

Original Research

Prevalence of Hypodontia in children of North Bihar: An Orthopantomographic Study

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ABSTRACT

Hypodontia, or tooth agenesis, is the most prevalent craniofacial malformation in human. It may occur as part of a recognized genetic syndrome or nonsyndromic trait as well. Both environmental and genetic factors are involved in the etiology of hypodontia, with the latter playing a more significant role. Excluding third molar, the reported prevalence of hypodontia ranges from 1.8 to 7.2 % depending on the population of the study group. **Aims:** The aim of the study was to assess the prevalence and distribution of hypodontia in permanent dentition in children of North Bihar. **Materials and Methods:** In this study, panoramic radiographs of 2000 children (981 girls and 1019 boys), aged 7 to 14 years were recorded and inspected for anomalies in the number of teeth. **Statistical Analysis Used:** The data was analyzed using SPSS version 10.00 (Statistical Package for the Social Sciences, Chicago, USA). **Results:** The prevalence of hypodontia in this study was 4.7%, and the most frequently absent tooth was the maxillary lateral incisor. There was an increased prevalence of hypodontia in males and in the mandibular arch of the permanent dentition. **Conclusions:** The prevalence of hypodontia in a North Bihar population was 4.7%, which was found to be in accordance with the findings of most of the published population studies on prevalence of hypodontia in India. Prompt diagnosis of these anomalies can help in diagnosis and plan treatment modalities at an early age to establish a functional and esthetic harmony.

Key words: Hypodontia, Prevalence, Orthopantomograph.

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INTRODUCTION

The formation of a tooth is a complex method which involves an interaction between the epithelial and mesenchymal tissues. A lack of initiation in the development of dental lamina may result in the absence of teeth. Hypodontia is the most prevalent dentofacial malformation in human being¹. It may occur as part of a recognized genetic syndrome or as a nonsyndromic isolated trait². By definition, congenitally missing teeth are those that fail to erupt in the mouth and remain invisible on a radiograph, which implies that it might be caused by

disturbances during the early stages of tooth development process.³ The congenital absence of one to six teeth, excluding the third molars is termed as hypodontia. When more than six teeth are absent, it is termed as oligodontia. The condition of complete absence of teeth, either in the primary dentition and/or in the permanent dentition is termed as anodontia. Environmental factors can cause tooth agenesis by a variety of means that can be broadly placed into two groups: Invasive and noninvasive. These can act either additively or independently to affect the positioning and physical development of the tooth. Jaw fractures,

surgical procedures, extraction of the preceding primary tooth, and changes in muscle pressure from the facial and lingual sides are all examples of invasive factors that can affect tooth development and positioning leading to tooth agenesis and impaction⁴. Among noninvasive factors, the most common are developing teeth which are irreversibly affected by chemotherapy and irradiation in an age- and dose-dependent manner, nutrient deprivation, and endocrine disturbances³. The prevalence of hypodontia varies from 0.03% to 10.1% among various populations.⁵ Although there have been numerous studies on tooth number anomalies throughout the world, there have been very few studies reporting the prevalence of tooth number anomalies in India and no earlier records of the same in children of Bihar. Hence, the aim of the study was to assess the prevalence and distribution of hypodontia in permanent dentition, excluding the third molars in children of North Bihar population of age group 7 – 14 years.

MATERIALS and METHODS

A total of 2000 patients (981 females and 1019 males) aged between 7 and 14 years attending the dental clinics of different cities in North Bihar were included in this study. Patients with the history of tooth loss because of trauma, extraction, or congenital disorder like cleft lip, and palate or missing because of syndromes were excluded from the study. Orthopantomograms (OPGs) were recorded for their different dental treatment needs was recorded and analyzed on x- ray view box employing a magnifying lens. OPGs

with poor image quality were not taken for the study. All the OPGs were evaluated by the one trained doctor under normal illuminated room using a magnifying glass on x-ray view box. The congenitally missing teeth were recorded in a datasheet. Third molars were excluded during this study. Data obtained was compiled on a MS Office Excel Sheet (v 2010, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 21.0, IBM). Descriptive statistics like frequencies and percentage for categorical data, mean & standard deviation (SD) for numerical data has been depicted. Comparison of frequencies of categories of variables with groups was done using chi square test. For all the statistical tests, p<0.05 was considered to be statistically significant.

RESULTS

A total of 2000 OPGs, 981 females (49.05%) and 1019 males (50.95%), with a mean age of 10.5 ± 2.55 years were included in the study. The prevalence of hypodontia was more in males (69.14%) as compared to females (30.85%) [Table.1]. There was a statistically non-significant difference seen for the frequencies between the groups (p>0.05). In this study the most common missing teeth reported were maxillary lateral incisors followed by the mandibular second premolars [Table.2].

Parameters	Female	Males	Total
Number of patients	981 (49.05%)	1019 (50.95%)	2000
Number of patients with hypodontia	29 (30.85%)	65 (69.14%)	94

Table.1: Data of participants with missing tooth

MISSING TEETH	MALE	FEMALE	TOTAL	Chi square value	p value of chi square test
	1019	981	2000		
MAXILLARY CENTRAL INCISORS	1	0	1	4.079	0.253#
MAXILLARY LATERAL INCISORS	31	16	47		
MANDIBULAR CENTRAL INCISORS	6	2	8		
MANDIBULAR LATERAL INCISORS	9	3	12		
MAXILLARY PREMOLARS	2	4	6		
MANDIBULAR PREMOLAR	14	6	20		
MAXILLARY MOLAR	0	0	0		
MANDIBULAR MOLAR	0	0	0		

Table.2: Distribution of hypodontia between both genders.

Majority of children in this study were reported with missing one or two teeth, but very few participants had more than two teeth missing. In relation to the primary teeth, there was no evidence of hypodontia as dental anomalies in the radiographs was visualized.

DISCUSSION

Hypodontia is ranked higher among the dentofacial anomalies. Due to its frequency, complexity in nature, approach and method of treatment modalities varies accordingly. Hypodontia is a subject of many research papers, several studies get us closer to its distribution among different populations. The purpose of this Orthopantomographic Study is to calculate its prevalence in the population of North Bihar, the ratio between the sexes, which teeth are most commonly affected, which jaw (upper/lower) is more affected and what is the total number of missing teeth in an individual with hypodontia. Also, through these studies, we can see a distribution among demographic distribution. As well as early diagnosis will prompt for early intervention and will act as important role in the prevention or cure of its serious esthetic, physiological, functional, and emotional consequences⁶.

Orthopantomograph of subjects was used for study since the evaluation of the congenitally missing teeth by clinical intraoral examination alone or on dental study models may lead to underestimation of such anomalies as they may be easily visualized on radiographs. In this study the age ranges for selected subjects was 7 to 14 years because the calcification of crowns of all permanent teeth except the third molars is not complete until 6 years of age, Hence, younger age before that may lead to false and inappropriate data.

In this study total sample of 2000 patients, 94 patients (4.70%) were affected with missing teeth. The result of our study is in accordance with study on prevalence rates of hypodontia that were 4.7% and 4.19% as reported by Mukhopadhyay et al⁷ in West Bengal, Gupta et al⁸ in Madhya Pradesh and Kathariya et al⁹ found that in Maharashtra the prevalence of hypodontia reported as 4.8%. Contrasting results were found by Soni HK et al⁵ in his study at Vadodra and Guttal et al¹⁰ where prevalence was 11.01% and 10.3% respectively. The wide variations in the prevalence may be due to differences in the types of populations examined, genetic factors, sample size, and presence or absence of radiographs during the examination⁷. In this current study, the number of missing teeth was 29 in females and 65 in males. The results of this study are in agreement with previous studies reported in India in which the prevalence of hypodontia to be more in males as compared to females^{10,11} although the results were not statistically significant.

In our study it was reported that most common congenitally missing tooth was maxillary lateral incisor followed by mandibular second premolar. Our result was Similar to Gupta et al⁸, Fekonja¹² Medina¹³ and Silva Meza result that the maxillary permanent lateral incisor is the tooth which is most commonly affected by hypodontia. In the assessed radiographs, number of participants with unilateral (50 participants) and bilateral (44 participants) missing teeth were nearly similar. The difference between them was not

statistically significant. On examination of all OPGs, there was no evidence of hypodontia present in the primary teeth.

CONCLUSIONS

The prevalence of hypodontia in a North Bihar population was 4.7%, which was found to be in accordance with the findings of most of the published population studies on prevalence of hypodontia in India. The most commonly missing teeth were maxillary lateral incisors followed by lower premolars. The majority of affected individuals had one or two missing teeth. None of the patients examined had more than four missing teeth. Prompt diagnosis of these anomalies can help in diagnosis and plan treatment modalities at an early age to establish a functional and esthetic harmony.

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