

MISSING TEETH AMONG SCHOOL GOING CHILDREN IN A PESHAWAR SAMPLE

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ABSTRACT

Congenitally missing teeth is the most common craniofacial malformation. It is present either individually or associated with syndrome. Hypodontia occur as a result of multifactorial trait, influenced by a combination of gene function, environmental interaction, hence vary among different ethnic regions. This study aims to determine the prevalence of missing teeth among the school going children in Peshawar, its occurrence rate among male & female and distribution of missing teeth in upper and lower jaw. This was a cross sectional study conducted with 780 school going children from age ranged 13 to 15 years. The data were recorded on a structured check list, analyzed by using SPSS version 15 and Micro Soft Excel. Out of total only 30 students were diagnosed as having missing teeth and accounted for 3.8% prevalence (3.0% in female, and 1.5% in male). Left mandibular site accounted highest frequency 10(33.3%). Mandibular 2nd premolar was the most commonly observed missing tooth among the sampled students. Hypodontia was more prevalent in females, though not significantly differ.

Key Words: Hypodontia , Prevalence, Agenesis.

INTRODUCTION

The children's health determines the future of the nation because they constitute a vital part of a country's demography. Childrens' social health is groomed during the school age of his life. "The impact of oral disorders on aspects of everyday life that are important to patients and persons, with those impacts being of sufficient magnitude, whether in terms of severity, frequency or duration to affect an individual's perception of their life overall"¹ defined by Locker and Allen.

Missing teeth is the condition in which a person has genetically one or more missing teeth which cannot be observed through clinical observation nor radio-graphically and also when there is no history of extraction

exists.² Missing teeth among children is a common developmental abnormality in dental development that can occur either in an isolated fashion, or as a part of syndrome.² The missing teeth remain permanently missing throughout the life unless it has been treated. According to severity, missing teeth are categorized as anodontia when there is complete absence of teeth when one or few teeth are missing the condition is called hypodontia. Oligodontia is the category of missing teeth when there is more the six teeth missing, it is usually associated with syndromes.

Development of human dentition is regulated by tissue interactions and genetic influence similar to those of other ectodermal organs during the tissue specification process or tooth agenesis.^{3,4,5} Hence any defects during the tissue specification process could lead to Congenital missing tooth. These defects include various types of developmental anomalies in structure of enamel, shapes and number of missing teeth. Missing teeth cause interruption in the development verbal fluency, chewing process, and occlusion of mouth and affect aesthetics.

The etiology of isolated missing teeth can be ancestral or sporadic in nature.⁶ Genetics play an important role in agenesis of tooth. A number of gene and their chemical product (protein) control the biological communication (signaling) within the cells which are

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necessary for tooth formation.⁶ There are approximately more than 49 different types of syndromes which are associated with missing teeth (agenesis).⁶ Mutation of *Msx1*, *Msx2* and *Pax9* genes was associated to agenesis of teeth as well as to other congenital anomalies.^{7,8}

Third molar tooth is most commonly missing tooth in permanent dentition. Agenesis of third molar is found to be 25 to 30% of universal population. Among remaining 28 teeth, in the Caucasian population the most frequently missing teeth were mandibular 2nd premolar followed by maxillary lateral incisor.⁹ Literature shows that the prevalence ranging from 1.6 to 9.6% in different population.^{10,11,12} World Health Organization has recognized the congenitally missing teeth as one of the handicapping dentofacial anomaly.¹³ The purpose of this study was to determine the prevalence of missing teeth, its pattern of distribution along with gender distribution among 13 to 15 years age group of school going children. Early detection helps to achieve an aesthetic and functional dentition and reduce the future complications.

METHODOLOGY

This descriptive cross sectional study is based on numerical representation of observations for the purpose of describing and explaining the occurrence of missing teeth in Peshawar. Peshawar is divided in to four towns (Town I, Town II, Town III and Town IV) and 59 union councils (UCs). There are total 97 high schools (67 male and 30 female) in the district situated all over the UCs. Study participants comprised of students (13 to 15 years of age) who showed willingness for the participation. Those students with previous history of extraction and agenesis of third molars were not included in the study. Prior permission list of high schools were obtained from the office of Executive District Office (EDO), department of Education, Peshawar, KPK. Hence using systematic random sampling technique ($Kth = 5$), a total 20 schools were then selected from the list of 97 government schools about 45 students were randomly selected from each school.

In this study apart from principal investigator, four trained doctors conducted the survey. Informed consent was also obtained from the parents of the students before undergoing through the procedure. The examinations were conducted with children sitting on chair. They were asked about their personal, medical and dental history. Visualization was ensured by using tongue depressor and mouth mirror. In addition personal protector like gloves and mask were also used. Students were examined in natural light aided by flash torch. The tooth that was not observed in the clinical examination and absent in the related radiograph was considered and recorded as missing. The radiographic study was done at Sardar Begum Dental College. The

frequency and percentages were calculated using SPSS Version 15. The graphs are constructed in Microsoft Excel (MS Excel).

RESULTS

A total 780 students, 220 (28.2%) being males and 560 (71.8%) being females participated in the study with mean age was 14.2 ± 0.82 SD, ranged from 13 to 15 years. Out of 780 participants, 30 were found with missing teeth varying in number which constitute a prevalence of 3.8% of the sampled population. Hypodontia was most common on left side than right side, 18(60%) and 12(40%) respectively. The agenesis of premolar was most common which accounted for 15 (50%) of total missing teeth, out of which 8 (26.6%) were left 2nd mandibular premolar, 3 (10%) each from right 2nd maxillary, right 2nd mandibular and 1(3.3%) left 1st mandibular premolar respectively.

The second highest reported missing teeth were in incisor 11(36.6%), out of which 6(20%) left lateral maxillary incisors 2(6.6%) were right lateral maxillary incisors, 3(10.0%) left lateral mandibular incisors and 6(20%) left lateral maxillary incisors. Similarly 3(10%) and 1(3.3%) were left maxillary canine and molar respectively.

According to the data the prevalence came out to be 3.0% among female, and 1.5% among male students. Out of four major types of the teeth (Pre-molar, molar, incisor and canine) all were observed in varying number among both of the genders, but female dominancy was recorded. Left mandibular 2nd premolar 8(26.7%) was most commonly reported missing teeth out of which male accounted for only one case and female 07 cases. Although differences have been noted among them but statistically they were not significant indicated by chi square test ($P = 0.689$).

DISCUSSION

Throughout human evolution, reductions in the number of teeth and the size of the jaws have occurred, along with decrease in the surface area needed for mastication.¹⁴ The most distal tooth within each group (premolar, incisors, molar) displays the greatest variability in size. These teeth are considered to be most prone as congenitally missing and are most frequently abnormal in shape. Maxillary lateral incisors vary in form more than any other tooth in the mouth except the third molars.¹⁵ Some authorities believe that, in future, man will have neither third molars nor maxillary lateral incisors just as we see already to have lost fourth molars.^{13,16} Nutrient deprivation and serious illness have also been linked to tooth developmental problems, although no definite etiological relationship has been found between hypodontia and systemic diseases^{17,18}, endocrine disturbances or ectodermal dysplasia.¹⁹

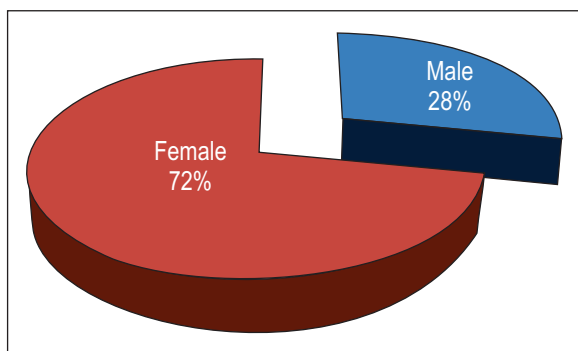


Fig 1: Distribution of participants on the basis of gender

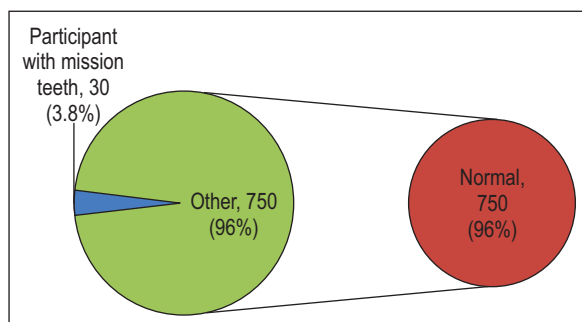


Fig 2: Proportion of participant with missing teeth

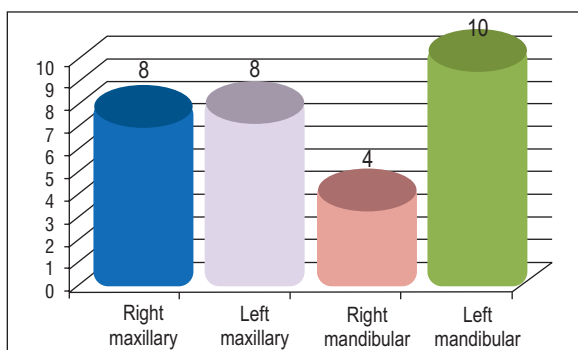


Fig 3: Distribution of congenital missing teeth according to the site

TABLE 1: FREQUENCY OF MISSING TEETH

Type of missing teeth	Frequency	Percentages
Max RT lat incisor	02	06.7%
Max RT 2nd molar	01	03.3%
Max LT lat incisor	06	20.0%
Max LT canine	03	10.0%
Max RT 2nd premolar	03	10.0%
Mand LT lat incisor	03	10.0%
Mand LT 1st premolar	01	03.33
Mand RT 2nd premolar	03	10.0%
Mand LT 2nd premolar	08	26.7%
Total	30	100%

According to the present study the prevalence was 3% with female dominance and most prominent to the mandibular region. The study result is consistent with another hospital based study conducted Rawalpindi, Pakistan. According to this study, 1185 patients (375 being male and 810 being female) were studied for knowing the prevalence of missing teeth. Based on anamnesis and clinical data, a total of 51 patients (25 males and 26 females) as hypodontia of permanent teeth which accounted for prevalence of 4.2% (males 6.7% and females 3.2%).²⁰ The same proportion burden of the problem with a bit variation was also reported in studies conducted in Kenya²¹, Norway²², Mexico²³, Israel²⁴, Jordan²⁵ and Turkey.²⁶ The reported prevalence of missing teeth was (6.3%, 4.5%, 2.7%, 5.3%, 5.5%, and 2.6%) respectively. High prevalence was seen in American whites. The prevalence of people with missing teeth is significantly lower in blacks (11%) than in whites (27%).²⁷ The prevalence of hypodontia (excluding 3rd molar) reported by Fuad Hamed was 7.1% in Southern Jordan, 2.10% were males and 5.01% were females.²⁸

The data about sex distribution in all searchable studies on agenesis or missing teeth indicates that girls tended to have a slightly higher occurrence of missing teeth compared with boys of the same age,^{21,26,29,30} which is in agreement with present study.

A similar local study conducted in 2006, revealed that females showed dominance in missing teeth which is in agreement with the current study. Female dominance was observed in both of these studies. Study conducted in Japan also favors the present study result.³¹ Literature revealed that variation in hypodontia is because of its dual nature (both non-syndromic and syndromic), where it is an independent congenital oral trait and syndromic, where it is acquired as a part of a specific disease.¹⁸ In addition to genetically influenced environmental factors contribute to the occurrence of hypodontia.³² The results of this literature review also revealed such trends, where the second lower premolars were most often absent, whereas missing upper laterals occurred almost equally as agenesis of the upper second premolars.³³ 80-85% of hypodontia cases studied involved the agenesis of just one or two teeth.^{34,35}

CONCLUSION

From the Results of the present study it is concluded that Prevalence of hypodontia is 3.8% among school going children of district Peshawar with one or two teeth missing mostly. The most common congenitally missing teeth found are mandibular premolars followed by maxillary lateral incisors. This data on the prevalence and distribution of hypodontia should be of value for future investigations at molecular level to see basic genetics and environmental differences among ethnic groups in different geography.

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