

# Management of Molar-Incisor Hypomineralisation (MIH): a Case Report of Identical Twins with MIH

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Introduction

Molar-incisor hypoplasia (MIH) has been defined as, “hypomineralisation of systemic origin of one to four permanent molars frequently associated with affected incisors.”<sup>1,2</sup> Demarcated enamel opacities in the first permanent molars are common in many child populations with a prevalence ranging from 3.6-25%.<sup>3</sup> The first permanent molars are particularly affected while the permanent incisors and the cuspal parts of the canines can be associated (Figures 1&3).<sup>4</sup> The degree of disturbance varies between creamy white spots with a hard mineralised surface to a yellow-brown discolouration and enamel breakdown.<sup>4</sup> This poster details the restorative treatment of identical twins with MIH (Figures 1-4).

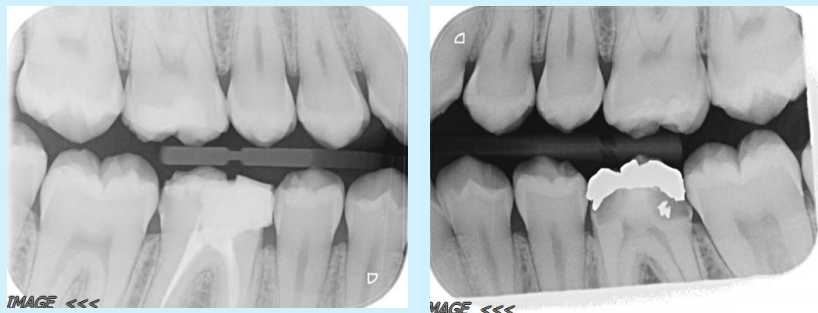
Aetiology

It is thought that ameloblasts are affected by a systemic disorder at a very specific stage in their development.<sup>3</sup> Weerheijm, describes how the ameloblasts are affected in the early maturation stage or at the late secretory phase of mineralisation.<sup>3</sup> If the primary teeth are affected there is a higher chance that the permanent dentition will be affected by MIH.<sup>5</sup>

Various causes for MIH have been suggested within the literature (Table 1). The use of antibiotics are commonly referred to in the literature with particular note of amoxicillin in the first year of life.<sup>6</sup> However, as antibiotics are often prescribed to treat disease it is often difficult to determine whether the antibiotics or disease are responsible. A recent review claimed there was insufficient evidence to determine the aetiology of MIH.<sup>7,8</sup> Many studies are limited by their retrospective nature, which relies on the memory of parents/children. A genetic link to the cause of MIH has been suggested and investigated; however, published studies are significantly underpowered and therefore it is not possible to draw definitive conclusions.<sup>9</sup>

In cases 1 and 2 there was no clear aetiology identified in the history. However, the almost identical presentation of MIH on these identical twins may suggest a genetic or prenatal aetiology, especially given there was no illnesses or medications during childhood identified in the history.

Case 1



Figures 1a-g) Case 1 Pre-operative photos



Figures 2a-e) Case 1 Post-operative photos

Table 1: Possible aetiology of MIH

• Environmental conditions
• Dioxins
• Perinatal complications
• Oxygen starvation of child
• Problems during pregnancy
• Low birth weight
• Frequent childhood diseases
• Respiratory tract conditions
• Antibiotics
• Genetic predisposition



Management Strategies

In cases of MIH, molar teeth are often associated with pain and sensitivity, making oral hygiene measures challenging even with intact enamel.<sup>3</sup> As the enamel structure is more fragile caries can develop more easily and rapidly. Challenges in anaesthetising severely affected teeth is common.<sup>3</sup> 97% of children with MIH were found to have their first molars restored and 28% had 1 or more extracted.<sup>10</sup> The majority of the restored teeth in children with MIH were repeated due to loss of restoration, caries or further breakdown.<sup>10</sup> Patients may have high levels of anxiety due to previous treatments and inadequate anaesthesia.<sup>10</sup> In addition, children may avoid brushing these teeth due to associated sensitivity exacerbating caries progression.

If an erupting molar shows signs of hypoplasia the child should be closely monitored until the eruption of all the first permanent molars. Preventative and interventional treatment should be initiated where appropriate. Oral hygiene instruction, diet advice, toothpaste advice, topical fluoride application and fissure sealants should be considered. Parents should be warned about the potential risk that incisor teeth will also be affected.

Adhesive restorations should be selected for the first molars, which aim to finish on sound non-affected enamel. As this is often hard to determine, repair or replacement of these over time is not uncommon as marginal enamel deteriorates. Where teeth are significantly broken down, medium term options include placement of prefabricated metal crowns.

The first molars should be assessed for restorability and where they are deemed of poor long term prognosis, extraction with or without orthodontic treatment should be considered. This should be done when the bifurcation of the second molars begins to calcify (usually age 8 ½ - 9 ½) to promote their more mesial eruption.<sup>1</sup>

Enamel defects affecting incisors tend to be milder than the molars. However, treatment is often required due to aesthetic implications. Minimally invasive techniques such as bleaching, microabrasion and resin inflation may partially eliminate incisor lesions to varying degrees.<sup>11,12</sup> Often masking lesions with direct composite is required to provide a conservative and predictable outcome (Figures 2&4). Opaque composites can be used in conjunction with regular shades to mask dark brown hypoplasia. If these restorations are carried out at a young age composite addition and further polishing can be performed after gingival maturation which is difficult to predict and hard to manage on indirect restorations. Indirect restorations are more destructive and there are significant implications on pulpal vitality,<sup>13</sup> with up to 30% to 72% tooth tissue removal for veneers and full coverage crowns respectively.<sup>14</sup>

Cases 1 and 2 are 17 year old male identical twins that presented to the Leeds Dental Institute from a GDP referral. In both cases the patients were unhappy with the appearance of their teeth, specifically the colour, stains and patches but not the size/spacing. They were well motivated patients and had previous treatment of the 1<sup>st</sup> molars. In case 1, MIH and caries LR6, LL6 was diagnosed, with a poor prognosis of the LL6. The LL6 and LR6 were investigated for restorability, where the LL6 was deemed unrestorable and extraction planned. An e.max<sup>®</sup> onlay LR6 and anterior direct composites were provided. In case 2, MIH and failing crown margins of the LR6, LL6 was diagnosed. The LR6, LL6 crowns were removed and deemed restorable. Replacement e.max<sup>®</sup> crowns on LR6, LL6 and anterior direct composites were provided in case 2. Both patients received preventative advice regarding fluoride, tooth brushing and diet advice.

Case 2



Figures 3a-e) Case 2 Pre-operative photos



Figures 4a-e) Case 2 Post-operative photos



Conclusions

The presentation of MIH presents a challenge to GDPs and dental specialists. It is important to discuss with parents and patients regarding the long and short term implications of MIH on the dentition. Generally there will be a number of restorative options for these teeth, however, conservative options must be considered a priority especially as the majority of patients present at a young age and are therefore likely to require further intervention over a lifetime. The cases presented demonstrate conservative management of the affected incisors with an aesthetic outcome. It is important to establish each patient’s priorities and concerns so that an individual treatment plan can be developed. These cases also demonstrate good communication with dental technicians to achieve desirable aesthetics with indirect restorations.

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