ; Type B: Bone crest is positioned less than 2 mm from the CEJ.

In general, the treatment of APE Type I involves gingivectomy with (Type IB) or without (Type IA) associated osteotomy. However, for conditions identified as type II, treatment requires repositioning of the gingival margin, which may be accompanied by flaps (Type IIB) or not (Type IIA) [1, 4, 12, 16].

The surgical approaches for altered passive eruption types IB or IIB can be performed by different procedures. Flap techniques associate the removal of cervical gingival tissue through internal bevel incision with full-thickness flap and osteotomy for recovering the space for tissue supracrestal attachment [1, 4, 12, 16]. However, in specific cases, a modification of the original technique can be performed, avoiding flaps (flapless), executing the osteotomy by adopting micro chisels [7, 16]. The benefits of this technique modifications include the reduction of postoperative discomfort and edemas, since the procedure does not require sutures. Additionally, by the absence of flap elevation, tissue repair is optimized. Establishing safe, predictable, and highly successful therapies is a constant challenge for clinicians and researchers [7, 16]. Therefore, the present study aimed to present two clinical cases, adopting different techniques of the surgical approach for type IB APE.

Case reports

Both cases presented followed the precepts established by Case Reports Guideline (CARE) [5].

Case report 1

Female patient, 20 years old, melanoderm, sought care at the UFPel Dental School complaining of having short teeth and being dissatisfied with the aesthetics of her smile (figure 1). In the anamnesis it was found that the patient did not have any systemic disease.



Figure 1 - Initial smile - case 1

As reported for case 1, all pre-clinical steps were followed to perform the surgical procedure, except for the proposed surgical technique. After signing the free and informed consent form, a clinical examination was performed with conventional periodontal probing to locate the CEJ. Clinical examination revealed the presence of gingival health, thick periodontal phenotype, presence of altered passive eruption Type IB, and slightly misaligned teeth (figure 2).



Figure 2 - Preoperative clinical appearance

Based on the clinical examination, the patient was asked to undergo previous orthodontic treatment to improve the prognosis of periodontal surgical treatment, but she did not want to undergo it. Thus, after elucidating the treatment plan, in agreement with the patient, it was decided that the better option would be a surgical technique of clinical crown lengthening performed using an apically positioned flap with osteotomy and osteoplasty of teeth 15 to 25.

The beginning of the surgical treatment took place through intra and extraoral disinfection with povidone-iodine and 2% Mepivacaine anesthesia, with the infiltrative technique and regional block of the bilateral infraorbital and nasopalatine nerves. With the aid of a millimeter probe, a transgingival

periodontal probing was performed to demarcate 3 bleeding points on the buccal of teeth 15 to 25 to guide the primary incision in an internal bevel and conformation of the height of the new contours and gingival zeniths (figure 3).



Figure 3 - Clinical appearance after removal of gingival collars

The secondary incision was performed intrasulcularly in each tooth and the tertiary one, with the aid of a minifive 5/6 curette to remove the gingival collars. (Figure 3) Continuously, using a number 2-4 Molt detacher, a full-thickness flap was raised from the papillae until it surpassed the mucogingival union, in order to create access for intervention in the alveolar bone (figure 4).



Figure 4 - Elevated full-thickness flap

It was noted that the CEJ was practically at the level of the bone crest. To recover the space for tissue supracrestal attachment space, osteotomy was first performed using a 2173F drill (KG Sorensen, Barueri, Brazil) to leave the level of the bone crests equidistant by 3 mm from the new gingival zenith (figure 5). Subsequently, with the aid of the 3018HL drill (KG Sorensen, Barueri, Brazil), osteoplasty was performed to smooth the protrusion of the bone crests left after osteotomy so that the end with the dental surface was without step, optimizing the postoperative gingival contour (figure 5).



Figure 5 - Osteotomy and osteoplasty

With the restoration of the space for tissue supracrestal attachment, abundant irrigation with saline solution was performed and the flap was positioned apically, slightly coronal (1 mm) to the CEJ of each tooth, and vertical mattress sutures were performed on each interdental papilla (figure 6).



Figure 6 - Flap positioned and sutured

Analgesics were prescribed according to the patient's need and daily mouthwash with Chlorhexidine Digluconate 0.12%, twice a day, for two weeks. At the postoperative periods of 2 (figure 7) and 12 months (figure 8), excellent healing of the gingival tissue, satisfactory increase in clinical crowns, stability of the gingival margins in the position left in the trans surgical period, great improvement in relationship of gingival exposure on the smile line and patient's facial harmony.



Figure 7 - 2 months post-op



Figure 8 - 12 months post-operative

Case report 2

Female patient, 20-years-old, leukoderma, referred to the same educational institution as in the previous case (UFPel), complaining about EGD while smiling. In the anamnesis, the patient reports not having systemic or local diseases and did not practice smoking or drinking habits (figures 9 and 10). After signing the free and informed consent form, a clinical examination was performed, including gingival health, thin periodontal phenotype, and the presence of an altered passive eruption type 1B.



Figure 9 - Initial smile - case 2



Figure 10 - Preoperative clinical appearance

Once the diagnosis was determined, alginate molding was performed, to obtain a study model, assisting in the decision making for the case. In light of this, aiming to increase the clinical crowns, a flapless technique of clinical crown lengthening was proposed.

The surgical treatment started with oral disinfection and bilateral regional anesthesia. An internal bevel incision was made, and a scalpel blade was positioned perpendicularly to the gingival margin, considering the new position desired. The gingival collar was carefully removed, setting a new gingival zenith, for teeth 14 to 24. Subsequently,

to verify the distance between the gingival margin and the alveolar bone crest, the teeth were probed, identifying that in the central incisors the distance was less than 3mm. It was necessary to perform osteotomy via the gingival sulcus -without flap elevation- in these teeth, using Fedi n. 1 micro chisels and a Mini five 5/6 curette, to remove bone spicules and obtain enough space to accommodate the structures of the supracrestal attachment tissues (figures 11-13).



Figure 11 - Clinical appearance after removal of gingival collars of right side



Figure 12 - Probing after the osteotomy performed



Figure 13 - Clinical appearance immediately after surgery and removal of excess restorative material

The procedure was completed with saline irrigation and there was no need for sutures. An analgesic was prescribed and daily mouthwash was recommended with 0.12% chlorhexidine gluconate, twice a day, for two weeks, the patient was also instructed on how to care for oral hygiene.

Postoperative control was performed after 7, 21, and 30 days, 3 and 12 months, and in the third postoperative week, it was already possible to observe the harmony between teeth, gums, and lips, as well as healthy periodontium (figures 14-16).



Figure 14 - 12 months post-operative



Figure 15 - 12 months post-operative

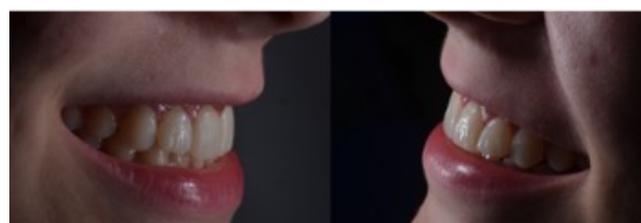


Figure 16 - 12 months post-operative

Discussion

Dental procedures are guided by health promotion and tissue preservation. However, many patients also seek dental care aiming to improve the appearance of their smile [15]. In order to achieve patient's expectations, their opinion must be carefully considered when planning treatment [2]. Some aspects relevant to the aesthetics of the smile must be considered, seeking balance between teeth, lips and gums, in addition to the way in

which these structures relate and harmonize with the patient's faces [3, 13].

EGD can present different etiologies, isolated or associated with other conditions [3, 16]. Among its causes, altered passive eruption is one of the most recurrent. This statement agrees with the diagnosis of the two cases presented, reiterating the importance of a careful diagnosis [12, 16]. Based on the difference between the recommended therapies, even for the same type of classifications, the APE diagnosis must be carefully evaluated, considering its subdivisions [1, 12]. Also, the treatment for the correction of the gingival smile can also consider multidisciplinary approaches [3, 14]. This can be noted in descriptions of case 2, which obtained an improvement in aesthetics from the association of periodontal surgery with direct restorations in composite resin.

Different surgical techniques can be considered for treating APE, depending on the amount of keratinized tissue and the aesthetic appeal of the area [1, 3, 12]. The amount of keratinized tissue determines the type of surgical incision, which may or may not remove part of that tissue. Emphasizing the need for the presence of at least 3mm of this tissue, to provide health space to the structures of the supracrestal attachment [1, 3, 12, 16].

Osteotomy can be performed using apically repositioned flap procedure (RFP). This technique can combine conventional protocol for gingivectomy with bone resection procedures. In other words, osteotomy by the removal of the alveolar bone and osteoplasty, promoting a new architecture to the bone [7, 16]. Gingivectomy is indicated when keratinized gingival tissue is abundant, considering that after its removal there is still less than 3 mm of free marginal gingiva concerning the alveolar bone crest [4, 7].

Bone recontouring can be required considering the proximity between the CEJ and the alveolar bone crest and/or little thickness of the alveolar bone [3]. As described in case 1, the flap technique was chosen, due the large need of bone recontouring, to increase the clinical crowns. It is extremely important to perform osteoplasty with a positive curvilinear shape to decrease bone enlargement and minimize the chance of soft tissue relapse after surgery since the final gingival architecture is determined by the underlying bone architecture.

Another periodontal surgical approach for correcting gingival smiles caused by an APE is the flapless technique. This technique, applied in the second case, is used for thin and intermediate

periodontal biotypes, where there is no need for extensive osteoplasty [3, 16]. Dispensing the flap elevation and performing osteotomy via gingival sulcus is a minimally invasive alternative. Additionally, this technique preserves the periosteum and provides greater blood supply to the tissue, generating less bone resorption and contributing to healing, with a faster and more comfortable postoperative period. Indicated for cases where space does not maintain the correct distance (3mm), an osteotomy is indicated via a gingival sulcus with micro-chisels. Given the indication for fine and intermediate periodontium, the technique must be carefully performed, avoiding risks of tissue lacerations [7, 16].

In 2014, Ribeiro *et al.* [16] performed a randomized clinical trial comparing two techniques addressed in clinical cases. As result, it was found that both techniques produced significant reductions in excess gingival tissue. In 12-month of follow-up, it was observed that the reduction achieved was similar in the groups.

To perform the flapless technique, prior planning and accurate diagnosis are essential. Through clinical and imaging exams it is possible to increase the predictability of the procedure [6]. Januário *et al.* [6] published a computed tomography technique using a lip retractor, facilitating the visualization of periodontal tissues, as the mucosa is removed from the gingival tissues, it is possible to visualize the buccal and lingual gingiva, making it possible to determine the dentogingival dimension.

Attention should be paid to the complexities of the flapless surgical technique, since it is a clinically blind procedure, where the bone limit is not freely observed, requiring tactile sensitivity to define the limits of osteotomy and osteoplasty [12]. When comparing the surgical time of these techniques, studies have shown that, in addition to reducing postoperative discomfort, the flapless technique has a 25% reduction in chair time [12].

Conclusion

Based on the results of these clinical follow-up, it is concluded that even though using different surgical approaches, the results were predictable and aesthetically favorable. This fact demonstrates the importance of the correct evaluation and indication of the techniques, respecting the individualities of each clinical condition.

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