

Prevalence of Molar Incisor Hypomineralization in the school children of Kanpur, Uttar Pradesh, India: A cross-sectional study

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Abstract

Background: Molar incisor hypomineralization (MIH) A common developmental disorder which c causes enamel abnormalities in first permanent molars and permanent incisors. Affected teeth could include one to four molars as well as frequently the incisors... The aim of the study is to evaluate the prevalence of molar incisor hypomineralization (MIH) in schoolchildren of the ages between 8 and 12 years.

Materials and Method: A total of 2,000 children of ages between 8 and 12 years were selected randomly from different schools. The dental examinations were performed in the classroom using a mouth mirror and explorer under a broad day light . The European Academy of Pediatric Dentistry (EAPD) criteria for MIH was used to determine the prevalence of MIH.

Result: A total of 2000 children were examined and 17 (0.85%) had MIH.

Conclusion: Early diagnosis and treatment can significantly reduce complications associated with MIH

Keywords: post eruption breakdown, hypomineralization, permanent incisors, permanent molars.

Introduction

It is known that enamel defects are caused by a decrease in the activity of the ameloblasts, which make the enamel, and that this leads to the production of pits or grooves that are dispersed linearly. Enamel matrix formation (secretion phase) and enamel mineralization (maturation phase) are the two stages at which these changes can occur. Hypoplasia is the term used to describe an enamel deficiency if there is an imbalance during the secretory phase. It is referred to as hypomineralization if it takes place throughout the maturation process. Every person's enamel is a record of the first eight or nine years of their existence

when the crowns are developed since enamel cannot be altered once it has formed.¹ Hypoplasia solely affects the surface of the tooth, which is regarded as an external defect linked to the thinnest enamel in the affected area. It may manifest as shallow or deep fossae, partially or completely devoid of enamel, and with horizontal or vertical grooves. Conversely, hypomineralization manifests as a deviation in the tissue's transparency. There is a visible white or yellowish/brownish patch, and the thickness remains unchanged. A recent change to the enamel that has a significant clinical impact on first permanent molars (FPM) was presented in four different ways at the 2000 European Academy of Paediatric Dentistry Congress. The disorder was referred to in these papers as idiopathic enamel hypomineralization in FPM,² or hypo mineralized FPM,³ hypomineralization of nonfluoride in cheese molars and FPM⁴. It was named molar incisor hypomineralization (MIH) and described as a single clinical entity. It is described as hypomineralization of systemic origin affecting the permanent incisors and one, two, three, or all of the first permanent molars.⁶ Prior to 2001, there was no consensus definition of MIH, therefore it is difficult to determine whether several studies are speaking of the same thing because of the complex literature on the subject. There might be wide variations in MIH severity. It can have minor opacities all the way up to post eruptive disintegration. Even though it could be asymmetrical, the contralateral molar is more likely to be impacted if an FPM is seriously compromised. The degree of hypomineralization in impacted incisors is often less severe than in affected molars.⁵ The literature on this extremely diverse ectodermal condition is lacking, and when combined with its numerous clinical symptoms, this results in a large number of undetected patients and a wide range of clinical mistakes. Professionals may find it extremely difficult to solve this issue and its potential repercussions due to the complexity of the treatment, Hence, this study was conducted to evaluate the prevalence of MIH in schools going children of Kanpur.

Materials and Method

In Kanpur, India, a cross-sectional epidemiological study was carried out on a random sample of 2000 schoolchildren, aged 8 to 12, who were in good health. The institutional review board granted ethical clearance for the study to be carried out. A list of every school in Kanpur was acquired from the deputy director of the public instruction office before to the study's start. Geographically, the city was split into five zones: North, South, East, West, and

Central. Six public and private schools were chosen at random from each of these Kanpur's five zones. The administration of the school granted permission for an oral examination of the students. Parents were informed about the purpose of the study and asked for their written consent to participate..

Using a blunt probe and a sterile disposable mouth mirror, a single, trained, calibrated examiner performed the oral examination in broad daylight. Every day, fifty kids on average were inspected. Weerheijm et al.'s criteria were used to diagnose MIH.⁷

Surfaces that were examined were the buccal, lingual, palatal, and occlusal surfaces of permanent first molars and labial surfaces of upper and lower incisors. A single examiner was involved to avoid inter examiner bias.

Results

Table 1 shows the distribution of children. Of the youngsters, 17 (0.85%) had MIH. 45 molars and 31 incisors were impacted overall. There were more maxillary incisors implicated (17) Table 2 shows that in children, a greater number (28) just had molar hypomineralization (MH). Hypomineralization impacted all four first permanent molars in eight children. The mandibular arch had a higher percentage of impacted molars (Table 3).

Table 1: Percentage of children with molar incisor hypomineralization and molar hypomineralization

	Males n (%)	Females n (%)	Total n (%)
Number of children examined	1000 (50)	1000 (50)	2000 (100)
Number of children with molar incisor hypomineralization	8 (0.4)	9 (0.45)	17 (0.85)
Number of children with molar hypomineralization (without incisors)	13 (0.65)	15 (0.75)	28 (1.4)

Table 2: Distribution of molars and incisors affected with molar incisor hypomineralization

Affected Jaw	Maxilla (n)	Mandible (n)
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	Incisors	Molars	Incisors	Molars
Left	9	10	6	14
Right	8	9	8	12
Total	17	19	14	26

Table 3: Distribution of first permanent molars affected with hypomineralization

Molars	Maxilla (n)	Mandible (n)	Total (n)
Left Side Molars	5	9	14
Right Side Molars	9	7	16
Total	14	16	30

Discussion

A single tooth or a set of related teeth may be altered by enamel flaws. Only the permanent teeth, the primary teeth, or even both dentitions may be affected by this abnormality.

Hypomineralization is the consequence of any systemic, local, or genetic condition that might lead to an imbalance during the amelogenesis maturation phase.⁸ Visually, hypomineralization is recognised as an abnormality of enamel translucency, or enamel opacity, a qualitative defect.⁹

At the tooth eruption stage, the enamel of the molars afflicted by MIH is intact, but structurally it is porous and fragile. It frequently disintegrates right away upon eruption, leaving exposed dentin to the oral environment and accelerating the development of caries. Numerous issues are brought on by MIH, including poor aesthetics, food retention in the damaged enamel region, and increased sensitivity of the exposed dentine.

Dentists must therefore diagnose MIH as soon as possible in order to treat it. From the late 1970s till the present, the majority of epidemiological investigations have been carried out in European nations. There are relatively few published research on the prevalence of MIH in Asia; prevalence in Chinese children in Hong Kong is 2.8%⁹ while in Iranian children it is

12.7%.¹⁰ Approximately 35 percent of India's 1.21 billion inhabitants are under the age of fifteen.¹¹ The frequency of MIH in Indian youngsters, however, has not been reported in the last 20 years.

Since all four first permanent molars and incisors would have erupted into the oral cavity, children aged 8 to 12 were chosen. There would be a chance of caries initiation and post eruptive enamel degradation at an older age.

The frequency of MIH has varied greatly around the globe.^{9, 12-14} According to two Indian studies, 9.3% of Gujarat¹⁵ and 6.31% of Chandigarh had a MIH prevalence.¹⁶ Our study's findings indicate a lower prevalence of MIH, most likely as a result of our careful adherence to the standards set forth by the European Archives of Paediatric Dentistry¹⁷ for MIH documentation. Higher prevalence rates could arise from including older kids in the study group.^{9,14,18}

In this investigation, gender predilection was not evident, as it was in previous reports^{9,19} on MIH. There was a greater prevalence of MH (1.6%) than MIH (0.48%), according to several research^{20,12, 21}. Contradictory results have been found in other investigations.^{16, 15, 18, 19}

Mandibular molars were more affected than maxillary molars in the current study. It can be the result of the mandibular molars' early eruption.²²

Numerous environmental factors that act systemically during the prenatal, perinatal, and childhood stages cause MIH. The cause of MIH has been linked to a number of risk factors, although the exact aetiology is still unknown. Enamel abnormalities can result from a variety of factors, including inadequate oxygen delivery to ameloblasts or modifications in the calcium-phosphate balance.

Acute illnesses such tonsillitis, pneumonia, otitis media, chickenpox, upper respiratory tract infections, and episodes of high fever have been identified as significant risk factors for MIH. According to our research, drug use and early childhood illnesses (pneumonia/chickenpox) were strongly linked to MIH.

The herpes virus family is the culprit behind chickenpox. It's plausible that the maturation phase ameloblasts generated from epithelial cells are similarly impacted. Because enamel cannot be remodelled, scarring may develop and manifest clinically as opacities. The asymmetric distribution of MIH faults may be similar to the patchy distribution of skin lesions caused by chickenpox. Further studies on larger populations are required to determine the complete prevalence

Conclusion

In children aged 8 to 12 in Kanpur, India, the frequency of MIH was found to be 0.85%, with no discernible gender difference. MIH must be regarded as a public health issue that has detrimental effects on the quality of life for those who are affected, as well as unpleasant side effects.

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