

Aesthetic approach for anterior teeth with enamel hypoplasia

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Abstract

Enamel hypoplasia is a developmental defect of the enamel that is produced by a disturbance in the formation of the organic enamel matrix, clinically visible as enamel defects. Disorders that occur during the stages of enamel development and maturation reduce the amount or thickness of the enamel, resulting in white spots, tiny grooves, depressions and fissures in the enamel surface. The complexity and intensity of the dental deformity lesions will conduct the ideal treatment-associating conservative techniques. This article presents a case report of a restorative treatment of enamel hypoplasia using hybrid composite resin to mask color alteration and enamel defects. An aesthetic appearance that respects the tooth polychromatic and the self-esteem of the patient can be achieved with this approach.

Keywords: Composite resins, dental restoration, enamel hypoplasia, enamel defects

Introduction

In dentistry, the concept of aesthetics is extremely subjective and is related to beauty, harmony and the needs of the patient. The interactions between new restorative materials and techniques allow the reproduction of dental structures, restoring form and function in such a way that restorative procedures become imperceptible.^[1,2]

Nevertheless, during the evaluation of aesthetically compromised teeth, we encounter unfavorable clinical situations of great complexity, characterized by deep invasions of the mineralized structures. The reproduction of the optical characteristics of the teeth, such as translucency, opalescence and fluorescence, requires a considerable knowledge of restorative techniques and the materials currently available.^[3,4]

Dental enamel defects have been associated with a broad spectrum of aetiologies, including genetic and epigenetic factors such as systemic, local and environmental factors.^[5] A serious disturbance that occurs during the stages of enamel

formation will impact the quality and/or quantity of the enamel formed, depending on the phase of amelogenesis that is affected and the duration of the stimulus on the ameloblasts.^[5] The consequence of this disturbance in the formation of the organic enamel matrix is enamel hypoplasia, which can be characterized as small grooves, depressions and cracks in the enamel surface that can be viewed in mild cases.

This article presents a case report of a restorative treatment of enamel hypoplasia using hybrid composite resin to mask color alteration and enamel defects of the anterior upper teeth.

Case Report

A 22-year-old female patient was referred to the dental clinic, reporting a visual discomfort from the presence of irregularities and discoloration in the maxillary incisors. Dental history and clinical examination revealed that she had a soft form of enamel hypoplasia [Figure 1]. Clinical examination also evidenced an enamel defect in the maxillary lateral and central incisors, with rough surfaces with irregular

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Figure 1: Initial clinical aspect of the maxillary incisors

limits that principally involve the middle third of the crown [Figure 2].

The clinical situation revealed that it was not possible to re-establish aesthetics and function without the use of a restorative procedure. The position and pattern of the enamel irregularities, the occlusion and a tooth remnant with a large substrate suggested that a composite resin restoration would be a reliable option for this case. The patient was systemically healthy, presented an overall plaque index and gingival index of below 10% and the restorative area was free from visible plaque.

A slight enameloplasty, using a spherical 1015F diamond bur (KG Sorensen, São Paulo, Brazil) and manual instruments, was performed on both the irregularities and the limits of the tooth defect [Figures 3 and 4]. The regularization of the defects created a good substrate that was favorable for adhesive restorations.

The color was recorded using the Vitapan Classical scale (Vita Zahnfabrik, Bad Säckingen, Germany), and the shade A2/A3



Figure 2: A buccal view of the central and lateral incisors with hypoplastic alterations



Figure 4: Enameloplasty with a spherical diamond bur for smoothing out defects

was considered as the initial color. Briefly, the dental surface was acid etched (35% phosphoric acid) [Figure 5], rinsed for 30 s and dried with absorbent paper. A two-component adhesive system (AdheSE, Ivoclar Vivadent AG, Schaan, Liechtenstein) was applied on the dentin and the enamel and was light-cured for 10 s with an intensity of 1400 mW/cm² (Radii LED Curing Light, SDI, Australia) [Figure 6].

A combination of the incremental and stratified layering technique was used to fill the tooth using a highly aesthetic nanohybrid composite resin, IPS-Empress (Ivoclar Vivadent AG). The composite was added in increments of 1.5–2 mm and was light-cured after every layer, according to the manufacturer's instructions. First, the dentin was simulated with a thin layer of a microhybrid composite (DA3) and a final layer with an enamel composite (EA2), which was placed with a fine #2 brush (Cosmedent, Chicago, USA) for fine detailing/texturizing to simulate the enamel, increasing the final brightness of the restoration [Figure 7].

The contouring was refined using 30-blade carbide trimming burs (9714FF, KG Sorensen), and the final polishing was performed with a high-luster polishing paste (Opal L, Renfert GmbH, Hilzingen, Germany) using goat-hair brushes and cotton buffs (Renfert GmbH). Four months after the



Figure 3: Delimitation of the tooth irregularities with graphite



Figure 5: The dental surface was acid etched (35% phosphoric acid)



Figure 6: A two-component adhesive system was applied on the dentin and on the enamel



Figure 8: Lateral incisor after the polishing of the restoration

restoration, a good final aspect was observed and the lateral smile view exhibited an imperceptible restoration [Figures 8 and 9].

Discussion

With the valuation of aesthetics, minimally invasive restorative techniques have provided an expansion of the current conservative philosophy.^[1,6] Nevertheless, during the evaluation of aesthetically compromised teeth, we encounter adverse clinical conditions of great complexity, marked by the invasion of the mineralized structures at depth.

Enamel hypoplasia is an incomplete or defective formation in the organic matrix of the enamel and remaining certain areas susceptible to decay; it is responsible for a major proportion of lesions. The irregularities present in a hypoplasia provide favorable conditions for the retention of plaque and the early development of caries lesions, which progress and reach deep into the enamel and the dentin.^[7]

One of the signs of hypoplastic lesions is diminishing enamel luster and dental surfaces that have become eroded with cavitations and irregular wear because of the loss of the microanatomy affecting the color, morphology and texture



Figure 7: A clinical view of the central incisor immediately after the restorative procedures



Figure 9: Final appearance of the restoration

of teeth. On some occasions, hypoplasia is mistaken for fluorosis; however, enamel hypoplasia is an incomplete or defective formation in the organic matrix of the enamel, triggered by diseases, systemic disorders, trauma and infections in the pulp of deciduous teeth.^[6] It manifests with partial or complete absence of the enamel, which can be systemic (when it affects a group of teeth) or local (when it has asymmetric distribution and is relegated to a single tooth).^[6]

Because it is neither fully transparent nor fully opaque, the enamel is a tissue whose optical characteristics are not easily reproduced. Some modern composites provide optical similarities consistent with natural teeth,^[3] yielding satisfactory levels of opalescence, value and chroma.^[4]

It is important to consider that the final restoration is dependent on both the thickness and the varying degrees of translucency and opacity of the several layers of the composite. Of all dental structures, enamel seems to be the optical entity that is most difficult to imitate.^[3] Reston *et al.*^[2] describe a minimally invasive technique performed in cases of enamel hypoplasia based on enamel microabrasion and complemented with composite resin restorations. The procedures employed are simple, but they require knowledge of the real causes of the staining and comprehension of restorative techniques.

Various treatment protocols may be performed, depending on the level of involvement and the severity of the lesions. Usually, these approaches include enamel microabrasion, aesthetic conservative restorations and dental whitening.^[6,8] Composite resin restorations are fully capable of reproducing the appearance of a natural tooth with highly aesthetic outcomes.^[9] In this context, the main goal of the treatment of enamel hypoplasia is to re-establish the anatomical harmony between occlusion, function and aesthetics and to restore patient self-esteem, promoting social and psychological benefits.

Conclusion

In conclusion, this case report demonstrates that restorative rehabilitation, in addition to promoting health, may provide a more favorable aesthetic appearance for the smile, matching the tooth polychromatic and raising the self-esteem of the patient.

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