

Moderate Molar Incisor Hypomineralization treatment with Microabrasion and Composite Resin

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ABSTRACT

Molar incisor hypomineralization (MIH) is a very common enamel development defect of the permanent molar and incisor teeth. With the eruption of the permanent molars and incisors at the age of 6-8 years, a significant need for dental treatment emerges. Discolorations and opacities in the maxillary incisors provide the grounds for varied treatment modalities, for managing MIH. Microabrasion and composite resin-based restoration can be considered as the treatment options in moderate to severely affected teeth. Here we present a case report of 12-year-old female patient, who was presented with moderately affected hypomineralized incisor teeth. Further, the patient was treated with the application of microabrasion followed by restoration with composite resin.

Key words: *Aesthetic Dentistry, Anterior Composite Restoration, Enamel Defect, Microabrasion, Molar Incisor Hypomineralization, Paediatric Dentistry*

Molar-incisor hypomineralization (MIH), with an incidence ranging from 5% to 40%, is a morphological enamel defect that can be seen on one-third or more of the surface of the occlusal permanent molars and incisal incisors. It occurs as a result of hypomineralization due to systemic causes. In addition, it may involve more than one surface of the incisors [1]. The term MIH indicates that at least 1 permanent 1st molar tooth is involved, often accompanied with the involvement of the incisors [2]. It is reported that permanent canine teeth, permanent second molars, and premolars may be involved as well [2].

Demarcated opacities are the defects with well-defined borders, manifested with changes in the translucency of the enamel, where the surface is smooth and the thickness is normal. These opacities may vary in color ranging from white to cream and yellow to brown. As the number of the affected permanent first molars increase, there will be an increased risk for the involvement of the permanent

maxillary incisors. While pain and sensitivity are often observed in the permanent molars of children with MIH, the primary concern is rather esthetic in case of the affected incisors[1]. The observable defects of the incisors also affect the psychological and social development of the children. Therefore, the management of MIH not only consists of clinical dental treatment but should include interventions to meet the psychologic and social needs [3].

This case report presents the treatment of a 12-year-old girl with MIH, whose moderately hypomineralized permanent incisors, were treated by microabrasion followed by composite resin restoration.

CASE REPORT

A 12-year-old female patient was presented to the clinic with moderately hypomineralized permanent incisors. In the initial examination, we found the bad appearance of the upper incisors, opacity in the upper anterior teeth, and

yellow-brown color change. In addition, the diagnosis of moderate MIH due to atypic caries and post-eruptive enamel fractures in the lower and upper first molar teeth were observed (Figure 1). It was found appropriate to treat the upper anterior teeth with microabrasion and composite resin because of opaque lesions and discoloration of the enamel. First, an impression was made for the restoration of the defects on the incisal edge. Then, a silicon matrix was made preceded by the mock-up. Isolation was ensured



Figure 1: Opacities and discolorations in the affected maxillary incisors due to MIH



Fig 2b: Opacity and discoloration of the enamel



Figure 4: Rough enamel Surface

by VivaDam (Ivoclar Vivadent AG, Liechtenstein) before the microabrasion procedure. The teeth were etched with 6.6% hydrochloric acid (Opalustre, Ultradent, USA) to eliminate the opacity and discoloration of the enamel (Figure 2a, 2b). After the procedure, the teeth were rinsed with water and the rubber dam was taken out (Figure 3). After the application of Optragate (Ivoclar Vivadent AG, Liechtenstein) isolation, abrasion was performed on the surface of the teeth with steel burs (MSG RF, Meisinger, Germany) under high-speed cooling water (Figure 4).

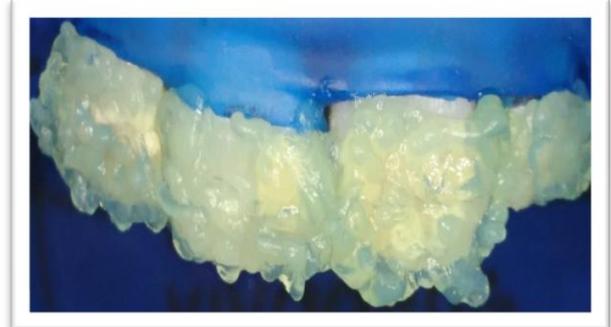


Figure 2a : The teeth were etched with 6.6% hydrochloric acid



Figure 3: After the microabrasion procedure

This process made the enamel surface rough. For the purposes of deproteinization, a piece of cotton impregnated with 5% sodium hypochlorite (Verax Hypochlorite, Verax, Turkey) was applied to the surface of the enamel for 30 seconds. Following the application of orthophosphoric acid (Scotchbond Universal Etchant, 3M Espe, Germany) and bonding (Single Bond Universal Adhesive, 3M Espe, Germany), the silicon matrix was placed and the enamel composites (Estelite Sigma Quick, Tokuyama Dental, Japan) were inserted (Figure 5a, 5b). The surface of the composite was protected with the

glycerin gel (Liquid Strip, Ivoclar Vivadent AG, Liectenstein) after the polymerization. The restorations were marked by a marker pen (Figure 6) and then, finishing touches were performed with diamond burs (MSG 888, Meisinger, Germany) under low-speed cooling



Figure 5a: Silicon matrix

water. The treatment was finalized by finishing and polishing (Rainbow Polishing Disks, Shofu Dental, Japan) (Figure 7). At the follow-up visit a month later, the teeth color were in good harmony, meeting the esthetic expectations of the patient and the family (Figure 8).



Figure 5b: Composite resin applied



Figure 6: Restorations marked by a pen



Figure 7: Final treatment



Figure 8: Follow-up after 4 weeks

DISCUSSION

The type of the defect and the resulting esthetic concerns come to the fore in the treatment of the permanent incisors [4]. Discolorations and opacities in the affected incisors lead to variable treatment options. Opacities usually occur

in the incisal third of the crown while opacities on the cervical third are rare. The untouched enamel surface is often hard, smooth, and usually hypermineralized during the maturation succeeding the eruption of the teeth, leaving the enamel at the lower layers soft and porous. As these opacities vary in shape and size, the restorations are not compatible with the general pattern of dental caries, often covering the incisal third of the crown [1].

When the teeth are mildly affected and defected with brown-yellow discolorations, etch-bleach-seal is used to treat little children and 10% carbamide peroxide bleaching is used in older children. In cases with the white to cream colored defects, microabrasion and if required, composite restorations are applied [4]. As the presented case had defects with white-cream discolorations, microabrasion was applied primarily. Although microabrasion well defines the margins of the defect, composite resins are

applied to accomplish more favorable esthetic outcomes if required.

When the teeth are affected moderately or at advanced levels, the incremental mineralization of teeth by means of saliva in time may be waited for the defect to improve. On the other hand, composite restorations are the other treatment options. In the presented case, the right and left lateral teeth had advanced defects, therefore, a composite restoration was considered appropriate. At the advanced levels of incisor hypomineralization, placing opaque resin-based composite restorations are possible following the microabrasion process, or following the interventions to the enamel. On the other hand, porcelain veneer restorations are preferred in adults [4]. In the hypomineralized teeth, the defected enamel on the interface with the adhesive is porous and fragile, leading to a weaker adhesive force. Consequently, cohesive failure causes insufficient adhesions [4]. Some authors suggest that a preceding application of 5% sodium hypochlorite to the enamel, similar to the applications in amelogenesis imperfecta, will cause deproteinization of the enamel tissue, eventually leading to increased cohesiveness [4-11]. Another view is that the affected enamel is completely removed. While the affected enamel is often easily removed using a steel bur, the normal enamel cannot usually be removed with this method [11]. However, the removal of the affected enamel using only steel burs increases the substance loss, therefore, it seems to be more appropriate to use it only for the purposes roughening of the incisors.

CONCLUSION

Despite all adversities encountered in the early diagnosis, preventive practices, and improvements in the restorative materials, advances in the treatment of the affected teeth are accomplished. On the other hand, excessive amounts of material can be removed from the incisors to endure esthetics and cohesiveness. Microabrasion before the composite resin restoration precisely defines the margins of the defect and the color of the resin to be applied. In addition, it leads to more favorable esthetic outcomes.

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