

MIH – Diagnosis, initial care and long term therapy

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Molar incisor hypomineralisation (MIH) has kept the field of Child and Adolescent Dentistry occupied for many years. The structural disruption of tooth enamel, which primarily involves the first permanent molars but also the incisors, presents a few challenges to both dentists as well as young patients. Since the raw structure often resembles that of chalk, the teeth affected by MIH are also referred to as “chalky teeth”. The condition emerges during the formation of enamel, i.e. even before eruption into the oral cavity.

The affected teeth exhibit yellowish/brownish, or even whitish/cream-coloured spots and are sensitive to pain in most cases. The reason for this is the impaired mineralisation of the tooth enamel: the enamel is softer and more porous than that of healthy teeth. It is thus more sensitive and also more susceptible to the infiltration of bacteria, which in turn can cause caries. In comparison to a healthy tooth, the enamel of MIH-affected teeth possesses only about one tenth of the normal hardness.

How does MIH occur?

Development of the permanent teeth already starts in the womb and is completed by the age of three-and-a-half to four years. During this time, phosphate and calcium are deposited in order to harden the enamel. If this process is disrupted, the enamel remains soft – and MIH can emerge. The causes for such a disruption are not absolutely clear. Different triggers such as antibiotics or infectious diseases, both in early childhood as well as in the pregnant mother, are considered to the same extent as BPA or dioxins. A vitamin D deficiency is also suspected.

How is the diagnosis made?

Not every tooth enamel disruption with discolouration in children is immediately considered to be MIH. If the faintest suspicion is present, however, close monitoring of the set of teeth is critical. The fact that the disorder cannot be detected on X-rays and is only visible after eruption of the

teeth is especially problematic. For this reason, preventive measures are not possible.

The following symptoms are suggestive of MIH:

- Whitish/cream-coloured to yellowish/brownish spots on the posterior teeth, with possible involvement of the incisors
- Chipped tooth enamel
- Missing tooth cusps
- Pain during dental care
- Sensitivity to pain when eating, especially when hot or cold

In order to offer every young patient an individualised and sustainably successful therapy, the MIH-Treatment Need Index (MIH-TNI) was introduced at the Annual Conference of the German Society for Paediatric Dentistry in September 2017. It categorises the diagnoses into five levels of severity:

Index 0 – No MIH

Index 1 – MIH without hypersensitivity and without substance defects

Index 2 – Substance defects

Index 3 – Hypersensitivity

Index 4 – Substance defects and hypersensitivity

What does therapy consist of?

Even if the disease is not curable, teeth affected by MIH do not need to be extracted in most cases. The motto should always be restoration not extraction! Depending on the severity of the tooth enamel disruption, there are numerous treatment methods that should be individually adapted to each of the young patients. The goal is to protect the affected teeth as well as possible, to manage the pain, and if needed to restore tooth defects. Regular dental check-ups in combination with good dental care at home are indispensable to control the advancement of MIH.

High-dose fluoridation in the dental practice

The affected teeth should be treated with a fluoride varnish approximately two to four times per year – depending on the risk of caries. Fluorides offer support to caries prophylaxis, which is especially important among MIH children due to the elevated risk. The VOCO Profluorid Varnish (VPV) with its high fluoride content of 22,600 ppm (≈ 5% sodium fluoride) is suitable for this purpose. The varnish is easy to apply and remains on the tooth for a few seconds so that continuous fluoride release can take place during this time. It also has a natural feel and a pleasant taste, which is important when considering that this treatment must be performed at close, regular intervals. The patient can choose from seven attractive flavours – from mint to melon, and from cherry to caramel, bubble gum, cola lime and piña colada.

Treatment of hypersensitive teeth using light-curing protective varnish

The ORMOCER®-based Admira Protect by VOCO is also ideally suited to achieve a sustained reduction of hypersensitivities. Admira Protect offers a secure bonding adhesion to the affected tooth through its light curing, and the special filler technology produces a high abrasion resistance.

Low-dose products for daily home use

In addition to the daily brushing of teeth, low-dose products can also be used at home by the patient himself/herself, or with the assistance of their parents. These products stand out because they contain hydroxylapatite. With regular use, the hydroxylapatite accumulates on the dental hard tissue, thus protecting the tooth from demineralisation and erosion. Thanks to the promotion of natural remineralisation, the tooth is strengthened and the MIH-affected teeth become less sensitive to pain. In addition to hydroxylapatite, Remin Pro by VOCO also contains fluoride and xylitol, to which cariostatic properties are attributed.

Fissure sealing

Fissure sealing is a reasonable form of therapy for mildly affected teeth, to protect caries-free fissures and to improve hygiene capability. With Grandio Seal, VOCO offers the first fluoride-containing nano-fissure sealant. If a self-etch adhesive is also applied, the light-curing fissure sealant adheres itself to the diseased tooth enamel. Grandio Seal performs better than many of its competitors in terms of abrasion, flexural strength and shrinkage.

Restorative treatment...

Invasive care is necessary in the case of substance defects. The treatment of choice is the provision of restorations made of composite materials or glass ionomer cements. If adhesive restoration with a composite is provided, a self-etching adhesive should be given preference during pre-treatment, in place of conditioning the dental hard tissue with an etching gel that is painful for the patient.

...with glass ionomer cement...

In the case of temporary or small permanent restorations, the use of a glass ionomer cement is advantageous as it can be introduced directly, without any prior conditioning. Modern glass ionomer restorative materials such as Ionolux (light-curing) and IonoStar Molar (self-curing) by VOCO help to limit therapy for the smallest patients to only those steps that are absolutely necessary: only relative isolation from moisture, no conditioning of the dental hard tissue before placing the filling, and fast curing.

...or with composites

The universal nano-hybrid restorative material GrandioSO by VOCO, for example, which is compatible with all conventional bonding agents and can be used for fail-safe restorations as a material that well resembles teeth, is particularly well suited for this purpose. Thanks to the different viscosities of the GrandioSO product range, it is possible to choose the correct product depending on location and cavity size.

Indirect restorations via onlays

In the case of heavily affected teeth that cannot be adequately restored with the placement of a filling, crowning is an additional option. Thanks to the always further-developing CAD/CAM technology, chairside aesthetic and durable onlays made of prepolymerised nano-ceramic hybrid materials, for example, can also be fabricated within a very short period of time. The Grandio blocs CAD/CAM composite blocks by VOCO are ideally suited for this purpose, as they are indicated for the manufacture of crowns, inlays, onlays and veneers. The affected MIH tooth is protected by the onlay and is less painful; the patient can chew freely.

Can MIH be prevented?

An effective way to prevent or inhibit MIH does not exist. For this reason, timely detection and rigorous therapy are even more critical. Nevertheless, parents can take a few steps in accordance with current research – in addition to

