Resin Infiltration of Hypomineralized Enamel Defects with Composite Resin Combined Restoration: Case Report

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Abstract

The purpose of these case reports is the aesthetic treatment of enamel defects using the resin infiltration method and conservative approach.

The treatment of three patients who came to our clinic complaining of an opaque enamel lesion in the upper anterior region is described. During oral examination, it was determined that the teeth were healthy but there were superficial and deep developmental defects. Before starting the restorative procedures, it was planned to treat the teeth using the resin infiltration method. The Icon infiltration technique, which has microinvasion technology, was applied in accordance with the manufacturer's instructions. Follow-up examinations were performed at 2, 6, 8 months and 1 year in 3 cases.

The most aesthetic results can be achieved in a short time by using the resin infiltration method and minimally invasive approaches. The micro abrasive technique is effective in superficial defects, but is insufficient in more advanced deep enamel defects. A combination of resin infiltration technique, composite resin restoration and bleaching procedures to treat increased opacity, discoloration and defects in the anterior teeth can result in a homogeneous and aesthetic appearance of the teeth.

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Keywords: White enamel lesion, resin infiltration, aesthetic. .

Introduction

White spot lesions (WNL) are very common defects in the anterior region and usually contain only enamel tissue. These may result from enamel demineralization, early carious lesions that develop after orthodontic treatment, fluorosis, and various developmental disorders. Developmental defects can be in the form of hypomineralization, where the enamel surface is intact, or hypoplasia, where there is structural enamel loss. These; Traumatic hypomineralization, molar incisor hypomineralization (MIH), Turner hypoplasia and idiopathic hypoplasia may occur (1). Initial enamel

demineralization is an opaque white-looking area limited to the enamel tissue, lighter than the natural tooth color without cavitation. BNL are demineralized areas that cause problems in patients with aesthetic concerns (2, 3). It is important to support remineralization before cavitation occurs and to stop the progression of lesions with conservative treatments (4). Many techniques stand out in the treatment of BNL. These techniques are casein phosphuretted amorphous calcium phosphate, fluoride application, laser application, micro abrasion and restorative procedures. In BNL, any technique can be chosen depending on the course of the disease (5).

In the treatment of BNL, the 'Resin Infiltration (RI)' technique, which is a non-invasive method that does not require anesthesia, has come to the fore (3, 6, 7, 8).

The aim of the resin infiltration technique is to ensure the penetration of low viscosity resin into the body of the lesion, blocking the pores and preventing the progression of the lesion. By hardening the resin with light, it provides mechanical support to the fragile enamel in the lesion area and provides a much more resistant structure. However, microporosity is filled and cariogenic microorganisms are kept in the inner parts of the lesion and are not allowed to benefit from nutrients (3, 7, 8).

The treatment approach varies according to different lesion types, with and without cavitation. In case of cavitation, a restorative approach is needed; In cases without cavitation, preventive treatments have been reported to be useful (9).

The resin infiltration system achieves the same bond strength as conventional adhesive systems on demineralized and intact enamel surfaces. These results show that initial cavitated enamel lesions can be successfully restored with composite, and in the same step, demineralized enamel at the edge of the cavitation can be protected by resin infiltration (10).

Case 1

The patient applied to our clinic with the complaint of opaque white lesions on his upper front teeth. In the anamnesis taken, it was learned that the patient had no pain or any systemic discomfort or complaints other than aesthetic complaints.

Depending on the patient's age, oral hygiene status, and treatment expectations, the most conservative approach was to treat BNL with a resin infiltration technique followed by composite resin restoration. First of all, tooth number 21 was treated using the resin infiltration technique. Then, a composite restoration was applied to the area close to the incisal area of tooth No. 11, where there was a deep developmental defect, following the resin infiltration technique treatment.

In the resin infiltration technique, the enamel surface is first coated with 15% hydrochloric acid gel (Icon Etch, DMG, Hamburg, Germany) for 2 minutes. It was removed by application for a short period of time. Then, acid gel was applied with a micro brush from time to time during application to ensure homogeneous etching. Then 30 seconds. The acid was removed with water. Application of hydrochloric acid eliminated both the discoloration on the surface and the hypermineralized layer that would prevent the resin from penetrating. 30 sec to remove water from the microporosity of the carious lesion body. Ethanol (Icon Dry, DMG, Germany) was applied throughout and air dried. After this procedure, the white appearance of the demineralized areas became more evident. Then, it is applied to the tooth surface for 3 minutes in the first application and 1 minute in the second application. Low viscosity resin infiltration (Icon Infiltration; DMG, Germany) was applied with a microbrush to last. After each application, use a light device (Woodpecker BUILT-INC, China) for 40 seconds. polymerized for a period of time. Then, the deep developmental defect area of tooth no. 11 was restored with Single Bond Universal (3M ESPE, St. Paul, MN, USA), G'ænial Anterior A2 (GC, JAPAN), Modeling Resin (GC, JAPAN) transactions were carried out.

Figure 1. The first version of the case.

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Figure 2. Clinical appearance of the case after treatment.

Figure 3. Clinical appearance of the case 1 year later.

Case 2

A 20-year-old female patient applied to our clinic with a complaint of an opaque white lesion on her upper lateral tooth. In the anamnesis taken, it was learned that the patient had no pain or any systemic disorder other than aesthetic complaints. In order to realize the patient's aesthetic expectations, the labial region of tooth No. 12, which has deep developmental defects, was applied to the labial region of tooth No. 12, considering that the lesion was limited to the enamel level, using the resin infiltration technique as described in Case 1, followed by Single Bond Universal ((3M ESPE, St. Paul, MN), USA), G'ænial Anterior A2 (GC, JAPAN), Modeling Resin (GC, JAPAN) and finishing operations were carried out.

Figure 1. Initial version of the case.

Figure 2. Clinical appearance of the case after treatment.

Figure 3. Clinical appearance of the case 1 year later.

Case 3

The patient applied to our clinic with the complaint of opaque white spots on her upper right central, upper right lateral, lower right central and lower left lateral teeth and discoloration of tooth no. 21 due to endodontic treatment.

For this purpose, internal whitening treatment was applied primarily for the discoloration of the patient's devital tooth number 21. Then, as described in Case 1, resin infiltration technique was applied to all the opaque

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white spots in the patient, followed by Single Bond Universal (3M ESPE, St. Paul, MN, USA), G-G, in order to obtain a more aesthetic appearance in teeth 11 and 12. Composite resin restoration was performed with G'aenial A'CHORD JE (GC, Tokyo, Japan), Modeling Resin (GC, JAPAN). Following internal whitening treatment with 37% carbamide peroxide (Whiteness Super Endo, Dentscare, ltda, Joinville, Brazil) on the patient's devital tooth no. 21, the dentin pin on tooth no. 21 was preserved and Single Bond Universal (3M ESPE, St. Paul, MN, USA), G-aenial A'CHORD JE (GC, Tokyo, Japan), Charisma Diamond OL (Kulzer GmbH, Hanau, Germany), Modeling Resin (GC, JAPAN).

Figure 1. The first version of the case.

Figure 2. Palatal view of tooth number 21 of the case.

Figure 3. Clinical appearance after the 1st session of the resin infiltration technique.

Figure 4. Clinical appearance after the 2nd session resin infiltration technique.

Figure 5. Clinical view immediately after applying carbamide peroxide for devital bleaching process.

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Figure 6. Clinical appearance of the case 1 year later.

Dıscussıon

Active lesions that do not require restorative treatment in the early stages of enamel caries, lesions in the oral environment and acid exposure are controversial issues that are frequently encountered in the literature in terms of both prognosis and treatment (11).

White spot lesions are the initial sign of enamel caries. Dissolved minerals passing from the surface layer into saliva accumulate and try to protect the external morphology of the enamel. This situation causes a rough, opaque and chalky white appearance on the enamel surface (12).

According to Backer-Dirks, approximately 50% of BNL are able to stop or repair themselves naturally. In addition, there are various and effective treatment methods that can accelerate this repair process (13). Indirect and direct composite resin restoration techniques can be used in white spot lesions and developmental enamel defects that do not respond to micro-invasive treatments and are accompanied by material loss or cavitation. Translucent composites can be used to provide a natural appearance, and opaque composites can be used to hide opacity. It has been reported that removing dense opacities that cannot be masked up to the enamel-dentin border produces more aesthetically successful results (14). Researchers also stated that the masking effect depends on the depth and activity of the lesion (15). Torres et al. They showed that the resin infiltration technique in developmental enamel defects provides better results in terms of color masking in cases of moderate and mild fluorosis. They stated that in cases with severe hypomineralization, color masking could not be completely achieved (12).

Gugnani et al. They treated four cases of fluorosis without BNL and material loss with the resin infiltration technique, and noted this method as micro-invasive, not requiring local anesthesia, completed in a single session, and greatly improved aesthetics (16, 17).

Although there are a large number of treatment approaches reported in the literature, new disciplines are turning to 'non-invasive treatments' (9). Today, tissue loss is minimal; Restorative techniques with the most clinical success are preferred. In this sense, clinically and aesthetically acceptable results are obtained with direct composite applications in the treatment of enamel lesions (18). The fact that the material used in the resin infiltration technique is not radiopaque prevents the radiological distinction between teeth without infiltration and teeth with infiltration. The use of hydrochloric acid causes the development of a rough environment suitable for bacterial colonization in the enamel tissue adjacent to the initial lesion (19).

Kim et al. It was determined that the lesions were completely camouflaged in 11 of 20 teeth (61%) with white spot lesions on which the resin infiltration technique was applied, the lesions were partially masked in 8 teeth (33%), and there was no change in 1 tooth (6%) (20).

Of the 3 cases in which we applied resin infiltration, partial improvement was observed in two cases and no change was observed in one case. Resin composite was applied in line with the patient's aesthetic expectations and a significant improvement was observed.

Permanent teeth, it was reported that Icon resin infiltration application could be an alternative to restorative and microabrasion treatments in non-cavitated initial lesions in which the tooth color appears opaque (17, 21). This treatment appears to fill the 'treatment gap' between non-invasive and invasive interventions for BNLs (9).

Conclusıon

By using the resin infiltration method, the most aesthetic results can be achieved in a short time with minimally invasive methods. The microabrasive technique is more effective in superficial defects than in more advanced deep enamel defects. To treat increased opacity, discoloration and defects in anterior teeth, a combination of resin infiltration, composite resin restoration and bleaching procedures can provide a homogeneous and aesthetic appearance in the teeth.

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