



## Prevalence and Sex Predilection of Molar Incisor Hypomineralization Among Children Aged 6-12 Years in Mangalore , Karnataka

## KEYWORDS

Molar incisor hypomineralization , enamel defect

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**ABSTRACT** *Molar Incisor Hypomineralization (MIH) is a common developmental condition resulting in enamel defects in the first permanent molars and permanent incisors.*

*AIM: To investigate the prevalence and sex predilection of MIH in a group of Mangalorean children.*

*METHODOLOGY: The study population comprised of 250 ; 6 - 12 year olds , from three schools in Mangalore , Karnataka . Subjects were evaluated clinically by one examiner in broad daylight and inspected and scored for hypomineralized molars and incisors using EAPD criteria cited by Ghanim et al . Statistical analyses were performed using ANOVA , TUKEY HSD test.*

*RESULT: Forty four (17.2%) children showed MIH. White creamy opacities were the most frequent enamel defect . There was no statistical significant difference in MIH seen among boys and girls*

*CONCLUSION : The prevalence of MIH in a group of Mangalorean children was 17.2%. This study suggests further research into the aetiology of MIH and caries susceptibility in these affected teeth*

**INTRODUCTION**

Developmental defects of tooth enamel are not uncommon , the causes of which may be congenital , acquired or unknown<sup>15</sup> . An example of this kind of defect is Molar incisor hypomineralization (MIH) , which is a qualitative developmental defect of systemic origin , which manifests as a distinctive hypomineralized lesion of enamel<sup>1</sup> . The defect primarily involves one to four first permanent molars and potentially affects permanent incisors . Also referred to as "hypomineralized" PFMs, "idiopathic enamel hypomineralization" , "dysmineralized" PFMs , "nonfluoride hypomineralization" , and "cheese molars" , the condition is attributed to disrupted ameloblastic function during the transitional and maturational stages of amelogenesis<sup>2</sup> .

It can be differentiated from fluorosis as its opacities are demarcated , unlike the diffuse opacities that are typical of fluorosis . It should be stressed that , only in very severe MIH cases , the molars are equally affected and mimic the appearance of Amelogenesis Imperfecta (AI) . Mostly in MIH, the appearance of the defects will be more asymmetrical in the molars as well as in the incisors . In AI , the molars may also appear taurodont on radiograph and there is often a history of family onset<sup>3</sup> .

The prevalence of MIH is reported to vary between 2.4 and 40.2% in normal child population<sup>4</sup> . Currently , the majority of the prevalence data are based on

studies from Europe , there had been only few published studies conducted in India and particularly in Karnataka . The lack of data , however , is not an indication that MIH is a rarity in these regions<sup>5</sup> . This study therefore aimed to assess the prevalence of MIH in Mangalorean children

**MATERIALS AND METHODS**

The present cross – sectional descriptive study was carried out after obtaining ethical clearance from the Institutional Ethical Committee.

**Study population**

The study population comprised of 250 , 6 to 12 year old school children studying in various schools in Mangalore , Karnataka . Children having fully erupted index teeth for MIH ( all permanent first molars and incisors ) and prior informed consents from their parents , were included in the study . Children with any disability or systemic disease that would compromise routine oral care and who were absent on the day of examination were excluded.

**Clinical Examination and Diagnosis**

All the dental examinations were conducted by a single dental examiner with the help of diagnostic instruments - mouth mirrors and disposable ice - cream sticks under broad sunlight . All the incisors and first permanent molars were kept wet during the examination to distinguish opacities from incipient caries le-

sions and each index tooth were scored individually . MIH was diagnosed using European Academy of Pediatric Dentistry criteria as cited by Ghanim et al , 2011.

CODE	CRITERIA
0	Enamel defect free
1	White / creamy demarcated opacities , no PEB
1a	White / creamy demarcated opacities , with PEB
2	Yellow / brown demarcated opacities , no PEB
2a	Yellow / brown demarcated opacities , with PEB
3	Atypical restoration
4	Missing because of MIH
5	Partially erupted ( i.e , less than one - third of the crown high ) with evidence of MIH
6	Unerupted / partially erupted with no evidence of MIH
7	Diffuse opacities ( not MIH )
8	Hypoplasia ( not MIH )
9	Combined lesion ( diffuse opacities / hypoplasia with MIH )
10	Demarcated opacities in incisors only

Table 1: EAPD criteria as suggested by Ghanim et al , \*PEB-post enamel breakdown



Figure 1 : white creamy demarcated opacities without PEB Figure 2 : yellowish brown opacities with PEB

**STATISTICAL ANALYSIS.**

The data was analyzed using the Statistical Package for Social Sciences software version 17.0 for Windows Anova test and Tukey HSD test.

**RESULTS**

**PREVALENCE OF MOLAR – INCISOR HYPOMINERALIZATION**

Of the 250 children examined , 144 were males and 106 females . The prevalence found was 17.2 % . The following results were seen.

1. There was a statistical significance ( p = 0.021 ) seen in the association between number of molars affected and the age group .
2. There was a statistical significance ( p = 0.026 ) seen in the association between teeth affected and the age group.
3. As far as the participants gender was concerned no statistically significant difference was found .

**FREQUENCIES OF DEFECTS**

	06	07	08	09	10	11	12	13
ENAMEL DEFECT FREE	233 (93.2%)	235 (94.1%)	237 (94.7%)	238 (95.2%)	239 (95.6%)	240 (95.7%)	241 (95.8%)	242 (95.9%)
WHITE/CREAMY PATCHES, NO POST ENAMEL BREAKDOWN	14 (5.5%)	14 (5.5%)	15 (5.9%)	16 (6.3%)	17 (6.6%)	18 (7.1%)	19 (7.4%)	20 (7.8%)
WHITE/CREAMY PATCHES, WITH POST ENAMEL BREAKDOWN	5 (2.0%)	5 (2.0%)	6 (2.3%)	7 (2.7%)	8 (3.1%)	9 (3.5%)	10 (3.9%)	11 (4.3%)
YELLOW/BROWN PATCHES, NO PEB	3 (1.2%)	3 (1.2%)	4 (1.6%)	5 (1.9%)	6 (2.3%)	7 (2.7%)	8 (3.1%)	9 (3.5%)
YELLOW/BROWN PATCHES, WITH PEB	2 (0.8%)	2 (0.8%)	3 (1.2%)	4 (1.5%)	5 (1.9%)	6 (2.3%)	7 (2.7%)	8 (3.1%)
COMBINED LESIONS	0	0	1 (0.4%)	2 (0.8%)	3 (1.1%)	4 (1.5%)	5 (1.9%)	6 (2.3%)
OPACITIES IN INCISORS ONLY	0	0	0	0	1 (0.4%)	2 (0.8%)	3 (1.1%)	4 (1.5%)

Table 2 : shows that white creamy opacities were the most commonly found defect. Yellow brown opacities with PEB was less in the incisors.

ANOVA		Sum of Squares	Df	Mean Square	F	Sig.
NO.OF MOLARS	Between Groups	7.474	2	3.737	3.923	.021
	Within Groups	235.282	247	.953		
	Total	242.756	249			



NO.OF INCISORS	Between Groups	1.551	2	.776	1.850	.159
	Within Groups	103.573	247	.419		
	Total	105.124	249			
TEETH AF-FECTED	Between Groups	15.191	2	7.596	3.695	.026
	Within Groups	507.709	247	2.056		
	Total	522.900	249			

**Table 3 :** shows the statistical significant difference between the number of molars affected within the age groups and the total number of teeth affected within the age groups

INVOLVED INCISORS	#1	Count	INVOLVED MOLARS		Total
			++1	Nil	
++1	Count	22	16	38	
		% with INVOLVED INCISORS	57.9%	42.1%	100.0%
		% with INVOLVED MOLARS	73.0%	7.2%	15.2%
Nil	Count	8	200	208	
		% with INVOLVED INCISORS	7.6%	97.3%	100.0%
		% with INVOLVED MOLARS	31.4%	99.8%	84.8%
Total	Count	30	220	250	
		% with INVOLVED INCISORS	11.2%	88.8%	100.0%
		% with INVOLVED MOLARS	100.0%	100.0%	100.0%

**Table 4 :** shows that 22 cases had both molar and incisors involved , 16 had incisors alone and 6 had molar alone . The total involved teeth = 250 - 206 = 44 teeth .

**GENDER CHARACTERIZATION**

NO.OF MOLARS		GENDER			
		MALE		FEMALE	
		Count	Column N %	Count	Column N %
0	0	129	99.2%	93	86.9%
	1	1	0.7%	2	1.9%
	2	6	4.2%	4	3.7%
	3	1	0.7%	1	0.9%
NO.OF INCISORS	4	6	4.2%	7	6.5%
	0	124	86.7%	88	82.2%
	1	7	4.9%	9	8.4%
	2	11	7.7%	9	8.4%
TEETH AFFECTED	3	1	0.7%	0	0.0%
	4	0	0.0%	1	0.9%
	0	120	83.9%	86	80.4%
	1	2	1.4%	2	1.9%
	2	10	7.0%	7	6.5%
	3	2	1.4%	3	2.8%
	4	3	2.1%	3	2.8%
	5	4	2.8%	2	1.9%
	6	2	1.4%	3	2.8%
	8	0	0.0%	1	0.9%

**Table 4 :** shows the gender distribution and the teeth affected and no statistical difference was seen.

**DISCUSSION**

The prevalence of MIH in Mangalorean children was found to be 17,2% is higher than that observed in a few studies conducted in northern India<sup>11-12,14</sup>. European , Arab and Asian countries<sup>3,5-6,8-9</sup> but lesser to that seen in Brazil<sup>7</sup>. The differences in ethnic and age groups being studied and the retrospective nature of this study were probable reasons . The children of age group of 6 to 12 years were selected because at this age at least one of the first molar would have erupted and also the risk of defect in the enamel being masked by large carious region in later age would be minimized<sup>10</sup>.

In the present study no gender predilection was seen in the children assessed which is in accordance to many other studies conducted in the western countries<sup>3,11,13</sup>. The most common defect seen was the white / cream opacities<sup>7</sup> without post enamel breakdown and the yellow brown opacities with post

enamel breakdown was seen very less in the incisors when compared to that of the molars .The most severe MIH defects were present on the first permanent molars .The permanent incisors only showed demarcated opacities in their labial surfaces , implying that the incisors do not require treatment except for aesthetic reasons .Defects on the permanent incisors are probably not related to structural loss because of the absence of masticatory forces upon these surfaces<sup>9</sup>. Early identification of MIH is important as affected teeth frequently display post eruptive enamel loss which in turn would result in rapid caries progression and ensuing pain<sup>5</sup>. MIH is induced during the first 3 years of life in the course of crown mineralization and its etiology is unknown .Until exact causes are known and prevention is an option , children with MIH require therapy soon after tooth eruption. Our recent research supports the assumption that MIH is a widespread problem in southern India . The ensuing costs and somewhat stressful nature of the respective dental treatment clearly indicate the urgent need for further intensive investigations . A carefully managed recall program for those children who are affected is essential . This would certainly help in the development of preventive and therapeutic measures for combating this threatening developmental disturbance of permanent teeth.

**CONCLUSION**

Special attention should be given to the enamel defects characterized as MIH . Although the majority of affected children present mild enamel defects , this study demonstrated the adverse impact of these defects on the development of the carious lesion in a population with high caries experience<sup>7</sup>. The regional difference in the MIH prevalence deserves attention from health professionals and administrators , especially in a country with an uneven distribution of oral diseases , where the contextualization of health promotion and prevention actions are necessary.Children should be monitored frequently during the eruption of permanent first molars so that re - mineralization and preventive measures can be instituted at the earliest . The general practitioner should be able to recognize MIH defects in order to perform an adequate treatment or to refer complicated cases for specialized treatment.

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