

# Resin composites direct restoration of enamel structural defects – case report

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## ABSTRACT

During dentition development stages, various defects of the dental structures can appear and can be in shape, number, position, structure. The latter primarily affect the aesthetic appearance, but also the other functions of the dentomaxillary system, when the severity of the lesions is important. Enamel hypoplasia in the frontal area of dental arches, with moderate extension of defects, can be easily treated with modern resin composite materials using adhesive technique, by direct restorations. In this way, the coronal morphological integrity and the harmonious dento-facial appearance are restored. Restorations for this type of dental lesions need to be carefully monitored and retreatment performed if necessary.

**Keywords:** resin composite, enamel hypoplasia, direct restoration

## INTRODUCTION

Impairing the aesthetic appearance in the anterior area of the dental arcades is most often the first reason why patients come to the dental practice. An unpleasant physiognomic aspect, unsuitable for the patient and society is firstly the result of the loss of hard dental tissues, which is present in different types of pathological situations such as: dental caries, dental trauma, tooth wear or different developmental defects of dental hard tissues [1]. Also, the dental lesions without any enamel or dentin loss are responsible for an aspect that does not fit into the accepted norms regarding the facial aesthetics ap-

pearance, when they are predominantly in the frontal area of dental arches. From this category we can mention: tooth discoloration, some structure lesions of dental tissues (mild fluorosis), dento-alveolar disharmony.

Restoration of the affected aesthetic function can be mostly achieved by direct restorations using resin composites. Nowadays this is possible due to the special advance of the dental restoration materials technology and industry, which has influenced and continues to influence treatment techniques [2]. Thus, the evolution of adhesive techniques from a few decades ago and their spectacular improvement

to the properties they present today, led to the development of minimally invasive and conservative dentistry, so that the sacrifice of sound dental tissues is minimized [3,4]. At the same time, the new restoration materials, among which the composite resins occupy the first place, exhibits now aesthetic, mechanical, biological properties and possibilities of adhesion to the dental tissues, without precedent. As such, their use is quasi-universal, regardless of the etiology of the dental pathology. There are currently on the market composite materials with specific properties for different types of dental lesions, which offer very good results for direct restorations regarding morphological, aesthetic and functional criteria.

The dentist must know in detail the particularities of the composite materials, in order to choose them accordingly to the each clinical situation. Also, the practitioner must carefully select the restoration material when requirements of both functionality and superior aesthetics must be fulfilled simultaneously: good mechanical properties, also superior optical properties and finishing and polishing of the restoration surface [5].

Structural defects of enamel and dentin occur as a result of systemic or local conditions of the body during their development stages. The etiologies are multiple and, depending on the localization of the defects and their appearance, we can identify with a high probability the etiological agent and the period in which it exerted its effect: during morphodifferentiation or calcification phase. The common clinical forms are: amelogenesis imperfecta, dentinogenesis imperfecta, enamel hypoplasia, dentin dysplasia, enamel pearls, dental dystrophies of number or shape [6].

Amelogenesis imperfecta can be: hypoplastic, hypomaturation, hypocalcified and its etiology is genetic. By contrast, enamel hypoplasia has both systemic etiology, when almost the entire dentition is affected (birth injury, congenital syphilis, infectious disease like measles, chicken pox at early ages, high deficiency of vitamins A, C, D) or local causes (local trauma or infections in deciduous teeth) [7].

The clinical aspect of enamel defects is various and can be: white opaque enamel spots, grooves, but the general enamel appearance is hard and translucent. Also, in mild to moderate forms, the pits can be presented in rows, horizontally displaced, or even large areas of enamel are absent in severe enamel hypoplasia. Sometimes, in time, dental caries can develop from that enamel defects [8,9].

The treatment for enamel lesions is related to the aspect, the severity of the structure alterations, the extent of the lesions in one tooth/all teeth and is in general achieved by direct restorations with resin composites, ceramics or composite veneers for ante-

rior teeth or tooth whitening if necessary. In very severe cases the patient can need an entire mouth prosthetic rehabilitation [10,11,12].

## CASE REPORT

A patient, male, 24 years old, has presented to dental practice for restoration of the lesions localized in all mandibular incisors and canines (Fig. 1). The patient could not specify when the defects appeared, he admitted most probably having them since childhood. All areas presenting loss of hard dental tissues were localized in vestibular surface, affecting also incisal margins. The clinic examination and anamnesis were performed in order to identify the etiology of enamel loss and the extent of it. Patient denied any trauma or accident at this level, no parafunctional habits which could lead to wear tooth. Also, the loss of dental tissues is not related to dental caries. The diagnosis based on all clinical signs and patient medical history is enamel hypoplasia. The treatment we decided to use for regain aesthetic aspect and functionality of the involved teeth is direct restoration using resin composites. In this case the dental material must fulfill to the same extent aesthetic requirements in order to mimic the properties of natural tooth structures like color, shade, translucency, superior polishing, and also must present good wear resistance, because of the incisal edge involved and the occlusal contacts with the upper frontal teeth. The resin used is a nano hybrid composite Charisma Diamond® (Kultzer), which meet the criteria mentioned before.



FIGURE 1. Enamel hypoplasia in mandibular front teeth

After removing dental plaque by professional brushing, the enamel defects were again inspected in order to identify if any altered hard tissues must be removed. No need for this, so the next step was to obtain dental adhesion for the restorative resin material. Total etch technique was used, by first applying 35% phosphoric acid (Gluma Dental Etchant, Kultzer) for 20 seconds, both on enamel and dentin (Fig.2).

After the completely cleaning of the etchant and slightly drying the cavities with air, we applied den-



**FIGURE 2.** Applying 35% phosphoric acid for total etch adhesive technique

tal adhesive (Gluma<sup>(R)</sup> Bond Universal, Kultzer) which was light-cured for 20 seconds (Fig. 3). From this working stage on, a transparent celluloid matrix was used in order to obtain a proper individual shape and morphology of every restored tooth and correct proximal points.



**FIGURE 3.** Dental adhesive applied into the enamel defects

The pre-selected resin composite was inserted into the cavities and every layer also light-cured for



**FIGURE 4.** Polishing the restorations surfaces with abrasive discs



**FIGURE 5.** Final aspect of direct resin composite restoration of enamel hypoplasia lesions

20 seconds. The occlusal adaptation was checked and all needed adjustments were done using diamond burs, then the restorations were polished with abrasive polishing discs and gums (Fig. 4, Fig. 5). Unfortunately the direct restorations with resin composites of enamel and dentin structure defects has in general a lower time survival rate, mostly depending on the type and severity of the developmental dental defects. For this reason this kind of direct restoration must be carefully monitored and re-treatment performed if necessary [13,14].

## CONCLUSIONS

Restoration of hard dental loss is achieved first of all with resin composite materials, using direct technique, in one session treatment. The results are spectacular, without high costs for the patient and very good in terms of quality and longevity of restorations, when the adhesive technique protocol is correctly applied. This type of treatment is also the method of choice for dental structure defects, like enamel hypoplasia lesions, with a limited spatial extension and when only an improvement of the aesthetic appearance is necessary.

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