

Pattern and Presentaion of Molar Incisor Hypomineralizaion in Pakistani Children

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ABSTRACT

Introduction: Molar-incisor hypomineralization (MIH) is a developmental disturbance that affects first permanent molars and incisors, with prevalence ranges from 3.6 to 25%. In MIH, hypomineralized dental enamel is fragile and can break easily leading exposed dentin and causing dental sensitivity and caries lesions. The etiological factors are frequently associated with childhood diseases during the first three years of life. This study was carried out to determine the pattern and presentation of molar-incisor hypomineralization in Pakistani children visiting Nishtar Institute of Dentistry, Multan.

Materials and Methods: A total of 233 consecutive patients ranging in age from 6-11 years presenting with any dental problem in Nishtar Institute of Dentistry and fulfilling the inclusion and exclusion criteria were included in the study. Detailed examination was done in all the patients to demonstrate the pattern and presentation of Molar Incisor Hypomineralization.

Results: Among 233 patients, there were 116/233 (49.8%) males while females were 117/233 (50.2%). Mean age of the patients was 8.51 ± 1.59 years. Molar incisor hypomineralization was diagnosed in 35/233 (15.1%) children, whereas no feature of MIH was found in 198/233 (84.9%). White patches were identified in 19/233 (8.15%) while white lines could be observed in 19/233 (8.15%). Brown patches were identified in 21/233 (9.01%). All the three features were altogether present in 11/233 (4.72%) of patients.

Conclusion: MIH is a common problem occurring in as many as 15.1% of our children population, predominantly with brown patches.

Keywords: Molar Incisor Hypomineralisation, Dental Enamel, Caries.

INTRODUCTION

The tooth is a vital organ present in the oral cavity.¹ Dental development and mineralization in humans starts before birth and continues to adolescence when the permanent molars complete their mineralization. The first permanent molar is the first tooth in the permanent dentition to mineralize, a process that starts around birth and is completed at approximately three years of age.² Histologically, tooth consists of Enamel, Dentine, Pulp and Cementum. Enamel develops in three phases. First an organic matrix formation, second mineralization and maturation is the 3rd one. Disruption at matrix formation manifests as hypoplasia while disturbances of mineralization results in hypo mineralization of tooth enamel.³ Dental enamel has a number of properties making it a unique tissue. It is the hardest tissue in the body and has a very high proportion of inorganic matter, mainly hydroxyapatite. The ameloblast has a limited reparative capacity; therefore disturbances occurring during the mineralization of enamel will remain as permanent marks.^{4,5} Clinically, disturbances

in enamel mineralization may be seen as opaque areas with colors ranging from white to yellowish-brown, or as defects where no mineralization of enamel has occurred.

The hard tissue formation of enamel and dentin is, as in many biological systems, characterized by a rhythmic appearance.⁴ The rate of mineralization is histologically seen as incremental lines in enamel and dentin. In the enamel the incremental lines are known as Retzius lines. Histological studies of dental hard tissues have provided information on the timing of their mineralization. Therefore, enamel may serve as a kymograph for events occurring during its mineralization, which is especially true for histological sections of teeth. An epidemiological study in Sweden reported children with defective first permanent molars with "cheese molar" appearance.⁵ A defect in dental enamel during development is defined as disturbance in hard tissue matrix and its mineralization. The major developmental defects in enamel are hypomineralization and hypoplasia.⁶ The molar incisor hypomineralization is qualitative defect and it follows the incremental lines from cuspal to cemento-enamel junction.^{7,8} These alterations become visible throughout enamel maturation and might be liable for the distinct decrease in elastic modulus and hardness of the affected enamel.⁹ The term enamel hypomineralization was first coined by Weerheijm et al. who defined it as disturbed clinical and morphological appearance in the incisal and occlusal surfaces of one of the permanent molars and incisors.¹⁰ MIH is actually a serious drawback for both the dentist and affected child because of high incidence of sensitive teeth, caries and expensive treatment.¹¹

Many epidemiological studies have reported that children with MIH undergo more dental treatment.^{12,13} First molars should be monitored carefully in order to early diagnosis and timely treatment for MIH. Regarding all the above mentioned facts, MIH is a greatest challenge for the restorative dentist because it has a notable impact on oral health. Therefore this study was carried out to describe the pattern and presentation of MIH in local population.

MATERIALS AND METHODS

This descriptive cross sectional study was carried out in

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Operative Dentistry Department of Nishtar Institute of Dentistry, Multan. After getting informed consent, 233 subjects were selected by following non-probability purposive technique.

Patients were examined clinically by two dentists. Molars and incisor teeth were dried and examined with a front surfaced mouth mirror and an explorer which was drawn across the surface to detect any interruptions in the surface continuity. The FDI index was used to classify the defects.¹⁴ The observations were written down on a modified data recording sheet. Data was entered and analyzed using SPSS 20.0. This study was certified and approved by Institutional Research and Ethical review Committee of Nishtar Institute of Dentistry Multan, Pakistan.

RESULTS

Among 233 children, there were 116/233 (49.8%) males while females were 117/233 (50.2%). Mean age of the patients was 8.51 ± 1.59 years. Molar incisor hypomineralization was diagnosed in 35/233 (15.1%) patients by presence of any one of the below mentioned three features whereas no feature of MIH was found in 198/233 (84.9%). White patches were identified in 19/233 (8.15%), with 6/19 (31.5%) females and 13/19 (68.5%) males. White lines were identified in 19/233 (8.15%), with 9/19 (47.3%) females and 10/19 (52.7%) males. Brown patches were observed in 21/233 (9.01%), with 13/21 (61.9%) females and 8/21 (38.1%) males. All the three patterns were present in 11/233 (4.72%) patients (Table 1).

DISCUSSION

In our study there were 233 patients in total. The number of males and females was almost equal. There were 116 males which constituted 49.8% of the patient population while females were 117 which constituted 50.2% of the patient population. Mean age of the patients was 8.51 ± 1.59 years. This was due to the inclusion criteria in which we selected children ranging in age from 6 to 11 years only. In our study population molar incisor hypomineralization was diagnosed in 35 patients who constituted 15.1% of the total population we surveyed. These patients were diagnosed on the basis of presence of any of the features of MIH including white lines, white patches or brown patches on their molar teeth. One hundred and ninety eight patients which constituted 84.9% of the population had no MIH. In another study conducted in India¹⁵, 1366 of 8-12 year old children were examined; 230

children were examined in the hospital and the remaining 1,136 in their schools. The age range of the children examined was 8-12 yrs. The mean age of the total sample was 10.4 years. Of the study sample, 612 (44.80%) were females and 754 (55.20%) males which is similar to that observed in our study. Out of the total number of children examined ($n = 1,366$), 126 were diagnosed with MIH, revealing a prevalence of 9.22% in the rural areas of Gandhinagar. In another study, 3,518 patients of age 5.5 to 12 year were examined; there were 360 (10.2%) children with MIH, 211 (58.6%) females and 149 (41.4%) males, with 1,926 affected teeth.¹⁶ Molar incisor hypomineralization was diagnosed in 35/233 (15.1%) patients by presence of any one of the below mentioned three features whereas no feature of MIH was found in 198/233 (84.9%) in current study. And when the frequency of various characteristics in the study population was noted it was found that brown patches were the most frequently encountered feature present in 21/233 (9.01%) of the population. White patches and white lines were found with equal frequency and were present in 19/233 (8.15%) of the study population. All the three features were present in 11/233 (4.72%) of patients. Fteita et al. examined 378 patients and reported the mean value of 1.5% for demarcated opacities in their first molars. MIH lesions were seen in first molars in only 1.1% of the children (tooth frequency) and every lesion was mild. Six children (1.6%) had diffuse opacities and 3 children's (0.8%) had hypoplastic defects in their first molars.¹⁷

Similarly COSTA-SILVA et al. reported a frequency of MIH in 19.8% of their study population. The mainstream of the defects were demarcated opacities with no post-eruptive structural loss, which has been assessed as mild defects. Children with MIH had elevated DMFT values.¹⁸ Another study conducted in Italy reported that thirty-nine children (13.7%) had MIH and the most common type of defects, which were observed in 19.4% of the children's, were demarcated opacities. Diffuse opacities were seen in 6.6% of the children and were observed in 4.4%, 4.0%, 3.8% and 2.4% of the lower first molars, upper central incisors, first molars and laterals, accordingly. Hypoplasia noted only in 1.3% of the children and hypoplastic defects in all tooth types were uncommon.¹⁹ Dietrich and his colleagues reported that demarcated opacities in children were observed in (5.6%) of MIH children with at least one first molar involvement.¹⁹ GHANIM et al. stated that 18.6% of children had minimum one affected first molar or first molars and incisors and were counted as having MIH. Demarcated creamy white opacities were the most common lesion type observed in children.²⁰ These all previously conducted studies are quite contrary in findings to the results of the present study.

For children with frequent illnesses in the first years after birth and children's with opacities on erupted incisors or molars it is strongly recommended to raise the rate of dental check-ups throughout the period of erupting first permanent molars.

CONCLUSION

MIH is a significant clinical problem that frequently involves both the specialist pediatric dentists and general dentist. The

Characteristic	Frequency	Gender
White patches	19/233 (8.15%)	Males = 13/19 (68.5%) Females = 6/19 (31.5%)
White lines	19/233 (8.15%)	Males = 10/19 (52.7%) Females = 9/19 (47.3%)
Brown Patches	21/233 (9.01%)	Males = 8/21 (38.1%) Females = 13/21 (61.9%)
All features	11/233 (4.72%)	Males = 6/11 (54.6%) Females = 5/11 (45.4%)
Any feature	35/233 (15.1%)	Males = 19/35 (54.2%) Females = 16/35 (45.7%)

Table-1: Frequencies of various patterns of molar incisor hypomineralisation

prevalence of MIH in this study was high in comparison to other previous epidemiological reports. Molar incisor hypomineralization is a common dental problem in our setup affecting as many as 15.1% of the children with predominantly brown patches of lesion.

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