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MESIODENS: A RADIOGRAPHIC STUDY AMONGST THE CHILDREN OF BHAGALPUR

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ABSTRACT:

Objectives: The aim of the present study was to know the prevalence and the radiographic characteristics of mesiodens in children of Bhagalpur, Bihar, India.

Methods: The study was based on radiographic review of 5714 children who visited the department of Dentistry during the period of May 2016 to May 2017. Radiographic characteristic of mesiodens including the number, shape, position, direction of crown and complication caused by mesiodens were recorded.

Results: It was found that among the total screened children 0.77% had mesiodens. Among 18 children, four had two mesiodens and rest had one each. Majority of mesiodens had vertically directed crown, 77.3 % had conical shape 63.6 % were erupted. The most common complication caused by the mesiodens was midline diastema.

Conclusion: Prevalence of mesiodens among the total screened children was found to be 0.77 %. Conical shape and vertical orientation were common characteristics with midline diastema being the most common complication.

Keywords: Mesiodens, Radiograph, Children.

INTRODUCTION:

The number of teeth in human has tended to decrease through evolution. However alteration in tooth development commonly results in increase in the number of teeth. [1] The first report of supernumerary tooth appeared between 23 AD to 79 AD. [2] The most common type of super numerary tooth as indicated by Alberti et al is mesiodens. The term mesiodens was coined by Balk in 1917 to denote a supernumerary tooth located mesial to both central incisor appearing as peg shaped crown in normal or inverted position. [4]

There are two subclasses in classification of mesiodens, according to their shape and size. The first group is eumorphic teeth resembling the central incisor with normal shape and size. The second group is dysmorphic teeth with different shapes and sizes and categorized into conical, tuberculate, supplemental and odontomas. Therefore supernumerary teeth might vary from normal tooth to dysmorphic mass. [5] Several theories have been postulated regarding the cause of super numerary teeth including atavism, dichotomy of tooth bud and hyperactivity of dental lamina. However

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the exact cause is still unknown. [1] The mesiodens may erupt normally, stay impacted, appear inverted or take horizontal position. Asymptomatic unerupted mesiodens may be discovered during radiological examination of premaxillary area [6] Mesiodens are frequently associated with various craniofacial anomalies including cleft lip and palate, Gardener's syndrome, Down's syndrome and Cledio cranial Dysostosis. [7]

The prevalence of mesiodens varies between 0.3% and 3.8% of the population with higher frequency in man than in woman with ratio of 2:1. [6] The presence of mesiodens often results in complication including retention of primary teeth, delayed eruption of permanent teeth, closure of eruption path, rotation and retention, root resorption, pulp necrosis and diastema as well as nasal eruption and formation of dentigerous and primodial cyst. Less common complication include dilacerations of developing tooth and loss of tooth vitality. [4]

Therefore, it is important for dentist as well as anthropologist, genetics and other professionals to know the prevalence of dental anomalies in different communities and early diagnosis of the mesiodens has particular importance in terms of preventing such complications.[5] The aim of this study was to determine the prevalence and radiological features of mesiodens among the children of Bhagalur, Bihar, India.

MATERIALS AND METHODS:

The study was based on radiographic review of 5714 pediatric patients who visited the department of Dentistry during the period of May 2016 to May 2017 (1 year) with the age ranging from 5 to 14 years. Patients with syndromatic backgrounds such as Downs's syndrome, Gardener's syndrome, craniofacial anomalies etc. were excluded from study. Ethical committee clearance was obtained from the concerned authority. Radiographic examination of premaxilla was based on intra oral periapical radiographs for all children after taking the consent from their parents. Some of the cases were supplemented with occlusal radiographs. The entire radiographs were performed using Intraoral periapical films and Occlusal films. Examination and interpretation of all radiographs were performed under standard conditions. The presence of an erupted supernumerary tooth or tooth bud between two central incisors, or of unilateral or bilateral teeth in the midline of maxilla was noted as mesiodens on radiographs. In addition to prevalence, age and gender distribution, the following radiographic characteristics such as number, shape, position, direction, complications caused by mesiodens were recorded.

RESULTS:

Results showed that among the total screened children, 0.77% had mesiodens. A total of 44 mesiodens were diagnosed

in 40 patients from 5714 samples of pediatric age group (male-2590, female-2046) with age ranging from 5-14 years were diagnosed with the ratio of boys to girls being 1.57:1. Twenty four (54.5%) mesiodens were in age group of 7-9 years, 16 (36.4%) between 10 to 13 years and 4 (9.1%) in 14 years of age group. Of the 18 children, 28 children (77.8 %) had one mesiodens and 8 children (22.2 %) had two mesiodens. Among the 44 mesiodens, conical shape was the most common type accounting for 77.3%, followed by round in 13.6% followed by incisor like in 9.1%. Of the 44 mesiodens 36.4 % were impacted and 63.3 % were erupted (partially / completely). Among 44 mesiodens, 72.8 % were in the vertical direction, followed by horizontal with 13.6 % and inverted with 13.6 %. The main complication was found to be midline diastema in 45.5%, followed by no complication in 27.2 %, delayed eruption in 18.2 % and axial rotation/inclination in 9.1% (Table 1, Fig 1).

Table 1: Radiographic characteristics of mesiodens

	Mesiodens characteristics	No. of mesiodens	Percentage (%)
Number	One Two	28 10	77.2 22.8
Shape	Conical Round Incisor like	34 6 4	77.3 13.6 9.1
Direction	Vertical Horizontal Inverted	32 6 6	72.8 13.6 13.6
Position	Impacted Erupted	16 28	36.4 63.6
Complications	Mid line Diastema Asymptomatic/ None Delayed eruption Axial rotation/inclination of permanent teeth	20 12 8 4	45.5 27.2 18.2 9.1

DISCUSSION:

The first documented report of supernumerary teeth has been found in the ancient human skeletal remains of lower Pleistocene era. [4,5] Until recently the most primitive evidence of the presence of mesiodens goes back to 13000 years when it was found among the remains of an Australian aborigine.[5]

Although both dentitions are affected a higher incidence of anomaly is noted in permanent dentition. [6]

Mesiodens may occur individually or in multiples which are termed as mesiodentes. [4] Studies of the prevalence of mesiodens involving certain ethnic or racial population including Caucasian 0.45%, Finnish 0.4%, Norwegians 1.43%, Hispanic 2.2%, [8]

3.18% in Indore children [4], 0.8% in Bengal children, 0.05% in Japanese children [9] , 0.3% in Turkish population, [7] 1.6% in Iranian children, [10] 2.7 % in Sub-Saharan and 3.4 % in the Asian population[5] are reported in the literature. In the present study prevalence of mesiodens was found to be 0.77% which was in accordance to the literature. [6]

Mesiodens occurs more frequently in boys than in girls with ratio being approximately 2:1. [1,7,8,11,27,28] In the present study we found it to be 1.57:1, slightly lesser than other studies, but was in accordance to study of Mukhopadhaya(1.78:1). The gender variation may be attributed to the difference in sampling size and racial group examined. In the present study most of mesiodens (54.5%) was found in age group of 7-9 years. This finding was in accordance with the literature. [4,7,8,12] This period is the eruption time of maxillary central incisors and the radiographic examination was performed as screening aid for congenitally missing teeth, supernumerary teeth, cysts, and tumors, when delay of eruption and apposition of maxillary central incisor was seen. It is therefore logic that most mesiodens were discovered in this period. [7] In the present study the number of mesiodens was one in 77.8 % two in 22.2 %. This was in accordance with the previous studies.[5,7,12,13,27] In the current study crown shape was mainly conical with 77.3% and this was in accordance with other studies. [6-8,14-16, 27] Conical mesiodens is more likely to erupt between the central incisors as a diminutive but developed tooth.[8] Most of the mesiodens in the present study were erupted with 63.6 % and impacted mesiodens were 36.4 % which was lower than the other studies in the literature. [4,7,8,27] This may be explained by presence of large number of conical mesiodens which are more likely to erupt and also may be due to difference in the sampling size and racial group examined. Similarly, 46.1% of mesiodens were erupted in the studies of Mukhopadhyay [6]. In the present study the most common growth direction was vertical direction with 72.8 % followed by horizontal and inverted with 13.6 % each. This was in accordance with the literature. [4,7,8] The most common complication in the present study was midline diastema with 45.5%. This finding was higher in the present study in comparison with other studies in the literature. [1,6-8] In the present study most of the conical mesiodens (which are most likely to erupt) have erupted between the central incisors creating the midline diastema and this could be the possible explanation for the higher occurrence of midline diastema in the present study. According to Tashima the presence of interincisal diastema is seven times higher in presence of mesiodens. [4] Moreover, 27.2% were not associated with any complication in the present study and this finding was similar to other studies. [1,17] There was no root anomaly, cyst formation and intraoral infection in any of the cases in

contrast to other studies where cyst formation was found to be 37% [18] and 30%. [19] The reason for this difference might be that the present series included in the children between 5-14 years. This indicates that when mesiodens have been impacted for long period, they have high risk of forming dentigerous cyst. [12] It is therefore preferable to extract as early as possible. [20] Russell, Solares and others recommend the extraction of mesiodens in the early mixed dentition stage for better alignment of teeth and minimizing the need for the orthodontic treatment. [21-23] Extraction during this period facilitates spontaneous eruption of incisors. Some authors [24] believe best time for removal of mesiodens is 8-9 years when upper incisors erupt. At this stage age behavior of child is much easier to manage and type of anesthesia required can be less invasive. Another treatment calls for late extraction of mesiodens when adjacent permanent incisor has completed their root formation. [25,26] If mesiodens is symptomatic periodic follow-up is necessary. [6]

CONCLUSION:

Prevalence of mesiodens among the total screened children was found to be 0.77 % with midline diastema being the most common complication. To prevent complications and timely surgical intervention, radiographic examination on regular basis is highly recommended for early detection of mesiodens.

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FIGURES:

Fig 1 : A case of unerupted mesiodens