

# Molar Incisor Hypomineralization

Karine Takahashi\* / Adriana de Sales Cunha Correia\*\* / Robson Frederico Cunha\*\*\*

*Enamel defects are common alterations that can occur in both the primary or permanent dentition. A range of etiological factors related to this pathology can be found in the literature. Molar Incisor Hypomineralization (MIH) is a kind of enamel defect alteration that requires complex treatment solutions, and for this reason, it is of great clinical interest for dental practice. This article describes the management of a clinical case of MIH in a 7-year-old child. The different treatment options depending on the extension of the defect, the degree of tooth eruption and the hygiene and diet habits of the patient are also discussed.*

**Keywords:** dental enamel, dental enamel hypoplasia, permanent teeth

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## INTRODUCTION

Enamel defects are alterations that can be easily detected in clinical exams. They can affect one single tooth or a group of similar teeth. This anomaly can involve only primary or permanent teeth, or even both dentitions.<sup>7</sup>

These alterations can be found in two different stages: enamel matrix formation (secretion phase) and enamel mineralization (maturation phase). Any systemic, local or genetic factor that can affect ameloblasts, extremely sensitive cells at these stages, can also cause superficial enamel defects. If an unbalance occurs during the secretion phase, the enamel defect is called hypoplasia. If it occurs during the maturation phase, it is called hypomineralization. Clinically, both variations can occur and this can only be differed through a histological examination.<sup>12</sup>

While enamel hypoplasia corresponds to a quantitative enamel defect, hypomineralization is a qualitative defect visually identified as an anomaly of enamel translucency, also called enamel opacity.<sup>8</sup>

In hypoplasia only the tooth surface is involved and this can be considered an external defect associated to the smallest thickness of the affected enamel. It can be present as shallow or deep fossae with horizontal or vertical grooves

and with areas of partial or total absence of enamel. On the other hand, hypomineralization is clinically identified as an anomaly in the tissue translucency. A white or a color-altered area (yellowish or brownish) can be observed, but enamel surface is smooth and there is no thickness alteration. Hypoplastic and hypomineralized areas can occur in the same tooth surface.<sup>15</sup>

One alteration of great clinical importance is MIH (Molar Incisor Hypomineralization), which can be defined as an alteration of systemic etiology, in which enamel disintegration of the occlusal tooth surface can be detected involving one to four first permanent molars. It can be associated with permanent teeth calcifying during the same formative period.<sup>10</sup> MIH was first described in Switzerland, in the late 70's. The prevalence ranges from 4 to 25%.<sup>11,18</sup> Clinically speaking, asymmetrical appearance is a typical appearance, where enamel of a molar or an incisor can be severely affected while enamel of the tooth in the opposite side is either not clinically affected or present smaller surface defects.<sup>16</sup> Hypomineralized enamel has a porous and soft consistency as in a chalk. The defect color ranges from white to yellow or brownish, and it can be easily differed from normal enamel.

First permanent hypomineralized molars are subject to enamel breakdown after eruption from masticatory forces.<sup>19</sup>

These enamel defects generally do not cause discomfort, but can cause intense pain if breakdown is large. Solving this problem and possible consequences can be a great challenge for professionals as treatment can be complex.<sup>17</sup>

The purpose of this article is to describe a clinical case and treatment of MIH (Molar Incisor Hypomineralization) and discuss ways of treatment of this enamel alteration.

## CLINICAL CASE

A 7 year-old black boy attended the Clinic of Pediatric Dentistry, Araçatuba Dental School of São Paulo State University (UNESP) reporting strong painful sensibility in the permanent molar region.

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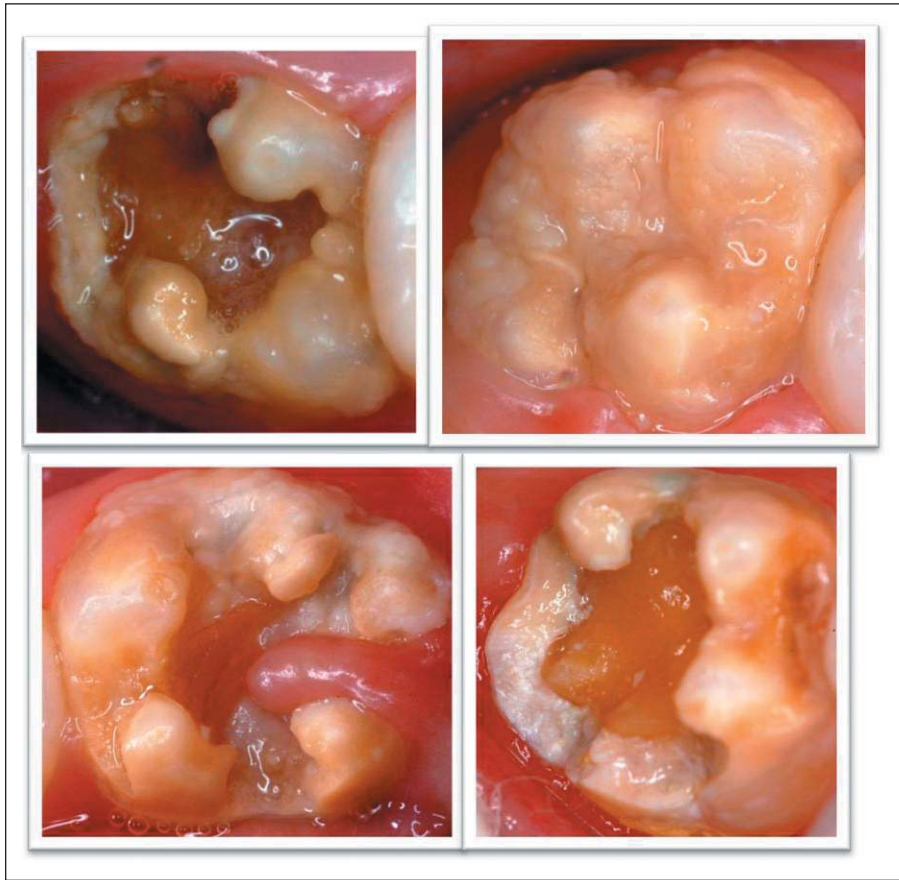
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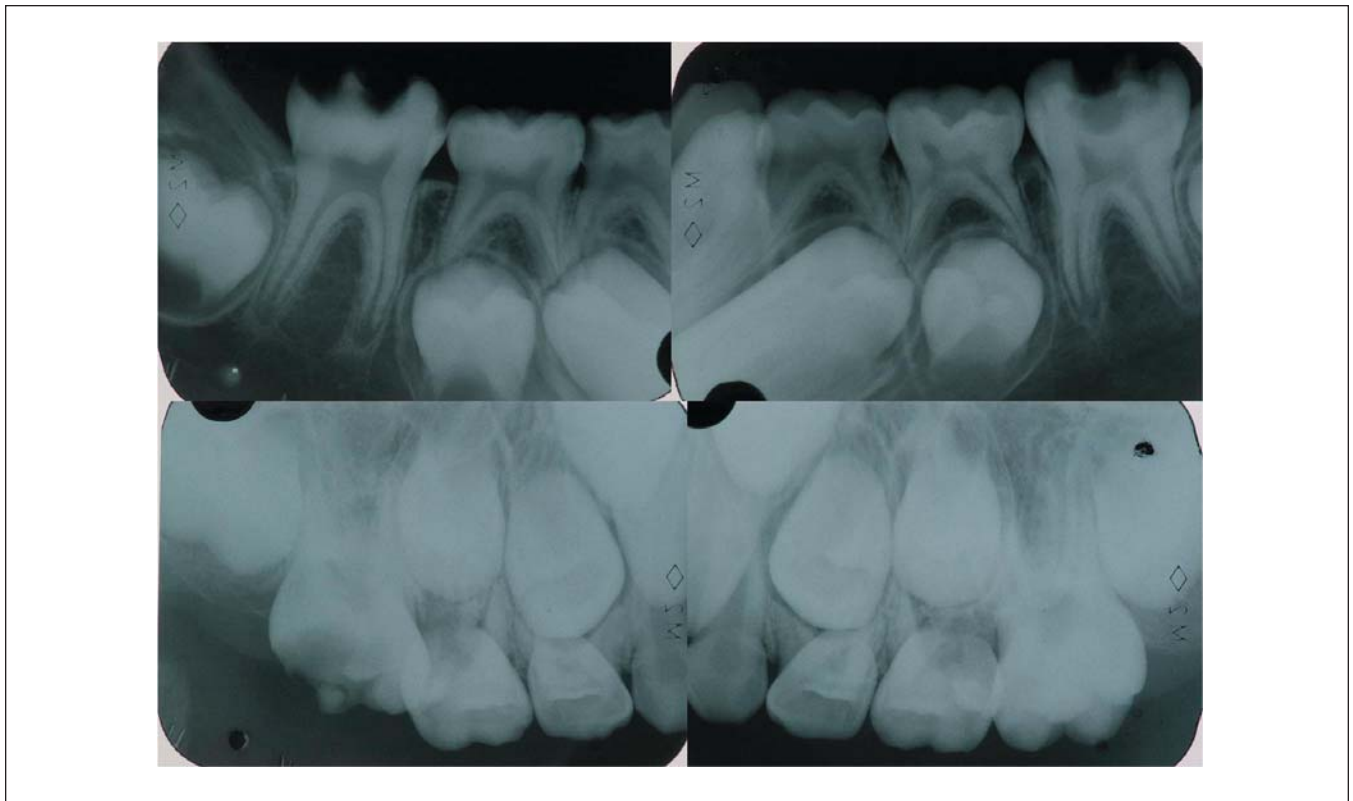
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**Figure 1.** Clinical view of first permanent molars with hypomineralization



**Figure 2.** Radiographic aspects of first permanent molars with hypomineralization

During clinical exam, enamel hypoplasia in the central maxillary incisors and all first permanent molars was identified, revealing large accumulation of dental plaque caused by poor oral hygiene. He reported intense pain in the molar region, caused by caries involving enamel and dentin mostly in left first permanent molar (Figure 1). The radiographic exam, showed that molar crowns of teeth 16, 36 and 46 were affected by deep caries lesions near the pulp tissue (Figure 2).

At first, three weekly applications of fluoride varnish (Duraphat/ Colgate) was carried out on permanent molars in an attempt to stop caries process and allow enamel remineralization.

Glass ionomer cement bases were placed in all first permanent molars (Figure 3). The patient was anesthetized with an infiltrative anesthesia (Prilocaine with felipressin, Cristália, Brazil) and the tooth was isolated with cotton rolls. Following removal of carious tissue using a carbide bur at low speed, teeth 16 and 26 were restored with a conventional glass ionomer cement (Ketac Molar Easymix/ 3M). Teeth 36 and 46 were restored using a resin-modified restorative glass-ionomer cement (Fuji II LC/GC). At first, pain was felt by the patient with the application of air or water. But after anesthesia, sensitivity decreased significantly.

After restorations were completed, and sensitivity was eliminated dental hygiene could be reinforced. An evaluation

performed two years later it was noticed that plaque accumulation was under control and restorations were intact (Figure 4).

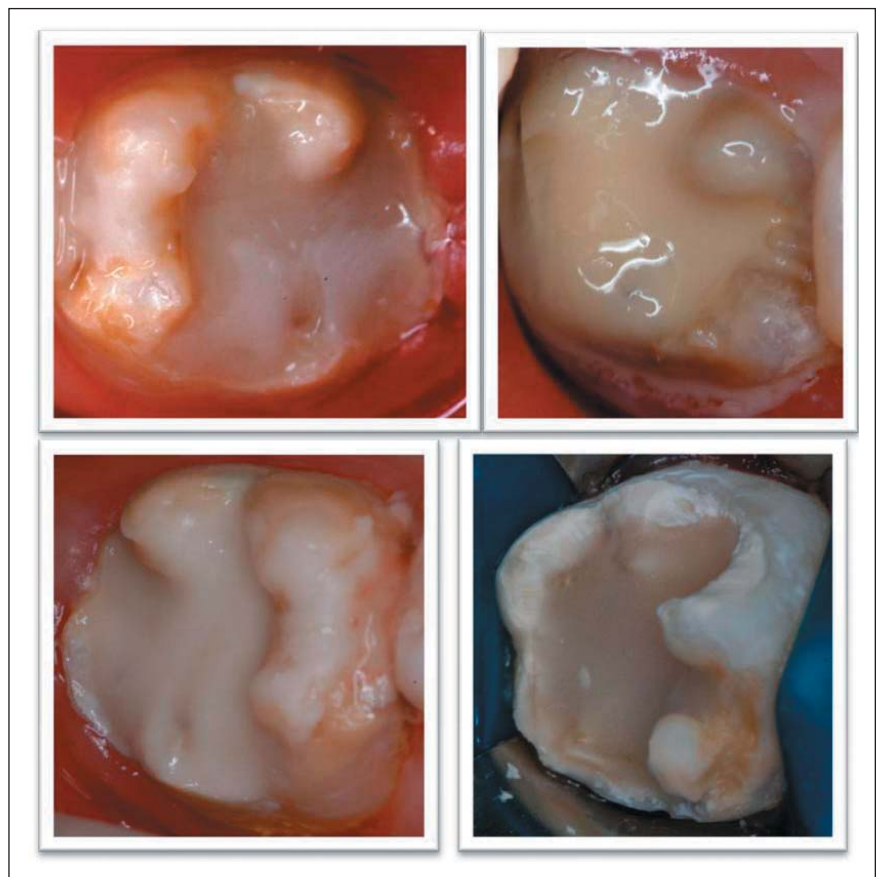
## DISCUSSION

Some systemic and environmental factors can cause injuries to ameloblasts and therefore cause hypoplasia.<sup>2,3,9,18</sup>

Enamel alterations do not follow the same evolution pattern as caries lesions in terms of location in different tooth surfaces. They may involve small areas or cusps or even the whole tooth surface(s). For this reason, the choice of materials with adhesive systems may favor the restoration of a tooth already compromised by enamel alterations.<sup>12</sup> In some cases, prosthetic restorations need to be made, from the extent of the tooth destruction. Because of the extent of the caries lesions on maxillary molars, resins were found to be the material of choice, prior placement of glass ionomer base to prevent sensitivity and the advantage of fluoride release. On the mandibular teeth due to its small caries lesion size, glass ionomer was placed as the final restoration.

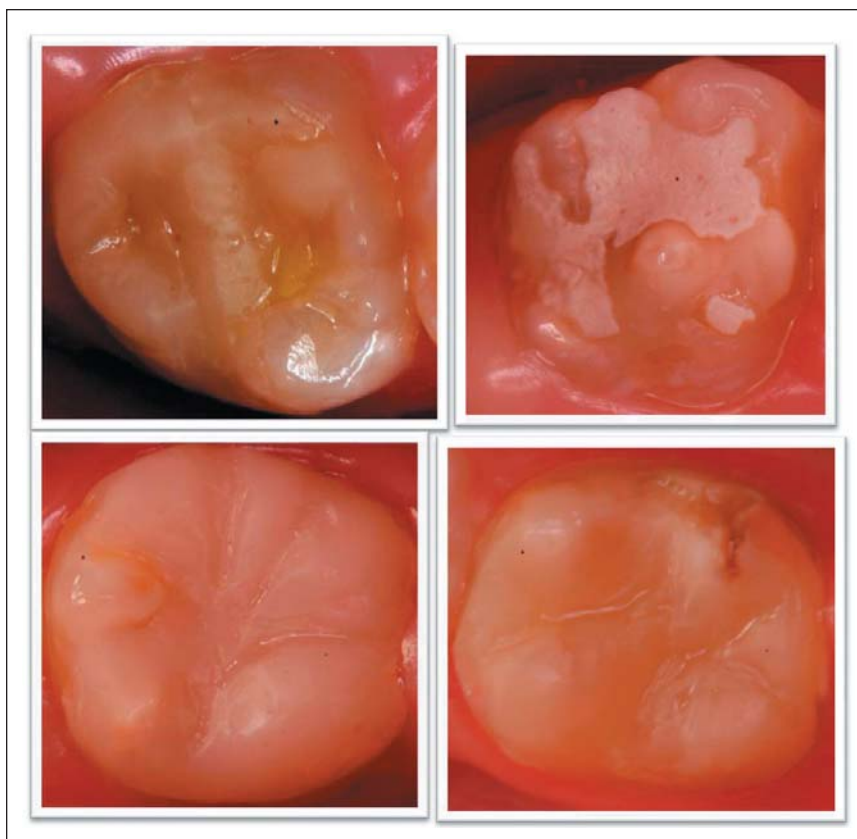
Pain sensitivity occurs mainly through thermal stimulus due to enamel breakdown and dentin exposure into the environment.<sup>10</sup> Since these teeth are at an eruption stage, a restorative approach is arduous, making dental hygiene difficult while favoring the development of new caries lesions.

Children who present this kind of enamel defects often



**Figure 3.** Temporary glass ionomer cement restorations after caries removal





**Figure 4.** Clinical aspects of glass ionomer cement restorations of upper first permanent molars, and composite resin restorations of lower first permanent molars. Follow-up after 2 years.

experience extreme sensitivity even after local anesthesia placement. This can create a great level of anxiety. In these cases we recommend the removal of soft caries tissue and placing a temporary cement (zinc oxide and eugenol) containing a cotton with hydrocortisone, neomycin sulphate and polymyxine (Otosporin, FQM, Brazil). This medicament has

the property of decreasing pain and sensitivity due to anti-inflammatory properties.

When choosing the best option for treating MIH, it is recommended the use of adhesive restorative materials while taking into account some important factor such as defect extension, sensitivity and eruption level.<sup>4,12</sup> The choice of the best therapy is directly related to the level of how compromised the dental structures are. In relatively small lesions resins or glass ionomer cements are generally. However, stainless steel crowns can be the best available option when multi surface enamel damage exists.<sup>14</sup> They are more durable and are less technique sensitive. They can be removed later for more esthetic options.

Restoration with adhesive materials need, sometimes, repetitive dentistry because of the altered enamel prismatic morphology, which may affect material adhesion and hence cause failures.

When composite resin as restorative material is chosen, marginal infiltration can possibly occur if tooth defect is extensive. Also, composite resin is technique sensible, therefore requires its placement to be in supragingival hypoplastic free enamel.<sup>5,20</sup>

Restorations with glass ionomer cement are recommended until further decision of a definitive restoration is made. Moreover, in young patients of difficult supervision, this restoration could be kept until a more appropriate behavior is achieved.

In addition to restorative treatment, preventive and interceptive measures must be taken.<sup>13,17</sup> Preventive measures

**Table 1.** Molar incisor hypomineralization: A clinical approach

MOLAR INCISOR HYPOMINERALIZATION: A CLINICAL APPROACH	
STEPS	RECOMMENDED PROCEDURE
1. Early diagnosis and establishment of etiological factors	Medical History Clinical exam Radiographic exam Eruption monitoring
2. Establishment of treatment planning	According to tooth's eruptive and clinical conditions.
2.a – Recently erupted tooth with slight surface defects	Remineralization – Fluoride therapy Hygiene and diet care Eruption monitoring
2.b – Partially erupted tooth with small hypoplastic defects associated or not to caries lesions	Restoration with glass ionomer cement or composite resin Repeat treatment option as in item 2.a
2.c – Fully erupted tooth highly compromising dental structures	Stainless steel crown Hygiene and diet care Clinical control

include dental hygiene orientations and application of fluoride varnish and sealants in order to avoid the development of new caries lesions.

## CONCLUSION

Hypoplastic permanent molars require special restorative consideration. The choice of the best restorative alternative depends on the analysis of each particular case including the extent of the lesions, patient's occlusion, esthetic factors as well as the professional experience.

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