Minimally invasive Dentistry applied to esthetic transformation of the smile

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Introduction: Minimally invasive dentistry allows aesthetic transformation of the smile in a fast and predictable way, since it is sustained by the basic concepts of biology, function and aesthetics. The preservation of the enamel structure is fundamental for the long-term restoration stability. For this, the preparation strategy must be defined, guaranteeing the minimum removal of the tooth structure giving ideal working conditions for the dental technician (ceramist) who makes the ultra-thin ceramic laminates veneers. **Keywords:** odontologia minimamente invasiva, esmalte, laminados cerâmicos.

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

INTRODUCTION

Adhesive Esthetic Dentistry currently allows clinicians to make changes in patients' smile in a fast, predictable and durable way; but, for that, some basic concepts of Dentistry must be respected. A restorative treatment must be supported by the triad biology, function and esthetics. Each one of these points must be carefully analyzed before planning, assuring that the results of the treatment will be long-lasting.

Minimally invasive procedures have been defended in Dentistry[1,2] for a while, since it is unanimous that adhesion to the enamel structure is superior when compared to adhesion to the dentin structure. Therefore, several restorative techniques have been improved with the aim of promoting less dental abrasion and create restorations increasingly thinner; yet, in order to do that, once more it is important to emphasize that basic Dentistry concepts must be followed.

Nowadays, there are many techniques for smile esthetics transformation, such as composite resins, ceramic partial fragments, contact lenses and ceramic laminates veneers. However, we frequently ask ourselves: What is the best technique to be applied? In our notion, decision making by the professional must be guided by some criteria, which are listed below:

What is the patient's degree of esthetic demand?

What is the patient's expectation regarding maintenance and durability of the treatment performed?

Does the patient accept dental structure abrasion for performing the restorative treatment?

What are the present conditions of the dental structure to be restored? Does the tooth show previous restorations or surface stretched by previous procedures?

For the restoration that will be performed, is there enough space without the need of creating restorations with upper-contouring?

With the aforementioned criteria well defined, the professional will be able to draw a planning that will meet all the patient's expectations and, at the same time, will ensure the best clinical approach for the case.

This article aims at showing the solving of a clinical case addressing the concepts of Minimally Invasive Dentistry in smile esthetics transformation.

CLINICAL CASE

A male patient sought the dental clinic with esthetic distress and, consequently, he would like an esthetic 'reanatomization' of the smile after the orthodontic treatment (Fig 1, 2). The planning was developed after anamnesis and a protocol of photos, videos, modeling and facial arch for assembly in semi adjustable articulator. During anamnesis, the patient showed to be extremely demanding regarding the esthetic result. When he was questioned about his dental structure being eventually worn due to the treatment, he said he did not mind it, as long as it was not extremely aggressive and that the esthetic results were guaranteed. These are fundamental parameters for the basis of the whole planning.

During the diagnosis stage, it was possible to observe that the enamel of the teeth surface showed scratches caused by the removal of brackets from the orthodontic treatment previously performed (Fig 3, 4).

Figure 1: Smile in a frontal view.

Figure 2: Initial intraoral photo in a frontal view.

Figure 3: Left Initial close-up photo, where we can see the dental surface with stretches caused by removal of an orthodontic bracket.

Figure 4: Right initial close-up photo, where we can see the dental surface with stretches caused by removal of an orthodontic bracket.

In the analysis of the emergence profile of the teeth, we noticed that they showed a correct emergence profile, which did not enable building additive restorations (without tooth abrasion) in that region of the tooth, as we can see in Figure 5. Being aware of all this information, the choice was transforming the smile by making use of ultra-thin ceramic laminates veneers. The planning consisted in prophylaxis, dental bleaching and the making of ten ultra-thin ceramic laminates veneers (from elements #15 to #25) and two ceramic partial fragments in the lower incisive teeth (teeth #31 and 41#).

After prophylaxis and bleaching, addition silicone was used for modeling (Honigum/Silagum DMG) and a mold was created in order to elaborate the diagnostic wax-up. A silicone guide was made over the diagnostic wax-up to perform the test-drive (mock-up or simulation). The test-drive is an important stage, for it will function as an orientation in several stages of the treatment and, also, it is a fast and practical way of allowing the patient to visualize the intended final result (Fig 6).

Figure 5: Side view of the left central incisive, where we can see that the emergence profile of the tooth was already adequate. Therefore, we were not able to perform restorations without preparations; otherwise, we would be creating restorations with upper-contouring.

Figure 6: Front view of the test-drive result.

Tooth preparations must be strategically planned, providing the ceramist with adequate conditions for making the restorations with proper shape and emergence profile.[3] The preparations were done over the test-drive, with the aim of minimizing dental structure abrasion.[3] Magnification is also a key point in the practice of minimally invasive Dentistry; in that case, preparations were done by magnification through an optical microscope (Proergo Zeiss). We know that the critical region of a tooth is the cervical one, the area that shows the lowest thickness of enamel and is, therefore, a region that must be prepared with extreme care, assuring that the dentinal tissue will not be exposed.[4] In cases of closure of diastema, such as the case in question, preparations in proximal regions must have intrasulcular termination, ensuring the correct emergence profile of the restorations (Fig 7). If that is not done, restorations will have an inadequate profile, which may create further areas of plaque and food retention, causing inflammation of the gingival tissue.

The preparations were finalized, having been done 100% in enamel, which guarantees a better condition of adhesion during the cementation process (Fig 8 to 11). Final modeling was done with a double step technique, using addition silicone (Honigum/Silagum DMG).

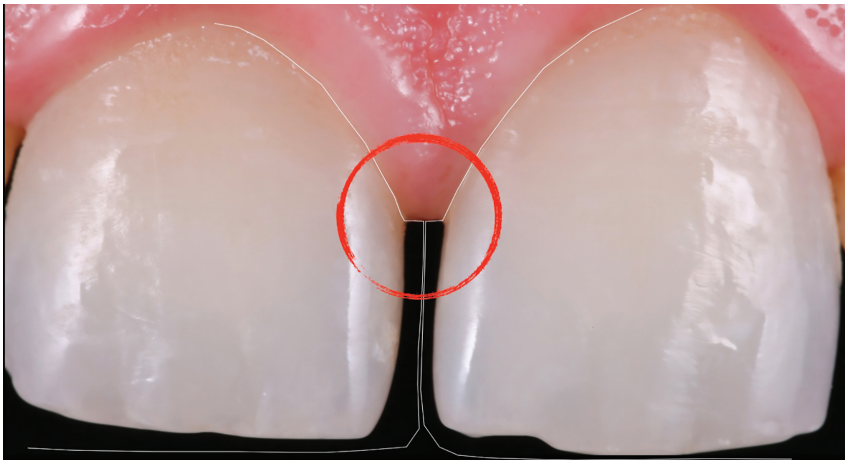

Figure 7: Scheme showing how the proximal contouring of the restoration would be if the termination of the preparation were not placed in the intrasulcular region. For the closure of the diastema, it would be necessary changing the dental shape, which would result in a restoration with erroneous contouring.

Figure 8: Front view of the finalized preparations.

Figure 9: Approximate view of the central incisive preparations, showing how the termination in the proximal region was placed intrasulcular.

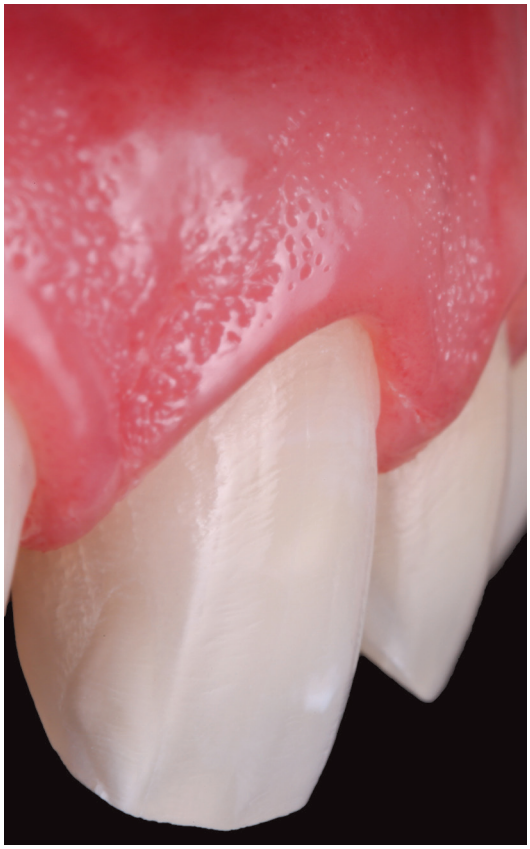

Figure 10: Approximate view of the central incisive cervical termination, showing how the enamel in that region was preserved.

Figure 11: Approximate view of the tooth preparation, evidencing the incisal termination with 45 degrees of palatal inclination.

At the laboratorial stage, final restorations were made with fluorapatite-based ceramic (IPS d.SIGN, Ivoclar Vivadent) on a refractory, following criteria of shape, texture and color, even in ultra-thin restorations (Fig 12 to 16).

The trying stage was divided into two phases: dry try, for checking adaptation and contact points; and wet try, for defining the resinous cementum of election for cementation (Fig 17, 18). Adhesive cementation was performed by using transparent resinous cementum (Variolink II, Ivoclar Vivadent). Once the cementation process was over, the next steps are the removal of excessive cementum, occlusal adjustment and final polishing (Fig 19, 20).

Figure 12: Ceramic restorations over the rigid model.

Figure 13: Side view of the ceramic restorations, evidencing the surface textures.

Figure 14: Palatal view of the ceramic restorations, showing how the preparations allowed the closure of the diastemas without impairing the correct restorations profile.

Figure 15: Wet ceramic restorations under rigid model, showing the low thickness of the pieces.

Figure 16: Ultra-thin ceramic restorations.

Figure 17: Wet try of the ceramic restorations.

Figure 18: Side view of the left central incisive during dry try.

Figure 19: Final result immediately after adhesive cementation.

Figure 20: Side photo of the smile, immediately after adhesive cementation.

CONCLUSION

When Minimally Invasive Dentistry is executed in accordance with the basic concepts of biology, esthetics and function, it allows us rebuild smiles in a fast and predictable way. Understanding of the fundamental criteria in deciding the technique to be applied is paramount for the success of the treatment. Thus, it is evident how tooth preparation, when it is done in a strategic way, is important to assure the ideal conditions in the restorative process.

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