



## PREVALENCE OF DEVELOPMENTAL DISTURBANCES OF TEETH IN 6-13 YEAR OLD INDIAN CHILD POPULATION : A CROSS SECTIONAL STUDY

### Dental Science

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### ABSTRACT

Disturbances during the period of tooth development may result in alteration the size, shape, number or morphology of teeth and are commonly encountered by dental professionals resulting in low self esteem in the conscious patients and or functional problems. Available literature has shown a wide variation in the prevalence of these aberrations in different populations throughout the world. Aims- To assess the prevalence of various developmental disturbances of tooth in a sample of Indian children. Methods- A total of 2500 children in the age group of 6 to 13 years visiting the OPD of pedodontics and preventive dentistry of Mithila Minority Dental College & Hospital, Darbhanga, Bihar were screened clinically for the prevalence of developmental disturbances of teeth, the data was tabulated and analysed statistically. Results- Prevalence of developmental disturbances was 5.02 % in the study population and Enamel hypoplasia, hypodontia were the most frequently encountered anomalies. Conclusion- Developmental disturbances of the teeth are common, an early detection and intervention may prevent future complications and requirement of more complex multidisciplinary treatment in the future.

### KEYWORDS

Developmental disturbance, prevalence, Enamel hypoplasia,

### INTRODUCTION

Disturbances during various stages of tooth development can markedly alter the number, size, shape, structure, color and eruption pattern of the teeth.<sup>1</sup> These disturbances vary in their prevalence in different populations of separate race and ethnicity, and also shows wide range of biological variations. The development of tooth involves a complete reciprocal interaction between oral epithelium and underlying ectomesenchyme involving a series of molecular signals, receptors and transcription control systems.<sup>2</sup> Disturbance during initiation, proliferation, histodifferentiation or morphodifferentiation stages of tooth development may result in a wide variety of developmental disturbances. Abnormalities of morphodifferentiation cause abnormalities in number, size and form of teeth, while abnormalities in histodifferentiation result in disturbances in the structure of teeth.

The prevalence of these abnormalities varies widely in different parts of the world, as observed in various studies<sup>3,5</sup> and may be the result of genetic differences between populations or because of local environmental factors. Either dentition deciduous or permanent in a localized or generalized manner may be affected. These disturbances may be an incidental finding during a routine dental examination, but an early diagnosis may be beneficial so that early interception may be initiated and future complications and or the need for complex therapeutic intervention may be avoided. India has a diverse population comprising of a high number of racial and ethnic groups with widely varying cultural practices. Very few studies have been done to assess the prevalence of dental anomalies in Indian population. So the present cross sectional study was designed to assess the prevalence of developmental abnormalities in a group of pediatric population.

### MATERIAL AND METHODS

This cross sectional epidemiological study was carried out on patients visiting the out patient department of Pedodontics and Preventive Dentistry of Mithila Minority Dental College & Hospital, Darbhanga during the period from April 2019 to September 2019. A total of 2500 children (1240 males and 1160 females) in the age group of 6 to 13

years (Mixed dentition period) were examined clinically for the presence of various developmental disturbances. The research protocol was approved by the Institutional Ethical Committee and informed consent was obtained from the guardians of all participants after explaining the purpose and procedure for study. Exclusion criteria were- patients with unilateral or bilateral cleft lip and or palate, underlying systemic conditions, any orofacial syndrome, tooth lost with a history of trauma, missing tooth extracted due to caries or orthodontic purpose. A detailed medical & dental history was obtained and demographic details too were recorded. The patients were made to sit in a dental chair and a thorough clinical examination was carried out under adequate lighting conditions to assess the presence or absence of below mentioned developmental anomalies. IOPA radiograph or OPG was taken if required as supplemental diagnostic tool.

- Microdontia- the presence of teeth which are physically smaller than normal, and Macrodontia- presence of teeth which is physically larger than usual. (Nayak and Nayak 2011)<sup>6</sup>
- Fusion- the union in dentin and or enamel between two or more separately developed normal teeth; Gemination- Incomplete division of a tooth germ. Dilaceration- any abnormal curvature in the crown or root of teeth, Talons cusp- an accessory cusp projecting from the lingual or facial surface of an anterior tooth; Dens in dente – a pit or fissure on lingual surface of anterior teeth. (Guttal et al ,2010)<sup>7</sup>, dens evaginatus, Peg lateral and taurodontism
- Hypodontia- the lack of development of one or more teeth (Javali and Meti, 2015)<sup>8</sup>, excluding the third molars, and Supernumerary teeth or hyperdontia where any tooth or odontogenic structure is formed from tooth germ in excess of usual number.
- Anomalies in structure- Amelogenesis imperfecta, Dentinogenesis imperfecta, Enamel Hypoplasia

All the data were tabulated and Descriptive statistics methods were used. Statistical package for Social Sciences (SPSS) version 18 was used for data analysis.

### RESULTS AND ANALYSIS

A total of 2500 paediatric patients (53.6% male, 46.4% female) belonging

to the age group- 6 to 13 years were examined clinically and radiologically when required for the presence of developmental disturbances of teeth. Amongst these a total of 146 (5.84%) patients (78 males & 68 females) had various dental anomalies. The presence of anomalies was a statistically significant finding ( $p < 0.05$ ) in the study sample.

**Table 1: Descriptive data for the study sample**

Male	78(3.12 %)
Female	68 (2.72 %)
Jaw	
Mandible	46(1.84%)
Maxilla	52(2.08 %)
Both Jaw	48(1.92 %)

**Table 2: Distribution of anomalies in the study population**

S No	Anomaly	Number Of Patients		Percentage
		Male	Female	
1	Microdontia	4	5	0.36
2	Macrodontia	2	3	0.02
3	Fusion	Nil	1	0.004
4	Gemination	2	1	0.12
5	Concrescence	Nil	Nil	-
6	Dilaceration	2	Nil	0.08
7	Dens in dente	2	2	0.16
8	Talons cusp	7	5	0.48
9	Dens evaginatus	1	2	0.12
10	Taurodontism	4	4	0.32
11	Anodontia	Nil	Nil	-
12	Hypodontia	6	3	0.36
13	Supernumerary tooth	6	3	0.36
14	Amelogenesis imperfect	37	44	3.24
15	Dentogenesis Imperfect	Nil	Nil	-

**Table 3: Distribution of patients with prevalence of anomalies**

Anomaly	Frequency	Prevalence
Disturbance in size	14	0.38
Disturbance in shape	33	1.284
Disturbance in structure	18	3.24
Disturbance in number	81	0.72

## DISCUSSION

Out of a total of 2500 patients that were examined, 146 patients (5.84%) had various types of developmental anomalies. Studies conducted in different parts of the world has shown results, ranging from 5.6 to 7.4%.<sup>3-5</sup> These differences could be due to genetic differences, method of sampling employed or diagnostic criteria used to assess the prevalence of developmental aberrations. Since no such study has been carried out to assess the prevalence of developmental aberrations in Bihar, this was our area of interest to assess the same in a sample of Darbhanga population.

In our study males were affected more than females (Table 1). This is similar to the observation by Singhal et al. and Nayak & Nayak. Najim and Younis<sup>19</sup> & Deolia et al<sup>10</sup> have observed a higher frequency of these disturbances in the female population. The upper jaw was more commonly affected (2.08%) as compared to mandibular involvement (1.84%), while bimaxillary involvement was found in (1.92%) of cases.

The most common disturbance of development was observed as involvement of dentition by Enamel hypoplasia. It could be due to dental fluorosis, attributed to the ingestion of drinking water with high levels of fluoride beyond permissible limit. Many districts in Bihar have fluoride concentration above 1.5mg/L, the limit prescribed by the Bureau of Indian Standards.

Talon's cusp was observed with second highest frequency, being reported in 0.48% of our study population. Prabhu et al (2012)<sup>11</sup> have observed a prevalence of 0.58% of Talon's cusp in their study and our findings are close to their observation. The pathologies attributed to the presence of this accessory cusp include- poor esthetics, interference with normal occlusion leading to cusp fracture, TMJ involvement with pain and irritation of tongue during various movements. However Siddaih et al (2017)<sup>21</sup> in a recent study found a higher percentage

(0.93%), which must be attributed to racial differences between different populations. A prevalence rate of 0.36% each was found for microdontia (presence of teeth smaller than normal size), Supernumerary teeth (presence of teeth extra than the normal complement) and Hypodontia (developmental absence of one or more teeth excluding the third molars). Deolia et al found a prevalence rate of 0.6% for microdontia, while Kathariya et al(2013)<sup>13</sup> found a very high prevalence rate of 4.3% in their study. Macrodonia, the presence of teeth larger than usual is quite less prevalent. In our study it was 0.02%; which is close to other studies by Javali and Miti (2015). The percentage of supernumerary tooth encountered was quite close to the study by Deolia et al and Salem G<sup>14</sup>. Supernumerary tooth usually present as mesiodens between the central incisors, and very commonly they may become impacted. Such impacted tooth may only be visible on an incidental radiological examination. Their presence may cause displacement of adjacent teeth or failure of eruption. In case of Hypodontia, lateral incisors were most commonly found to be missing, our finding of hypodontia in 0.36% is close to the observation of 0.35% prevalence by Singhal et al (2017). Davis<sup>15</sup> too has reported a similar involvement in the Asian population. Taurodontism (enlargement of tooth crown at the expense of root) was present in 0.32% cases, which is quite close to 0.3% reported by Javali et al and Sener et al<sup>16</sup> (2011).

The prevalence of Gemination in our study was 0.12%. Javeli and Meti have observed a prevalence of 0.17% to 4.8%, while Kathariya et al 2013 have reported a prevalence of 3%.

An invagination in the surface of tooth crown before beginning of mineralization is referred to as Dens in dente. We found a prevalence rate of 0.16% of dens in dente. Kayal et al<sup>17</sup> (2011) in their study found a very low prevalence of 0.03%, while Sener et al (2011) have reported a 1.5% prevalence in their study. The incidence of Dens evaginatus in our study was 0.12% which is similar to the observation by Javali et al (2015). The prevalence of dilaceration in our study was 0.08%, while Goya HA et al<sup>18</sup> 2008 observed a prevalence of 0.02% and Javali et al 2015 reported a prevalence of 1%.

## CONCLUSION

The findings of our study suggest that Enamel hypoplasia is the most common developmental disturbance in the pediatric population of Darbhanga and attributed to be the result of dental fluorosis. Other common disturbances in order of their frequency of occurrence include Talon's cusp, supernumerary and missing teeth, microdontia, followed by Taurodontism. Other less common anomalies included macrodontia, fusion, germination, dens in dente and dens evaginatus.

Developmental disturbances of teeth have widespread prevalence have been reported to have wide geographical, racial and ethnic variations. Though the overall prevalence of such anomalies is quite low, early detection of such disturbances may prevent future complications and complex therapeutic intervention. A careful clinical and radiographic examination is required for early diagnosis and management of such cases.

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