

A close-up photograph of a young child with dark hair, smiling broadly and showing their teeth. The child is wearing a green and white plaid shirt. The image serves as the background for the top half of the page.

MOLAR INCISOR HYPOMINERALIZATION (MIH)

MIH Treatment Solutions

MOLAR INCISOR HYPOMINERALIZATION (MIH)

A global burden concerning one in seven children^{1,2}

MIH is a common developmental condition affecting primarily one or more first permanent molars. The central incisors may be affected as well, but this usually occurs to a lesser extent. Hypomineralization of the second deciduous molars (HSPM) or canines may also occur.³ Children with HSPM are up to five times more likely to develop MIH in the permanent dentition. Great varieties in severity exist, ranging from mild opacities to posteruptive enamel breakdown.

Currently, the etiology of MIH is still unknown. Some correlations with prenatal, perinatal and postnatal illness, exposure to antibiotics or chemicals such as dioxin, bisphenol A and polychlorinated biphenyl have been described, but sufficient evidence is still lacking.

Clinical appearance

- Demarcated opacities, ranging from creamy white to yellow, brown discoloration
- Defective enamel has normal thickness (unless posteruptive breakdown has occurred)
- Lesions may occur asymmetrically
- When a first molar is severely affected, there is an increased chance that the contralateral molar is also affected
- Lesions of central incisors are usually milder, but they can sometimes be unsightly



Mild MIH
Courtesy of Prof. van Amerongen,
the Netherlands



Moderate MIH
Courtesy of Dr. Jeanette MacLean, USA



Severe MIH
Courtesy of Dr. Jeanette MacLean, USA



Affected incisors as part of MIH
Courtesy of Prof. Baroni, Italy

Symptoms

- Hypersensitivity and decreased response to local anesthesia
- Rapid caries progression
- Posteruptive breakdown

Clinical management of MIH is challenging due to:

- Hypersensitivity and rapid development of dental caries in affected teeth
- Difficulty in achieving anesthesia
- Limited cooperation of the young child
- Repeated marginal breakdown of restorations
- Often, an increased number of dental visits is required

Children with MIH often develop dental anxiety as a result of invasive and even painful dental experiences at a young age.





INITIAL INTERVENTION

Empowering your patient is the first step



Courtesy of Judy Bendit, RDH BS, USA

- The teeth should be brushed twice a day with a toothpaste containing at least 1,000 ppm fluoride. Fluoride content should be age-appropriate; in older patients higher levels of fluoride may be desirable.
- Using identification tools such as GC TriPlaque ID Gel™ can help to identify cariogenic plaque, motivate patients and give them the opportunity to optimize their brushing technique
- Frequent intake of sugar and acidic food should be avoided



Strengthen and desensitize with the MI Paste® Family and MI Varnish®

Topical treatments are useful to strengthen teeth and decrease sensitivity in MIH. The application of RECALDENT™ (CPP-ACP)[†], containing high levels of bio-available calcium and phosphate, has been shown to be effective in this case.^{4,5}

MI Paste® (without fluoride) & MI Paste Plus® (900 ppm fluoride)

- topical creme with RECALDENT™ (CPP-ACP) for daily at home application
- apply after brushing, before bedtime; do not rinse

MI Paste® ONE (1,100 ppm fluoride + potassium nitrate)

- anti-cavity and anti-sensitivity toothpaste with RECALDENT™ (CPP-ACP)
- replaces current toothpaste; do not rinse

Choose the right MI Paste® product for your patients

Products in the MI Paste® Family can be used for the same indications. MI Paste® is recommended below the age of 6 to avoid the risk of fluorosis and in cases where extra fluoride supplementation is not needed or desired. For overnight application, MI Paste® is recommended until the age of 12. MI Paste Plus® and MI Paste® ONE are recommended for children 12 years of age or older.

MI Varnish® (22,600 ppm fluoride)

- varnish with RECALDENT™ (CPP-ACP) for quarterly in office application
- apply after prophylactic cleaning
- seals the dental tubules tightly; desensitizes teeth and leaves a film of varnish on the surface

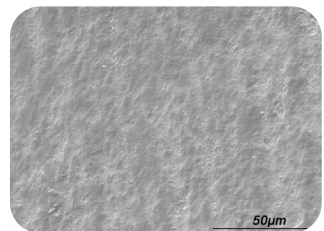
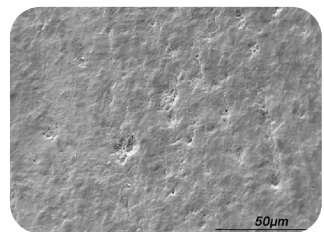
Prior to use, carefully read the instructions for use.



Courtesy of Prof. Gatón Hernández, Spain



Courtesy of Dr. Rouas, France



MI Paste Plus® reduces porosity and improves homogeneity of hypomineralized enamel.
Courtesy of Dr. Crombie, Australia



Courtesy of Dr. Marinova, Bulgaria



Courtesy of Dr. Rouas, France

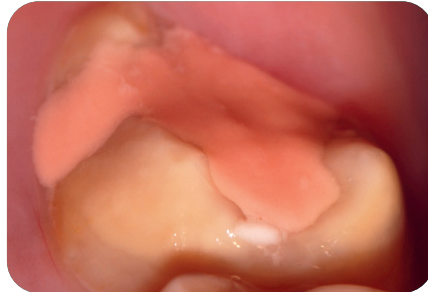
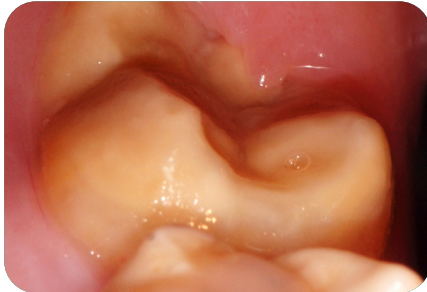
[†]RECALDENT™ (CPP-ACP) is derived from milk casein. Do not use on patients with a milk protein or hydroxybenzoates allergy. In case of allergic reaction, stop use, rinse mouth with water, and seek medical advice.



PROTECT SURFACES WITH GC FUJI TRIAGE®

GC Fuji TRIAGE®, a low-viscosity glass ionomer, will help to protect the surface against caries formation and hypersensitivity

- GC Fuji TRIAGE® can bond chemically in a moist environment
- Teeth can be protected even before they are fully erupted
- The setting of GC Fuji TRIAGE®, pink shade can be accelerated with the dental curing light



Courtesy of Dr. Rouas, France

Early protection is important to avoid complications

- Fast and easy application; perfect for first-line treatment
- Helps to postpone or even avoid more invasive treatment options
- Since the procedure is generally well tolerated by children, the risk of developing
- Dental anxiety is reduced



Courtesy of Dr. Lance Kisby, USA



Courtesy of Dr. Mark L. Cannon, USA



Courtesy of Prof. Gatón Hernández, Spain





RESTORATIVE TREATMENT

Minimally Invasive restorations with EQUIA Forte® HT

Long-term restorations

- The glass hybrid EQUIA Forte® HT is suitable as a long-term, minimally invasive restorative. Moreover, its quick bulk placement is a huge advantage in young, anxious patients.
- The chemical adhesion and moisture tolerance of EQUIA Forte® HT offer a great advantage since adhesion to hypomineralized enamel is challenging.
- In case teeth are difficult to anesthetize, hand instruments (such as a spoon excavator) can be used to excavate caries before application of EQUIA Forte® HT.⁶
- A composite can be placed when the lesions are very well demarcated and do not require too much additional removal of tooth tissue.
- Alternatively, a Silver Modified Atraumatic Restorative Treatment (SMART) can be used. It involves the application of Silver Diamine Fluoride (SDF) followed by a restoration with self-adhesive, long-term restoratives such as glass hybrids. In SMART, SDF arrests the decay while glass-based restorations help hide stains and provide an excellent seal to protect against further decay.

SMART Technique with EQUIA Forte®



Courtesy of Dr. Jeanette MacLean, USA

Interim restorations

- In some cases of severe MIH, a long-term solution such as full-coverage crown or orthodontic extraction is not advised immediately due to the young age. In such cases, glass hybrids can be used as an interim restoration until the patient/family are able to take the next step.
- Alternatively, severe cases can be restored with Hall technique, a stainless steel crown luted with RMGI cement such as GC FujiCEM® Evolve.

Hall Crown Technique with GC FujiCEM® Evolve



Courtesy of Dr. Jeanette MacLean, USA

Orthodontic considerations

In certain orthodontic conditions, it might be indicated to extract severely affected permanent first molars. The ideal moment is when the furcation of the second molar starts to calcify, usually around the age of 5-9 years. Extracting at that moment favors spontaneous migration of the second molar; results are usually better in the upper arch than in the lower arch.

RECALL

Follow-up regimen adjusted to response to treatment

The recall frequency is usually higher for patients with MIH, due to the higher caries susceptibility. Several points have to be kept in mind:

- Restorations need to be controlled regularly, as adhesion to hypomineralized enamel is challenging
- It is important to maintain the patient's compliance to home treatment and to evaluate its effects regularly
- Oral hygiene (with GC Tri Plaque ID Gel™) and dietary habits should be regularly evaluated
- Interim restorations need to be monitored and replaced when the circumstances have become appropriate for definitive treatment

An important part of the preventive strategy is the home care. It is crucial to motivate and educate the child/caregiver because they are the ones who will have to implement good oral hygiene habits and healthy dietary intake.

The Dentonauts program further puts the emphasize on making every dental visit a positive experience for the child. This is important to ensure the compliance in the long term and to ensure life-long, healthy functioning.

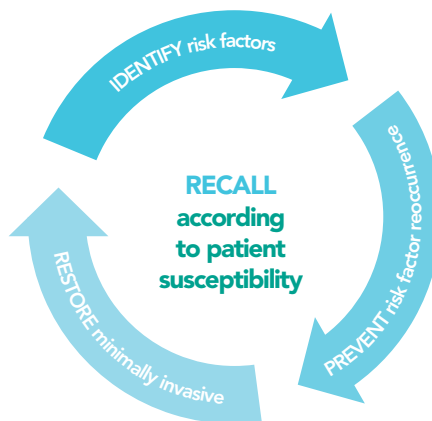




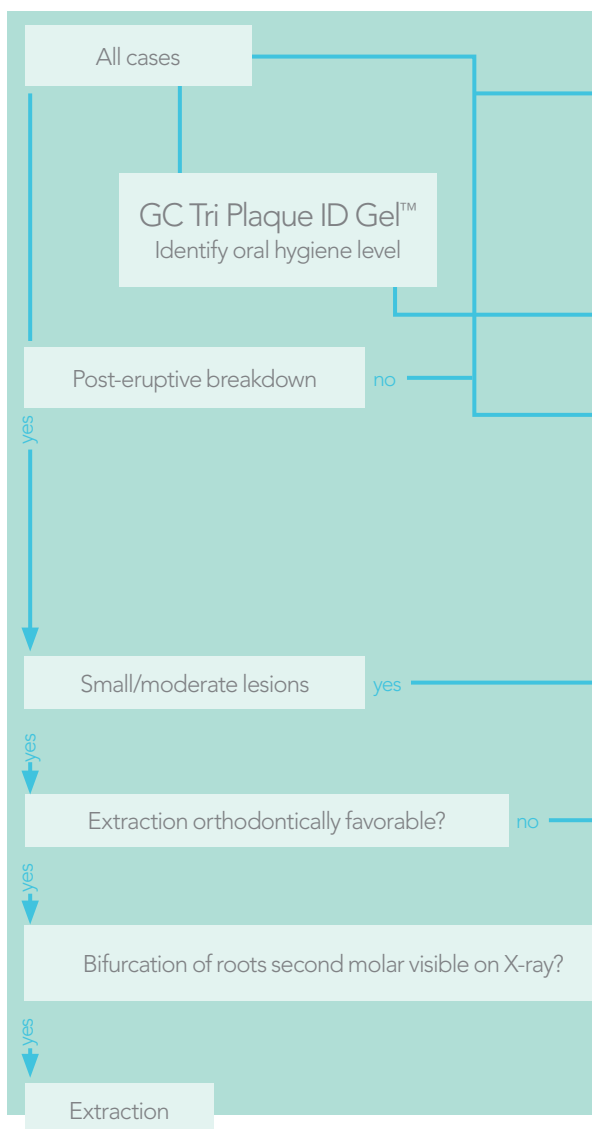
INITIAL THERAPEUTIC INTERVENTION

A framework for patient-centered treatment

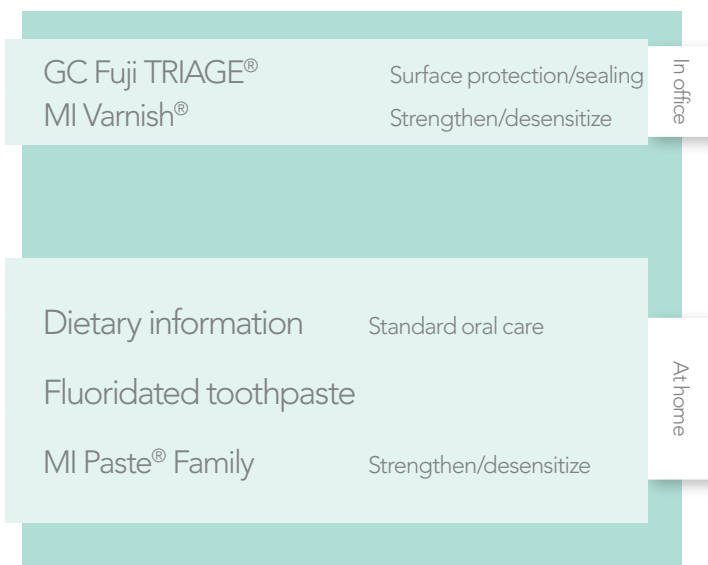
It is essential to adapt the treatment of MIH to the individual patient's conditions. The schedule below will make it easier to select the necessary interventions. It also shows which products from GC are especially suited for each individualized treatment plan.



IDENTIFY



PREVENT



RESTORE



RECALL

**MI Varnish®**

Contains: 50 MI Varnish® Unit-Doses (0.4mL / 0.44g each) and 50 disposable applicators.
442500 (US) / 442550 (CA) Fresh Strawberry
442505 (US) / 442555 (CA) Fresh Mint

MI Paste® ONE

Contains: 10 tubes (46g each).
437000 (US) / 438000 (CA) Fresh Mint

MI Paste®

Contains: 10 tubes (40g each).
424505 Strawberry 423679 Mint
422265 Assorted (2 each: Vanilla, Strawberry, Mint, Melon and Tutti-Frutti)

MI Paste Plus®

Contains: 10 tubes (40g each).
422888 Vanilla 422886 Strawberry 422621 (US) / 428295 (CA) Mint
422614 Assorted (2 each: Vanilla, Strawberry, Mint, Melon and Tutti-Frutti)

GC Tri Plaque ID Gel™

004273 40g tube (36 mL, approximately 130 applications)

GC Fuji TRIAGE® Starter Package

Contains: 50 capsules, one GC CAPSULE APPLIER III, one CAVITY CONDITIONER (5.7mL) and one GC Fuji COAT™ LC (5.2mL).
439990 Pink 439991 White

EQUIA Forte® HT Intro Kit

Contains: 48 EQUIA Forte® HT Capsules (Powder 0.4g, Liquid: 0.13g (0.10mL) per capsule), one EQUIA Forte® Coat (4mL) bottle, 1 CAVITY CONDITIONER (GC) (5.7mL).
453001 A1 453002 A2 453003 A3 453004 A3.5
453006 B1 453007 B2 453008 B3 453009 C4
453005 Assorted

GC FujiCEM® Evolve

012949 Triple Pack Handmix
Contains: Three 9.2g / 5.0mL syringes and one mixing pad.
012950 Triple Pack Automix
Contains: Three 9.2g / 5.0mL syringes and 45 GC Push and Click Tips (Regular).
012948 Single Pack
Contains: One 9.2g / 5.0mL syringe and 15 GC Push and Click Tips (Regular).

- Schwendicke F, Elhennawy K, Reda S, Bekes K, Manton DJ, Krois J. Global burden of molar incisor hypomineralization. J Dent, 2018; 68: 10–18.
- Zhao D, Dong B, Yu D, Ren Q, & Sun Y. The prevalence of molar incisor hypomineralization: evidence from 70 studies. Int J Paediatr Dent, 2018; 28: 170-179.
- Garot E, Denis A, Delbos Y, Manton D, Silva M, Rouas P. Are hypomineralised lesions on second primary molars (HSPM) a predictive sign of molar incisor hypomineralisation (MIH)? A systematic review and a meta-analysis. J Dent 2018;72:8-13.
- Baroni, C. & Marchionni, S. MIH supplementation strategies: Prospective clinical and laboratory trial. J. Dent. Res, 2011;90: 371–376.
- Wierichs, R. J., Stausberg, S., Lausch, J., Meyer-Lueckel, H. & Esteves-Oliveira, M. Caries-Preventive Effect of NaF, NaF plus TCP, NaF plus CPP-ACP, and SDF Varnishes on Sound Dentin and Artificial Dentin Caries in vitro. Caries Res, 2018; 52: 199–211.
- Grossi JA, Cabral RN, Ribeiro APD, Leal SC. Glass hybrid restorations as an alternative for restoring hypomineralized molars in the ART model. BMC Oral Health, 2018; 18;18(1):65.

RECALDENT and RECALDENT Device are trademarks used under license.