

Prevalence of Developmental Anomalies of Teeth in a Group of Indian Children A Cross Sectional

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ABSTRACT

Introduction: Developmental anomalies of the tooth are routinely encountered by paediatric dental professionals and may present with esthetic and or functional problems. The reported literature has shown a wide variation in the prevalence of these conditions across the globe. Study aimed to assess the prevalence of various developmental anomalies of tooth in a sample of Indian paediatric population

Material and Methods: A total of 3000 children in the age group of 6 to 13 years visiting the OPD of pedodontics and preventive dentistry of BIDSHP, Patna were examined clinically and radiologically when required and the data was tabulated. Descriptive statistics methods were used using SPSS.

Results: Prevalence of dental anomalies was 4.86% in the study population and Enamel hypoplasia, hypodontia and talon's cusp were the most frequently encountered anomalies. The presence of developmental anomalies was a statistically significant finding.

Conclusion: Early detection of developmental anomalies may prevent future complications and eliminate the need for complex therapeutic intervention.

Keywords: Developmental Anomaly, Prevalence, Teeth, Enamel Hypoplasia, Talon's Cusp

and no such study has been done so far in the state of Bihar. Hence the present cross sectional study was carried out to determine the presence of developmental anomalies in a group of Patna population.

MATERIAL AND METHODS

Cross sectional study was carried out on patients visiting the out patient Dept. of Pedodontics and Preventive Dentistry of BIDSHP, Patna during the period from January 2017 to December 2018. A total of 3000 children in the age group of 6 to 13 years (Mixed dentition period) were examined for the presence of various dental anomalies, out of which 1783 were boys and 1217 were girls. The research protocol was approved by the Institutional Ethical Committee and consent was obtained from the guardians of all participants after explaining the purpose and procedure of study. Exclusion criteria included patients with any orofacial syndrome, cleft lip and palate patients, underlying systemic conditions, tooth missing because of trauma, caries or orthodontic extraction. A detailed medical and dental history and demographic details of each patient was recorded. A comprehensive clinical examination under adequate lighting conditions was carried out by a single examiner to identify the following developmental disturbances-

INTRODUCTION

Deviations from normal acceptable variation in tooth morphology, color or number is regarded as anomaly, which may be either congenital or acquired during the course of development of teeth. 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.¹ Abnormalities of morpho differentiation causes abnormalities in the number, size and form of teeth while abnormalities of histodifferentiation result in disturbances in the structure of tooth.

Studies done across the globe in different populations has shown varying degrees of prevalence of such developmental disturbances.²⁻³ This may be attributed to racial and ethnic differences and local environmental factors. Such influences may affect the deciduous or permanent dentition⁴ and may be localized or generalized. An early diagnosis of developmental disturbances is important to initiate preventive measures or to minimize complicated multidisciplinary approach for treatment. 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 few Indian population

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- Anomalies in size- microdontia and macrodontia
- Anomalies in shape- Fusion, Gemination, Concrescence, Dilaceration, Talons cusp, Dens in dente, dens evaginatus, Peg lateral and taurodontism
- Anomalies in number- Anodontia, Hypodontia and Supernumerary teeth
- Anomalies in structure- Amelogenesis imperfecta, Dentinogenesis imperfecta, Enamel Hypoplasia

Pretreatment dental casts, IOPA and panoramic images were taken whenever required.

STATISTICAL ANALYSIS

All the data were tabulated and Descriptive statistics methods were used using statistical package for Social Sciences (SPSS) version 20.

RESULTS

A total of 3000 patients (59.43% male, 40.57% female) in age group of 6 to 13 years were examined, out of which a total of 146 (4.86%) patients (86 males and 60 females) (Table 1) had various dental anomalies. Out of 146 patients

Male	86(2.86%)
Female	60 (2.00%)
Jaw	
Mandible	44(1.46%)
Maxilla	62(2.06%)
Both Jaw	40(1.34%)

Table-1: Descriptive data for the study sample

S No	Anomaly	Number of Patients		Percentage
		Male	Female	
1	Microdontia	8	2	0.3
2	Macrodontia	3	Nil	0.1
3	Fusion	Nil	Nil	-
4	Gemination	2	1	0.1
5	Concrescence	Nil	Nil	-
6	Dilaceration	1	Nil	0.03
7	Dens in dente	3	2	0.11
8	Talons cusp	9	6	0.5
9	Dens evaginatus	2	2	0.13
10	Taurodontism	7	5	0.4
11	Anodontia	Nil	Nil	-
12	Hypodontia	8	2	0.5
13	Supernumerary tooth	7	1	0.3
14	Amelogenesis imperfecta	36	44	2.33
15	Dentonogenesis Imperfecta	Nil	Nil	-

Table-2: Distribution of anomalies in the study population

Anomaly	Frequency	Prevalence
Disturbance in size	13	0.43
Disturbance in shape	40	1.33
Disturbance in structure	20	0.67
Disturbance in number	84	2.80

Table-3: Distribution of patients with prevalence of anomalies

with anomalies, maxillary involvement was seen in 62 patients (2.06%), mandibular dentition was affected in 44 patients (1.46%), while 40 patients (1.34%) had involvement of both the jaws (Table-1). The presence of anomalies was a statistically significant finding ($p < 0.05$) in the study sample. Table 2. depicts the prevalence of different types of anomalies in the study population. Amelogenesis imperfect had the highest prevalence (2.33%) followed by talon's cusp and hypodontia (0.5%each), taurodontism was observed in 0.4% of study population, while supernumerary teeth and microdontia had a prevalence of 0.3% each. Our study did not find any case of fusion, concrescence, anodontia and dentinogenesis imperfect in the study population.

Table 3, describes the overall prevalence of various anomalies in terms of disturbances during various phases of tooth development. Disturbances in number of teeth was present in 84 patients (2.8%), followed by disturbances in shape in 40 patients (1.33%), disturbances in structure was seen in 20 patients (0.67%), while 13 patients (0.43%) had disturbances in size.

DISCUSSION

Out of a total of 3000 patients that were examined, 146 patients (4.86%) had various types of developmental anomalies. Several studies done across the globe amongst different populations have shown conflicting results, ranging from 5.6 to 7.4%.^{2,3} These differences in results can be attributed to racial differences, variable sampling techniques and different diagnostic criteria.⁵

No such epidemiological study has been carried out to assess the prevalence of developmental anomalies in Patna city, Bihar, India and hence this was our area of interest.

In our study males were predominantly affected as compared to females which is similar to the observation by Singhal et al¹ and Nayak and Nayak⁶, however Najim and Younis⁷ and Deolia et al⁸ have reported a higher prevalence of such anomalies in females. Maxillary involvement was more common than mandibular involvement while both the jaws were affected in 1.34% of cases.

Enamel hypoplasia was the most common anomaly and it could be attributed to the ingestion of drinking water with high levels of fluoride beyond permissible limits. (Dental fluorosis). Many districts in Bihar have fluoride concentration above 1.5mg/L, the limit prescribed by the Bureau of Indian Standards.

Microdontia, the presence of teeth smaller than normal in the present study its prevalence was 0.3%; which was close to 0.6% observed by Deolia et al, however Kathariya et al⁹ (2013) have reported a prevalence of 4.3% in their study. Macrodonia, the presence of teeth larger than usual is quite less prevalent. In our study it was 0.1%; which is close to other studies by Javali and Miti.¹⁰

Talon's cusp was the second most commonly found anomaly with a prevalence of 0.5% in our study population. This is close to 0.93% as observed by Siddaih et al¹¹ and 0.58% as observed in the study by Prabhu et al.¹² The presence of Talon's cusp may cause irritation of the tongue during

function, compromise esthetics, occlusal interference may lead to cusp fracture, displacement of affected tooth, TMJ pain and traumatic bite.¹² The prevalence of Taurodontism (enlargement of tooth crown at the expense of root) was observed in 0.4% cases, which is close to 0.3% reported by Javali et al¹⁰ and Sener et al.¹³

Supernumerary teeth or Hyperdontia is a frequent finding in dental practice and in our study it was found in 0.3% cases, which was similar to the findings of Deolia et al and close to 0.5% as observed by Salem G.¹⁴ Most supernumerary tooth are impacted and usually diagnosed incidentally on radiographic examination. These may be asymptomatic or may cause tooth displacement and failure of eruption.¹⁵ Hypodontia or developmental absence of one or more tooth (excluding third molars) was observed in 0.5% of cases and mandibular lateral incisors were the most commonly affected. This finding is close to 0.35% prevalence reported by Singhal et al.¹ Davis¹⁶ has reported similar involvement in the Asian population.

Dens in dente is an anomaly due to invagination in the surface of tooth crown before beginning of mineralisation. Our study observed a prevalence of 0.33% of this condition while Kayal et al¹⁷ and Sener et al have reported a range of 0.03% to 1.5%. The incidence of Dens evaginatus in our study was 0.13% which is similar to the observation by Javali et al.¹⁰ The prevalence of dilaceration in our study was 0.03%, while Goya HA et al¹⁸ observed a prevalence of 0.02% and Javali et al reported a prevalence of 1%.

CONCLUSION

Our study observed that Enamel hypoplasia was the most common anomaly, followed by hypodontia and talon's cusp, taurodontism, supernumerary tooth, dens evaginatus, dens in dente, gemination and dilaceration in order of frequency. Fluorosis was the major cause of enamel hypoplasia and hence fluoride mitigation programs need to be instituted in the study area.

Dental anomalies 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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