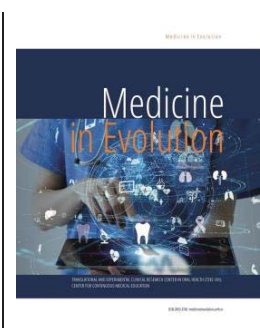


# Non – invasive therapeutic approach in dental dysplasia – Molar Incisor Hypomineralisation Syndrome



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## Abstract

**Aim and objectives:** Dental dysplasia is a structural or developmental defect that can be classified into two types based on the etiology: environmental and genetic. Environmental dysplasia can affect the enamel and dentine and can occur before or after birth. They are the result of several environmental conditions that emerge before or during the development of the dental structures, prior to the eruption of the teeth, from a chronological aspect.

**Materials and Methods:** The research focuses on the descriptive approach of MIH Syndrome clinical treatment cases (A-F). Non-invasive treatment involving CPP-ACP and Varnish was used to treat the patient.

**Results:** The contemporary treatment strategy to treating these defects is based on the collection of a series of data, beginning with determining the etiological causes for an early diagnosis and minimizing the scope of carious lesions as much as feasible. After 6 months we observe an improvement of the oral hygiene.

**Conclusions:** The approach of a non-invasive treatment idea, resulting in keeping the dental tissues as healthy as possible and free of cavities, is the key to success in correcting any structural defect.

**Keywords:** MIH Syndrome, CPP-ACP, GC Tooth Mousse, MI Varnish GC, Non- invasive

## INTRODUCTION

MIH (molar incisor hypomineralisation) is a common developmental dental disease that manifests itself in childhood. One or more first permanent molars (FPM) are affected by well-defined regions of hypomineralised enamel. Although associated opacities on front teeth are less likely to cause practical problems, they can cause aesthetic and psychological concerns. [1]

MIH can have a wide range of severity. It might range from minor opacities to complete posteruption. It may be asymmetrical, although the contralateral molar is more likely to be impacted if an FPM is badly afflicted. The degree of hypomineralization in afflicted incisors is generally less severe than in affected molars. [2]

The structural changes occur infrequently and have varied degrees of severity on the incisors. [3] Defective enamel is white cream or golden brown in color, normal thickness, smooth on the surface, and has a noticeable border adjacent to normal enamel. [4] The opacities are confined to the incisal or cuspal third of the crown, with just a few cases affecting the cervical one-third. Because of post-eruptive mineralization, the surface enamel is hypermineralized. [5]

Due to lower hardness and elasticity modulus, as well as the presence of disorganized and weakly attached prisms, the dental enamel of teeth affected by MIH is fragile and easily fractured, making the enamel porous, which favors greater microbial proliferation and, as a result, the establishment of caries disease, whether or not associated with other factors. In most cases, there is sensitivity to cold, heat, or mechanical stress, and brushing is typically uncomfortable, therefore the kid avoids it. [6]

### *Aim and objectives*

The purpose must conduct out in order to improve the accuracy of diagnosis of the syndrome in order to be able to choose the most benefit situation for treatment, given that 21st century dentistry refers to the non-invasive and less invasive approach.

## MATERIALS AND METHODS

The basic idea of the study emphasizes the establishment of the correct diagnosis given that we refer to the signs and symptoms of the patient regarding the oro-dental health. In order to make the early diagnosis, a scoring index of MIH Syndrome was implemented with indices from 0 to 4 depending on the evolution of clinical signs. (figure 1).

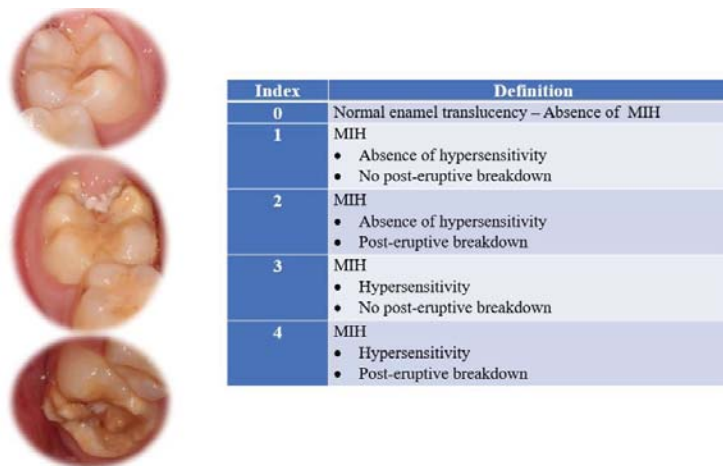


Figure 1. MIH - Index [7](Personal pictures – Dr. Brăilă E.)

Depending on the index it belongs to, the MIH Syndrome has 6 stages of treatment ranging from non-invasive treatment to radical treatment. (figure 2,3).

	MIH – 1	MIH – 2	MIH – 3	MIH – 4
Therapy A	Prophylaxis			
Therapy B	Resin sealing / Infiltration			
Therapy C	Temporary restoration - short duration			
Therapy D	Temporary restoration - long duration			
Therapy E	Permanent restoration			
Therapy F	Extraction			

Figure 2. Treatment MIH [7]

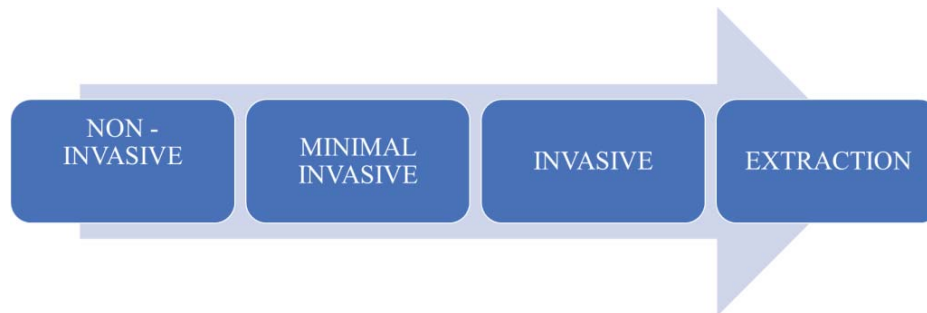


Figure 3. The phases of therapy in order

The modern therapeutic approach is based on the accumulation of a series of information with the purpose of early diagnosis of anomalies and finding important treatment strategies in limiting the extension of caries processes. The key to success in treating any structural anomalies refers to the approach of the modern concept of non-invasive or minimally invasive, resulting in the preservation of dental tissues as healthy as possible, free of caries.

Therapy A is a non-invasive therapy that includes prophylaxis that can be completed at home and also later in the dental office.

At home diet control, following the instructions of oral hygiene, use of desensitizing toothpastes with an increased fluoride content of at least 1450 ppm F, reduces caries risk and tooth sensitivity. Increases the strength of dental structures is done by local applications of fluoride - gel / cream 900 ppm F / 1450 ppm F.

In office in terms of professional cleaning once every three months, local fluoride applications 1 every 3 months, using MI Varnish (GC) 22600 ppm F that seals dental tubules. It desensitizes the teeth and leaves a film of varnish on the surface.

Non-invasive treatment - Therapy A, with CPP-ACP (GC Tooth Mouse) and MI Varnish (GC), was used to treat patients prophylactically. (figure 4)



Figure 4. Therapy A, with CPP-ACP and varnish

## RESULTS

The treatment plan was established by using a toothpaste with a content of 1450 ppm F. In the dental office, professional cleaning and local application of gels based on CPP-ACP and Varnish was used. After 6 months, the improvement of dental hygiene and also the dental sensitivity at the level of 1.6 was observed decreased. (figure 5).



Figure 5. Occlusion in frontal, right lateral /and left lateral view before and after treatment

## DISCUSSIONS

Many theories exist to explain how enamel hypoplasia develops in the permanent teeth. [6] Many variables, including asthma, pneumonia, upper respiratory tract infections, otitis media, antibiotics (amoxicillin), breast milk dioxins, and fevers during childhood, had a role in the development of teeth in children with MIH.[8]

Fluoride varnish was first utilized as a topical treatment for enamel remineralization. The CPP included in the material can release a high concentration of calcium and phosphate, maintaining a supersaturated mineral environment, minimizing demineralization and enhancing enamel remineralization because the MIH tooth is mineral poor. According to Ozgöl et al., the activity of the substance utilized (CPP-ACP linked fluoride) explains the reduction in sensitivity in this case study. [6,8] Our research findings identifies with Ozgul et al., research explanations that a significant improvement in children dentine sensibility from the first application to the last one is observed.

Fluoride Varnish was the treatment of choice in moderate instances, and it resulted in enamel hardening, which can help prevent cavities. The treatment of MIH-affected teeth was advised for all patients who were treated by this disease. [9,10]

Abdalla [11] learns this while mandibular PFMs were impacted by MIH more frequently than maxillary PFMs, maxillary incisors were substantially more affected than mandibular incisors. His research also revealed the necessity for all dental practitioners in Sudan to get education on the diagnosis and management of MIH in order to assist them in early detection and effective therapy of this illness.

Ghada and Shaimma [12] specifies that fluoride varnish approach gives a slight decrease in color but being less invasive than other approaches, while resin infiltration is masking white spot lesions much better. In our study we observed some decrease in color, and a significant improvement in children dentine sensibility from the first application to the last; this is also in accordance with Chin et al., 2009 [13] that found a limited improvement of white spot lesion and the instability of color over time.

Definitely, further studies with longer periods of follow up and other clinical techniques and approaches must be taking in consideration in treating children with MIH syndrome.

## CONCLUSIONS

This study backs up the theory that individuals with MIH damaged teeth who benefit from treatment in conjunction with oral hygiene improvement, show significant reduction in hypersensitivity. Furthermore, after treatment, the number of food restrictions decreased. The approach to the modern concept of non-invasive treatment, resulting in the preservation of dental tissues as healthy as possible and free of caries, is the key to success in correcting any structural defect.

## REFERENCES

1. Rodd H.D., Graham A., Tajmehr N., Timms L., Hasmun N. Molar incisor hypomineralisation: current knowledge and practice. *International Dental Journal*. 2020; idj.12624
2. Garg N, Jain AK, Saha S, Singh J. Essentiality of Early Diagnosis of Molar Incisor Hypomineralization in Children and Review of its Clinical Presentation, Etiology and Management. *Int J Clin Pediatr Dent* 2012;5(3):190-196.
3. Sadashivamurthy P., Deshmukh S. Missing links of Molar Incisor Hypomineralization: A review. *J. Int Oral Health* 2012. Volume 4; Issue 1: April 2012
4. Brînză C.M., Toma V., Savin C., Sîrghe A., Surlin P. Diagnosis criteria of molar incisor hypomineralization syndrome: a case report. *Romanian Journal of Oral Rehabilitation*. Vol. 12, No. 2, April - June 2020
5. Tam C., Manton D.J. Aesthetic management of incisors affected with molar incisor hypomineralisation. *Clinical Dentistry Reviewed* (2021) 5:6
6. Elger W, Illge C et all. Relationship between deciduous molar hypomineralisation and parameters of bone metabolism in preschool children. *International Dental Journal*.(2020) doi: 10.1111/idj.12550
7. Bekes K, Steffen R: Das Würzburger MIH-Konzept Teil 1. Der MIH-Treatment Need Index (MIH-TNI). Ein neuer Index zur Befunderhebung und Therapieplanung bei Patienten mit Molaren Inzisiven Hypomineralisation (MIH). *Oralprophylaxe Kinderzahnheilkd* 2016; 38: 165–170
8. Trévia L.R.A., Arruda de Castro V., et all. Molar Incisor Hypomineralization (MIH): Literature Review and Case Report. *Journal of Young Pharmacists*, Vol 12, Issue 2, Apr-Jun, 2020
9. Fütterer J, Ebel M, Bekes K, Klode C, Hirsch C. Influence of customized therapy for molar incisor hypomineralization on children's oral hygiene and quality of life. *Clin Exp Dent Res*. 2019;1-11
10. Cardoso M, Moreira KMS, Cardoso AA, Rontani RMP. CPP-ACP complexe as an alternative to treatment of incisor molar hypomineralization: case report. *RGO, Rev Gaúch Odontol*. 2019;67: e20190035
11. Abdalla H.E., Abuaffan H., Kemoli A.M. Molar incisor hypomineralization, prevalence, pattern and distribution in Sudanese children. *BMC Oral Health* (2021) 21:9

12. ElBaz G.A. and Mahfouz S.M. Efficacy of two different treatment modalities on masking white spot lesions in children with molar incisor hypo-mineralization. *Egyptian Dental journal*. Vol. 63, 2147:2154, July, 2017
13. Chin MY, Sandham A, Rumachik E N and Huysmans M C. Fluoride release and cariostatic potential of orthodontic adhesives with and without daily fluoride rinsing. *American Journal of Orthodontic and Dentofacial Orthopedics* 2009; 136:547-553.