# Advice for clinicians on managing Molar Hypomineralisation in primary care

As important aspects of care for children with Molar Hypomineralisation (MH) can be managed in dental practice, this leaflet has been designed to enable the General Dental Practitioner to gain confidence in diagnosis and management of Molar Hypomineralisation (MH).

The mainstay of care involves early diagnosis by the child's own dentist and management in practice with enhanced prevention and sealants.

Specialist referral is recommended for Moderate/Severe cases* when the child is age 8 and over, or where pain is no longer being managed effectively with the measures provided in practice. All other cases can be managed conservatively in general dental practice, and can mainly be done without the use of AGPs.

**= See part two for the suggested grading system.*

Part One deals with Diagnosis, and Part Two concerns Management of MH.

**For more in-depth guidance, visit:** thed3group.org/practitioner.html

## Part One: Diagnosis and Background

**What is it?**

Molar Hypomineralisation (MH) is defined as a developmentally-derived dental defect that involves hypomineralisation of between 1 and 4 permanent first molars (FPM), frequently associated with similarly affected permanent incisors (MIH).

Second primary molars which form at a similar time as the FPM, can also be affected. It has been suggested that the presence of hypomineralisation can be an early predicator of MIH (4.6 times more likely to have MIH).

**What is the prevalence and aetiology?**

The global prevalence of MIH is 14.2%. There is no difference in prevalence between males and females. The aetiology of MIH is not fully understood. Several causes relating to disturbances during development of the incisors and FPM, either in the prenatal, perinatal or postnatal period have been described. Recent literature review suggests early childhood illnesses e.g. fever, asthma and pneumonia are likely to be associated with development of MIH.

**Diagnosing Molar Hypomineralisation**

Teeth affected by MH can be acutely sensitive and uncomfortable when performing toothbrushing or consuming cold or sweet food/drink. Children may however under-report sensitivity, presumably because they *alter* brushing or eating habits to avoid discomfort or may be used to this sensation. Often children who report no concerns with discomfort can find use of a 3 in 1 air spray uncomfortable.

Once diagnosed, timely management in practice is important. This will be described in detail in a later section. Usually the best initial management for asymptomatic cases involves maintaining the molars with conventional fissure sealant *or* GIC used as a sealant, and focusing on enhanced caries prevention. An opinion can be sought for symptomatic and moderate to severe cases once the child reaches the age of 8.5 years .

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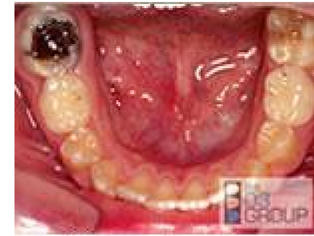
### Common features that indicate Molar Hypomineralisation

- Obvious Hypomineralisation lesions – perhaps of aesthetic concern to the patient
- Unusual caries – restricted to one or more molars, often contradicting good oral hygiene status
- Dental pain/sensitivity – often localised to the affected molars

In any particular patient, the clinical appearance will depend to a large extent on how long the affected teeth have been erupted.



## Spotting it Early

Generally a Hypomineralised Molar is easiest to spot soon after it emerges into the mouth – that is, before complicating factors set in.

***Typically, a newly-erupted Hypomineralised Molar will exhibit:***

- patches of opaque enamel (i.e. lesions) with abnormal colour (white, cream, yellow or brown)
- normal *thickness* of enamel throughout the lesion
- intact enamel surface throughout the lesion, but this may not last for long
- lesions of varied size and shape, located in the cuspal half of the crown
- and sometimes a painful response to regular stimuli (tooth brushing, cold, heat, airstream)

***A typical Molar Hypomin mouth may have:***

- from one to four Hypomineralised first permanent molars ,plus/minus...
- one or more Hypomineralised Incisors (generally less-affected than the molars), plus/minus...
- Hypomineralised areas in the Es (primary second molars) too

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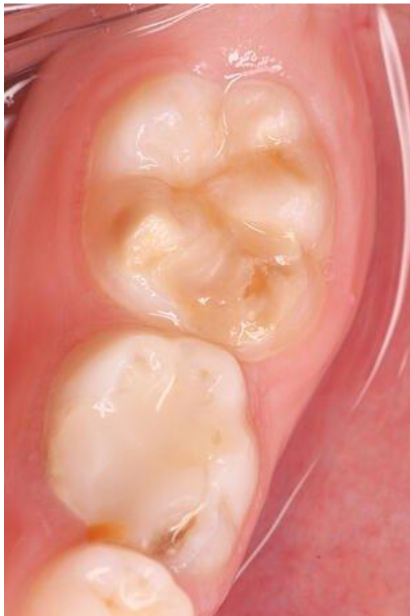
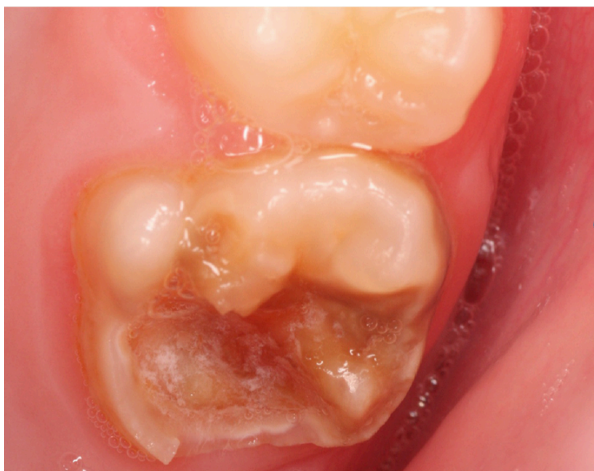


MH defect seen on tooth 36. Mild on disto-buccal cusp, further advanced on mesiolingual and start of PEB on mesiobuccal cusp. This could be managed by GIC dressing ensuring maximum occlusal extension. (Note also atypical caries on 75)

### Spotting it Late

With time, a Hypomineralised Molar may change its initial appearance quite radically, reflecting inherent weaknesses of the abnormal enamel (i.e. soft, porous & caries prone). And at whole-mouth level, other clues and complications may manifest as follows:

- First permanent molar already been extracted
- Atypical restorations on first permanent molars or second primary molars



A more advanced lesion with extensive PEB. Likely to require extraction. If asymptomatic and the tooth requires retention until an ideal age, it can either be dressed with GIC or a stainless steel crown placed.

### Distinguishing between Hypomineralisation and Hypoplasia

Most simply, **Hypoplasia** means a developmental deficiency in the **thickness** of enamel, whereas **Hypomineralisation** refers to a deficit in its **mineral content**.

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| Other enamel defect | MIH |
|---|---|
| Fluorosis | Fluorosis tends to present as diffuse opacities which have a symmetrical distribution bilaterally while MIH is more likely to have more demarcated lesions with a non-symmetrical distribution. In addition, opacities relating to fluorosis tend to be more resistant to dental caries. |
| Amelogenesis Imperfecta | AI presents with generalised involvement of the dentition while MIH tends to affect the FPM, incisors +/- SPM. AI often affects many primary teeth too. |
| Enamel Hypoplasia | The margins of hypo*plastic* defects tend to be smooth while the margins of post-eruptive breakdown areas are irregular. |
| Demineralisation associated with caries | Occur in areas of plaque stagnation while MIH lesions can occur on surfaces not normally associated with dental caries. |

**Hypomineralisation in clinical terms**

Lacking the hardness and durability of normal enamel, Hypomineralised enamel is prone to degrade rapidly once exposed to the oral environment (e.g. masticatory forces, dietary acids).

Because such degradation of Hypomineralised enamel doesn't happen before emergence, it is fundamentally incorrect to refer to it as Hypoplasia.

Hence a key distinguishing feature of Hypomineralised is its relatively fast rate of change post-eruptively.

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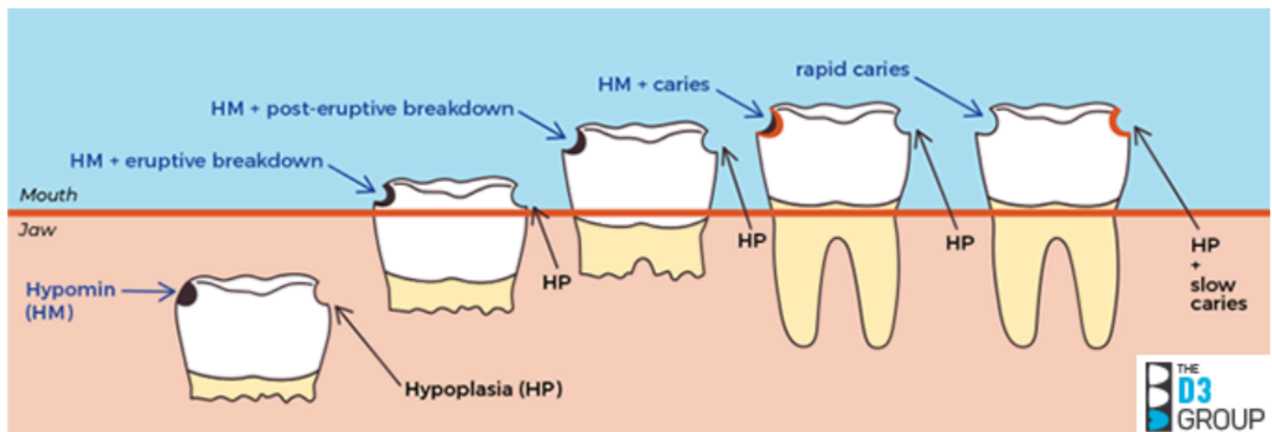


## Part 2: Management of molar hypomineralisation

### How can molar hypomineralisation be managed in practice?

First, take a history of any symptoms experienced, asking specifically about how the patient manages with cold drinks/ice-cream and tooth-brushing. It important to direct questions at the child, as they may have adapted eating and brushing habits and not mentioned to parents.

In the clinical examination, if there has been sensitivity experienced in the history, avoid use of the compressed air to MH affected teeth. Cotton wool can be used to dry teeth instead.

### Grading Hypomineralisation

During clinical examination the presence and extent of any hypomineralised lesions should be recorded. For each individual tooth affected it is helpful to note:

- The presence, position and colour of any demarcated lesions
- Presence of post eruptive breakdown
- Presence of an atypical restoration
- Presence of an atypical carious lesions

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**Patient Symptoms** are an important part of grading. Hypomineralised molars have increased nerve innervation which can make them hypersensitive to temperature stimuli.

In general, the following are considered as definitions of a mild, moderate and severe case:

- **Mild MIH**: the demarcated opacities located at non-stress bearing areas, no caries associated with the affected enamel, no hypersensitivity and incisor involvement is usually mild if present
- **Moderate MIH:** the demarcated opacities are present on molars and incisors, the post-eruptive enamel breakdown limited to one or two surfaces without cuspal involvement, atypical restorations can be needed and normal dental sensitivity
- **Severe MIH:** post-eruptive enamel breakdown, crown destruction, caries associated with affected enamel, history of dental sensitivity and/or aesthetic concerns.

The table below is a suggested grading system,

| Index | Definition |
|---|---|
| **0** | **No MIH, clinically free of MIH** |
| **1** | **MIH without hypersensitivity, without defect** |
| **2** | **MIH without hypersensitivity, with defect** |
| 2a | <1/3 defect extension |
| 2b | >1/3 <2/3 defect extension |
| 2c | >2/3 defect extension or/and defect close to the pulp or extraction or atypical restoration |
| **3** | **MIH with hypersensitivity, without defect** |
| **4** | **MIH with hypersensitivity, with defect** |

| 4a | <1/3 defect extension |
|---|---|
| 4b | >1/3 <2/3 defect extension |
| 4c | >2/3 defect extension or/and defect close to the pulp or extraction or atypical restoration |

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**Management of MIH in primary care:**

1. **Prevention**

Any child diagnosed with MIH/HSPM should have an intensive prevention regime as outlined in the SDCEP Guidelines.

Toothbrushing sensitive teeth may be uncomfortable. The patient can be encouraged to warm the brush with warm water prior to toothbrushing. Covering hypomineralised areas/areas of breakdown with a fissure sealant using Glass Ionomer Cement, or Conventional Sealant using etch and bond* (or placing a preformed metal crown) can help to minimise sensitivity.

2. **Management of sensitivity**

- Casein phosphopeptide and amorphous calcium phosphate paste (e.g. Tooth Mousse) can help decrease sensitivity.
- Desensitising toothpaste can be helpful in reducing mild sensitivity. Patients should be advised to rub a small amount of these toothpastes onto the affected area twice daily after brushing.
- Fissure sealants help protect posterior teeth against progression of dental caries and help decrease sensitivity. These are essential in the management of MH. Glass ionomer cement can be used to seal teeth which are partially erupted, have porous enamel/ areas of PEB or where sensitivity precludes the use of resin sealants. *Where resin sealants are used, the use of a dental bonding agent after etching can improve retention to hypomineralised enamel.
- Glass Ionomer Fissure Sealant can be used as an alternative where AGPs are to be avoided, with use of cotton-wool for drying as an alternative to 3-in-1 air.
- For teeth with extensive post eruptive breakdown, or where sensitivity remains following techniques outlined above, preformed metal crowns can provide more reliable reduction in sensitivity.

3. **Management of Posterior Dentition:**

a) Hypomineralised Second Primary Molars (E’s)

- Fissure sealant should be used to protect the occlusal surface of these teeth prior to any post-eruptive breakdown (PEB). Glass Ionomer Fissure Sealant can be used as an alternative where AGPs are to be avoided, with use of cotton-wool for drying as an alternative to 3-in-1 air.

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- Glass ionomer cement or composite resin can be used to restore small areas of Post-Eruptive Breakdown(PEB). **(Avoid use of handpieces, if soft caries is present, use of a sharp excavator to remove is more appropriate)**
- Preformed metal crowns using the Hall technique are the restoration of choice where there are larger or multiple areas of PEB on a **primary** molar. These will also protect the remaining tooth structure against further deterioration. These should be placed at the earliest opportunity to prevent extensive tooth-breakdown/pain and need for extraction.

b) Hypomineralised first permanent molars

The aims of treatment to manage affected posterior teeth are:

- Relief of symptoms
- Protect remaining tooth structure
- Restore function

Where affected permanent teeth have a guarded long term prognosis, extraction should be considered.

*NB. **Avoid use of handpieces, on these teeth**, If soft caries is present, consider use of a sharp excavator to remove. In most instances, sealing over the caries with Glass Ionomner, or use of a Preformed Metal Crown is more appropriate than caries removal.

The decision to extract is based on a number of factors including:

- The stage of dental development
- Presence/absence of the remaining dentition including third permanent molars
- Severity of symptoms
- Condition of surrounding teeth
- Medical history
- Occlusion
- Co-operation for treatment

The ideal time to consider tooth removal would either be (a) when (as observed on an OPT) the 2nd premolar is in the crypt of the 2nd primary molar and the bifurcation of the 2nd permanent molars is beginning to develop or (b) later when space is required as part of an orthodontic treatment plan. A thorough clinical and radiographic (OPT) evaluation around the age of 8.5 years old is helpful to identify if removal should be considered, assessing at this time whether orthodontic input is likely to be required in the future.

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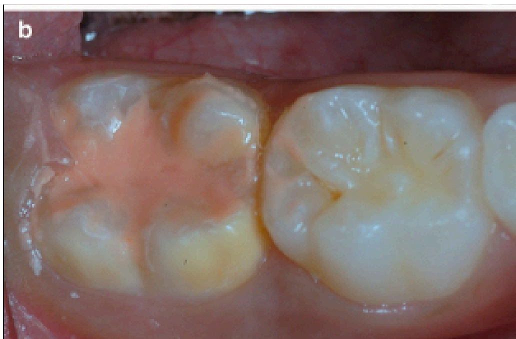
Where a decision is made to restore the hypomineralised teeth (either definitively or to maintain until extraction) the following techniques can be considered:

- Glass ionomer cement (GIC) – this is appropriate as a temporary restoration to decrease sensitivity and maintain the tooth until it can be definitively restored or extracted. **The aim is to cover the occlusal surface of the tooth as much as occlusion allows.**
- Composite resin can be used as a definitive restorative material if the decision has been made to retain the tooth in the long-term **and the defect is mild**. (Amalgam is *not* appropriate for hypomineralised teeth). When preparing the cavity all porous enamel should be removed leaving cavity margins on a firm enamel surface which is resistant to removal with a slow speed bur.
- Preformed metal crowns can be used to restore severely affected molars temporarily prior to future extractions. These can be placed with minimal or no reduction of the molar. PMCs can provide more robust protection and reduction of sensitivity than other options such as placement of GIC. It can be more comfortable to use local anaesthetic prior to placement of PMC on FPM and therefore they can be more demanding on patient co-operation than GIC.
- Preformed metal crowns when used in the permanent dentition will require trimming with crown scissors circumferentially, prior to smoothing (with green-stone or similar) and crimping to aid fit. (Anterior extraction forceps can be used for crimping).




This picture shows a Hypomineralised molar sealed with coloured glass-ionomer cement (can be useful to use coloured GIC to aid monitoring, but not essential)

For technique see SDCEP guidance
https://www.sdcep.org.uk/published-guidance/caries-in-children/

Great resource for the primary care dental practitioner
https://www.thed3group.org/practitioner.html

Examples of management:

**Mild MIH: Teeth with good long term prognosis:**

1. Enhanced prevention advice
2. Management of sensitivity

3. Fissure seal occlusal surfaces of all molars. Use bond as well as etch to aid retention.
4. Restore small hypomineralised areas with composite resin.

**<u>Severe MIH: Teeth of poor long term prognosis:</u>**

*This includes patients with post-eruptive breakdown; marked sensitivity; extensive caries; Demarcated areas affecting > 1 or 2 surfaces or with cuspal involvement.*

- Enhanced prevention advice
- Management of sensitivity.
- Stabilise dentition: Cover affected areas with fissure sealant (Use Glass Ionomer as a fissure sealant and/or occlusal dressing on teeth with breakdown or sensitivity) Preformed metal crown can be used on teeth with more advanced break-down or those that are particularly sensitive.
- For moderate and severe cases, referral to paediatric dentistry to consider long term treatment planning at the age of 8.5 years or earlier if uncontrolled pain/sensitivity. Prior to 8.5years, most cases can be managed in practice as outlined above.
- Where an affected tooth results in significant pain, which cannot be stabilised, or spontaneous pain not related to thermal stimuli or toothbrushing, extraction may need to be considered. This may result in tooth removal out with the ideal age window.

*With thanks to thed3group.org for images*