



Eruption Status of First Permanent Molar and Prevalence of Dental Caries among School Going North Indian Children: An Epidemiological Study

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Abstract

Background: Dental caries is one of the most widespread oral disease affecting children and adults globally irrespective of age and gender. The prevalence of dental caries is of the immense concern and is the primary subject of many epidemiological researches being executed throughout the world. **Aim:** The present study aimed to assess the eruption status of first permanent molar and evaluate the prevalence of dental caries in children between 5-8 years of age. **Materials and Methods:** A cross sectional study was carried out in 1008 children in five different schools of district Barwala, Ambala, Haryana. The aim was to determine the caries free proportions, caries experience and collection of baseline data regarding the status of permanent first molars between the age groups of 5-8 years. Dental caries was assessed using dmft index using World Health Organization criteria 1997. **Results:** The prevalence of dental caries was more in boys of 7-8 years age group as compared to girls in the same age group (p-value 0.052).

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89% of children had first permanent molar erupted between 7-8 years of age while only 27% of children of 5-6 years age group had first permanent molar erupted.

Keywords

Dental Caries; DMFT; First Permanent Molar; Epidemiological Study

Introduction

Teeth are considered the salient integrant of maxillofacial complex. They are appraised as biological maturity markers and important milepost in individual's life. The eruption of teeth and development of occlusion is a complex process. Several factors such as gender, ethnicity environment and socioeconomic level can be associated with the timing of eruption of permanent tooth [1]. As these factors can vary from one area to another, there cannot be a standard table applicable to all children. Dental caries was ranked as the most common oral condition among 291 diseases between the years of 1990 and 2010. It is the most prevalent disease of childhood worldwide, involving 60-90% of all children. The distribution of caries varies greatly among different individual teeth and tooth surfaces with occlusal surfaces being affected more than interproximal and smooth surfaces. Initial occlusal carious lesions usually occur during the first 36 months after eruption into the oral cavity [2-4].

The preponderance of carious lesions in school aged populace is focused on the masticatory surfaces of the first permanent molars [5,6]. In addition to the intra-oral distribution and the challenges to control this disease in the population groups that are more vulnerable to this disease, knowledge about the timing of tooth emergence is all important to plan the diagnostic, preventive and therapeutic measures [7].

India is a country with diversity in culture and significant differences in region, religion, language, caste, and race. In developing countries sedentary lifestyles and dietary patterns are the main reason for increasing the incidence of caries. Epidemiological data plays a key role in updating recent trends of the disease and treatment needs. The localized prevalence data is important not only to understand the disease, but also plays a key role in prevention and treatment planning. Despite incredible advancements in dentistry and the fact that caries is preventable, the disease continues to be the major public health problem.

Thus the present study was conducted to determine the gender and age wise prevalence of dental caries in school going children of 5-8 yrs age and to estimate the emergence trends of

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first permanent molars in children aged from 5 to 6 years and to quantify the differences between boys and girls in this life cycle.

Materials and Methods

The present epidemiological study was conducted in school going children of 5-8 years of age. A total of 1008 children including both boys and girls were randomly selected from five different schools, in district Barara, Ambala, Haryana. Before conducting the study written informed consent was obtained from district education officer and respective school authorities. After explaining the complete intend of the survey day of examination was planned. On the basis of the physical conditions of the school, proper arrangement was done for the oral examination of the subjects. The subjects were examined on the upright chair in adequate natural light. Examination was done by single examiner and a well-trained assistant to avoid inter examiner variability. Before the intra oral examination, a questionnaire was filled by the investigator to determine the personal data and oral hygiene habits. Age of children was recorded from the school records. Intra oral examination was carried out using mouth mirror under natural light and CPI (Community Periodontal Probe), as indicated by WHO. Dental caries score was assessed using dmft index. The components of dmft are d= decayed, m= missing, f= filled and t=treated and simultaneously the eruption of first permanent molars was evaluated in all the four quadrants. Data was collected, compiled and subjected to statistical analysis.

Results

The present epidemiological investigation was conducted on 1008 children (59.3% M, 40.7% F) between the age group of 5-8 years from five schools with mean age of 5.9 years [Table 1]. The mean of total number of teeth examined/present in oral cavity was 22.10 (S.D+ 1.9) [Table 1]. No significant difference was observed between the number of teeth examined in boys 22.08 (SD+ 1.9) and girls 22.12 (SD+1.9). Also the status of eruption of all four permanent molars was not statistically significant between boys and girls [Table 2].

However the difference in eruption of all four permanent molars amongst three age groups considered, (5-6), (6-7), (7-8) years, was statistically highly significant (p-value .001**). Only 28% permanent molars had erupted before completion of 6 years of age while 89% were fully erupted before completing the age of 8 years [Table 3]. There was no statistically significant difference in the time of eruption of maxillary v/s mandibular or right side v/s left side molar. WHO diagnostic criteria was used for scoring dental caries. The mean caries experience in children was .0926(SD +.12). The caries experience was not statistically significant between boys (.097) and girls (.0925) [Table 4].

The corresponding mean caries experiences of all the age groups was .087, .096, .093 respectively [Table 5]. No significant differences were found amongst all the age groups. Overall 58% of the children had DMFT/dmft 0 (point prevalence of caries) [Table 6]. On the whole baseline dmft values for various age groups did not differ significantly. The total percentage of children who were caries free (DMFT/dmft=0) was 42%. The decayed score was the significant major component predominating with mean value 1.91(SD+2.53) followed by m component .01(SD+ 0.1) and f component .02(SD+ 0.2). Majority of the affected teeth were untreated. On the other hand mean DMFT in boys and girls was .06(SD+ .37) and .13(SD+ .58) respectively where D component, i.e the decayed teeth contributed maximum [Table 7,8].

M	598 (59.3%)	22.08	1.934	191 (56.3%)	229 (57.7%)	178 (65.4%)
F	410 (40.7%)	22.12	1.912	148 (43.7%)	168 (42.3%)	94 (34.6%)
Total	1008	22.1	1.924	339	397	272

Table 1: Total number of teeth examined and Gender wise distribution of children within age groups.

Tooth number	16	26	36	46
Boys	59%	59%	59%	59%
Girls	60%	58%	60%	58%

Table 2: Genderwise percentage distribution of permanent first molars.

Age	16	26	36	46
5-<6	28%	27%	28%	27%
6-<7	65%	65%	65%	65%
7-<8	89%	89%	89%	89%

Table 3: Age wise distribution of eruption of permanent first molars.

	Mean	N	Std. Deviation	Minimum	Maximum
Male	.0927	598	.11809	.00	.70
Female	.0925	410	.12514	.00	1.00
Total	.0926	1008	.12094	.00	1.00

Table 4: Genderwise caries experience.

Percentage distribution of dmft	N	dmft= 0	dmft>0
Male	598	246(41%)	352(59%)
Female	410	177(43%)	233(57%)
Total	1008	423(42%)	585(58%)

Table 5: Genderwise distribution of caries (dmft).

Percentage distribution of dmft age-wise	Number of children	Percentage	(%) dmft= 0	(%) dmft>0
5-<6	339	33.6%	42%	58%
6-<7	397	39.4%	41%	59%
7-<8	272	27.0%	44%	56%

Table 6: Agewise distribution of caries (dmft).

Variable	D	m	f	dmft
Mean	1.91	0.01	0.02	1.94
Std. Deviation	2.537	0.109	0.224	2.553
Minimum	0	0	0	0
Maximum	17	2	4	17

Table 7: Decayed missing and filled components of dmft.

Gender		N	Mean	Std. Deviation	Minimum	Maximum
Male	D	598	1.98	2.58	0	17
	M	598	0.01	0.122	0	2
	F	598	0.02	0.168	0	3
	Dmft	598	0.02	2.597	0	17
	D	597	0.06	0.377	0	4
	M	598	0	0	0	0
	F	598	0	0	0	0
	DMFT	598	0.06	0.377	0	4
	dmft+DMFT	598	2.06	2.658	0	17
Female	D	410	1.81	2.464	0	14
	M	409	0.01	0.085	0	1
	F	410	0.03	0.287	0	4
	Dmft	410	1.86	2.488	0	14
	D	410	0.12	0.548	0	4
	M	410	0	0	0	0
	F	410	0	0.049	0	1
	T	410	0.13	0.584	0	4
	dmft+DMFT	410	1.99	2.626	0	14

Table 8: Genderwise descriptive statistics of dmft, DMFT.

Discussion

Since dentistry has widened its horizons towards many specific fields, justification of eruption timings is more desirable in the present era. Developmental norms of emergence of permanent teeth need to be established for diagnosis, orthodontic treatment planning, preventive dentistry procedures, archeological, anthropological, paleontological and may have legal as well as forensic application [8]. The growth and development patterns are not possible to be applied universally owing to ethnic variations. The standards for tooth eruption patterns derived for a western population cannot be extrapolated to an Indian scenario. Hence there is a need for a study that will generate local data.

The sequence and schedule of eruption of permanent teeth has been studied among different ethnic groups and within the same ethnic group by several researchers. A variation in the sequence of tooth emergence in both dentitions adds to the difficulties in establishing the dental age. Tooth eruption time must be based upon a mean with wide latitude of variation for individual cases as suggested by Steggerda and Hill [9]. The eruption of permanent teeth is influenced by a variety of factors. Genetic factors, hormonal factors, differences in gender, geographical, climatic, racial, and ethnic differences, as well as socio-economic status, body constitution, nutrition, fluoride, season and time of birth, temporal variations, and growth parameters together with infrequent general pathological conditions, such as endocrine pathology, irradiation, and developmental syndromes exert an influence on eruption patterns. Children who are below average weight and height as per their age show a delayed eruption time than those who are within their standard age range. The timing of permanent teeth eruption is of considerable importance in the planning of diagnostic, preventive and therapeutic measures [10]. As there is finite information on the timing and sequence of permanent teeth eruption in Haryanvi population, so this epidemiological survey was planned. Most of the prior studies done in children from Tanzania, Pima India, Kingston (New York), West Africa (Gambia), Japan, Danish, Hawaii, Australia, French, Kelatan (North-eastern Malaysia), Izmir (Turkey), Malaysia, Flemish, Patiala District (India), and Kerman province confirm that the girls were leading the boys in permanent tooth emergence [11-25]. Genderwise percentage distribution of permanent first molars status in our study showed p-value .681, and girls were leading the boys in the eruption sequence of 16 and 36. The first permanent molar usually erupts at 6 years of the age. For this reason they are often known as the six year molars.

Age wise distribution of emergence of permanent first molars in our study showed the highest percentage in age group 7-8 years (p-value .001) and lowest in 5-6 years age group (27%). Various studies have been carried out to determine the prevalence of caries in various parts of India. In the present epidemiological study, the prevalence of dental caries was higher in boys (59%, dmft 0) when compared to girl children (57%, dmft 0). Similar findings were reported

by Moses, et al., Joshi, et al., [26,27]. The increased prevalence of caries in the boys may be due to the fondness for the sons, which manifest in preferential feeding in comparison to the daughters. It is also attributed to more snacking habit among boys during the longer outside stay. Age wise distribution showed that children between 6-7 years of age had increased dmft score with 59% and less caries, 56% was found in age group of 7-8 years and the results were statistically insignificant. These results are in correlation with the study done by Mahesh Kumars, who conducted a study on oral health status of 5-12 years school going children in Chennai city population. In the present study, the prevalence of dental caries was higher between 6-7 years age and this could be attributed to the poor oral hygiene practices, lack of awareness and improper food intake. These results were similar to the studies done by Gustafsson, et al., Winter, et al., and Shetty, et al. [28-32].

The present study reported the mean DMFT/dmft of 2.06 in male children and 1.99 in female. The results of the present study provide an insight into variability in emergence sequence of permanent teeth and prevalence of dental caries in school going children living in district Barara, Haryana. Our data shows a highly significant difference in eruption of all four permanent molars amongst the three age groups considered but there was no significant difference in the time of eruption of maxillary v/s mandibular or right side v/s left side molar. The total percentage of children who were caries free was 42%. Evaluation of the past and planning of future prevention of oral health, diagnosis and treatment programs for young children in primary schools may require this data. In order to increase general oral health awareness, it is recommended to include oral health education in elementary schools and homes.

Conclusion

The results of the present study provide an insight into variability in emergence sequence of permanent teeth and prevalence of dental caries in school going children living in district Barara, Haryana. Our data shows a highly significant difference in eruption of all four permanent molars amongst the three age groups considered but there was no significant difference in the time of eruption of maxillary v/s mandibular or right side v/s left side molar. The total percentage of children who were caries free was 42%. This data may be of importance in the evaluation of the past and planning of future oral health prevention and treatment programs targeting young children in primary schools. A comprehensive community-focused oral health-care intervention that includes oral health education in elementary schools and homes are recommended to increase general oral health awareness.

Conflict of Interest

There are no conflicts of interest.

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