Original Article

Eruption of Premolars

Eruption Time of Premolars in Children at Urban Schools of Lahore, Pakistan

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ABSTRACT

Objective: The purpose of this study was to ascertain mean eruption ages of premolars in local school children and to compare with other population groups.

Study Design: cross sectional study

Place and Duration of Study: This study was conducted in the Deptt. Of Oral Maxillofacial Surgery, KEMU, Lahore from 17.12.2009 to 17.12.2010.

Materials and Methods: The mean eruption ages of permanent teeth were derived from a cross sectional study of 4000 public and private schools children in Lahore with ages ranged 8-13 years. Children were from all classes of socioeconomic status. Sample was examined in good torchlight and emergence through the gingivae was noted.

Results: Maxillary premolars erupted earlier than the mandibular ones in both genders. The mean sequence of eruption in upper and lower arch was P_1, P_2. Maxillary 1st premolar was the first tooth to erupt in boys and girls; whereas mandibular 2nd premolar was the last one.

Conclusion: (1) The premolars erupted slightly earlier than the standards used in our practice of text books. (2) Maxillary premolars erupted earlier than mandibular premolars. (3) Local standards should be applied while planning preventive and interceptive orthodontic measures and treatment modalities in other specialties.

Key Words: Eruption, sequence, emergence, maxillary 1st premolar, 2nd premolar, Mandibular 1st premolar, 2nd premolar.

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INTRODUCTION

Eruption is a process of tooth development from bone to the stage when tooth enters in mouth and becomes clinically visible.[1] Typically, humans have 20 primary and 32 permanent teeth that erupt at different times in people. There exists a general eruption time line.[2] Primary teeth erupt into the mouth from around 6 months until the age of 2 years. These teeth are then replaced by their permanent succedaneuos teeth that begin to erupt at 6 years of age.[3] Variations in timing and atypical sequence of eruption usually correlated with genetic factors.[8] This view was supported by high inter correlation of tooth formation, between the identical twins from same zygote, compared to fraternal twins from two ovums.[9] Several authors have reported that genetic differences in permanent tooth eruption occur not only between individuals but also between population groups.[10-15] Also vast evidence exists for the racial differences.[9,16] A number of non aborigines erupted their permanent teeth earlier than Australians aborigines, whereas European or North American whites erupted later. Age standards of permanent teeth eruption currently used in Pakistan are based on norms of other countries which should not necessarily applied in our region. This knowledge of ages and sequence of eruption at which individual teeth erupt in a given ethnic group are essential for planning preventive measures, and treatment of malocclusion.[17-19] No information is available regarding the eruption chronology of local children. Therefore this study was conducted to acquire accurate eruption parameters of premolars in our region.

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MATERIALS AND METHODS

Total subjects were 4000 from different private and public schools of Lahore. There were 1969 males and 2031 females. The personal details of children were recorded from school birth registers that contained date of examination, name, date of birth, school name and sex column. The Lahore is one of the 2nd big city of Pakistan; because of job opportunities, population comprises of various parts of country.

Selection Criteria: A tooth was considered erupted when any part of its crown had pierced the Gingivae and visible in oral cavity.

Inclusion Criteria; Age range 8-13 years. All clinically healthy children with normal height and weight

Exclusion Criteria: Children excluded were like those having craniofacial or skeletal deformities, cleft lip and palate or developmental syndromes

Examination : Each child was examined by torch with the help of disposable mirror for the clinical visibility

of premolars. Findings were recorded manually in the designed Performa.

Study Design: This study was cross sectional. The ages of children were calculated from their birth date to date of examination. The calculation was done in years, more than fifteen days were taken as a whole month. Data was distributed into age groups for eruption frequency in boys and girls. Mean ages of erupted premolars were calculated.

Statistical Analysis: The data was entered and analyzed by using Statistical Package of Social Sciences (SPSS) version 18. The qualitative data like gender was presented in form of pie chart. The quantitative data has been presented in frequency table (%). Whereas mean eruption age ± SD along with S.E, and 95% confidence interval (CI), of quantitative data calculated.

Normality of quantitative data was checked by using one Sample Kolmogrove Simirnove test.

RESULTS

Total sample size 4000. Their ages ranged 8 -13 years. According to our objectives we screened the children whose lower and upper 1st and 2nd pre-molars were erupted. There were 1969 (49.2%) males and 2031 (50.8%) females. Male to female ratio was 0.96:1. (Figure 1)

The mean eruption age of lower first and second premolar was 10.21+- 1.30 and 10.63+- 1.28 years respectively. Moreover the mean eruption age of upper first and second premolar was 10.13+-1.30 years and 10.44+-1.33 years respectively.(Table 1)

There were 1604 children (872 males and 732 females) whose lower first premolar was erupted. There were 838 children (476 males and 362 females) whose lower second pre-molar was erupted. There were 1842 children (1024 males and 818 females) whose upper first pre-molar was erupted and second upper pre-molar was erupted in 1092 children (604 males and 488 females). (Table 2)

Table 3 & 4 present the Eruption of Maxillary and Mandibular 1st premolar was seen earlier in Pakistani population than English as compared to eruption ages of children in American, Hong Kong, Chinese, Iraqi, Kenyans and Zulu Negros. Maxillary 2nd premolar eruption was earlier than the English, Americans and Iraqi population group. Mandibular 2nd premolar erupted earlier in our population than in English, American, Chinese, Iraqi and Kenenyen Asian while later than Kenyan Africans and Zulu Negro population.

Table No.1: Mean Eruption age (years) of Lower/ Upper 1st and 2nd Pre-Molar

		L1PM	L2PM	U1pm	U2PM
N		1604	883	1842	1092
Mean Age (years)		10.21	10.63	10.13	10.44
S.D		1.30	1.28	1.30	1.33
S.E		0.046	0.06	0.04	0.05
95% C.I	Lower Bound	10.12	10.51	10.05	10.33
	Upper Bound	10.30	10.76	10.21	10.55
Minimum		8	8	8	8
Maximum		13	13	13	13

Table No.2: Frequency Table of Age (years) of Eruption of Lower/ Upper 1st and 2nd Pre-Molar

Age Groups (Year)	L1PM	L2PM	U1PM	U2PM
1. (8-8.99)	160	52	198	114
2. (9-9.99)	338	98	416	128
3. (10-10.99)	446	230	528	300
4. (11-11.99)	400	244	426	324
5. (12-13)	260	214	274	226
Total	**1604**	**838**	**1842**	**1092**

Table No. 3: The comparison of mean eruption ages of maxillary teeth various ethnic groups.

Tooth	Pakistani	American	English	Chinese	Iraqi	Kenyan	Kenyan	Zulu
P1	10.25	10.12	10.62	9.66	10.0	9.85	9.63	9.93
P2	10.58	11.00	11.33	10.62	10.85	10.89	10.45	10.36

Table No.4: The comparison of mean eruption ages of mandibular teeth of various ethnic groups

Tooth	Pakistani	American	English	Chinese	Iraqi	Kenyan	Kenyan	Zulu
P1	10.36	10.33	10.50	10.13	10.4	10.20	10.06	9.93
P2	10.75	11.20	11.43	10.96	11.2	11.01	10.05	10.45

DISCUSSION

This study established the eruption norms of upper and lower 1st and 2nd premolars in local population (both genders) of Lahore. Children examined belonged to different socioeconomic classes in private and public schools. Subjects belonged to lower, middle and upper classes. Variables like race, environmental, socioeconomic status, nutritional status and somatic growth etc have been mentioned widely in literature affecting mean eruption ages and sequences of permanent and deciduous dentition. These factor along

with many other local and systemic factors had shown the effects on mean eruption ages and emergence sequences of teeth. This kind of study has been not conducted ever before in any city of Pakistan. Although literature is full of such studies, which researched on different aspects of tooth eruption radiographically using different development quantitative methods. This does not end here different statistical methods have been used for clinical studies of mean and median ages. Therefore it was needed to research eruption chronologies and mean ages of races in Pakistan. The study will prove foundation for research lovers to establish eruption norms of Pakistani population in different areas. Thus keeping in view the limited resources and uncooperative behavior of school administration especially of private schools, this work could only established the eruption age norms of upper and lower premolars in local population. Therefore presented norms should not be assumed as representative of whole Pakistani population due to the different racial, geographical, environmental and tribal identities in our country. This needs to be researched in every nook of country.

Sequence of eruption: The classical eruption sequence in both genders taught and practiced in our country from the text books of dental anatomy. Which is of European population is as: M1, I1, I2, P1, C, P2, M2, of the upper arch whereas in lower arch: I1, M1, I2, C, P1, P2, M2. Likewise this study also followed the classical eruption sequence as: P1, P2 in upper arch whereas for lower arch was; also p1 and P2. However cross sectional studies provides only the mean sequence of eruption whereas exact order of eruption is possible through longitudinal study.

Upper & Lower premolars mean eruption age comparison with other populations: Mean eruption ages of upper and lower premolars in local population children has been compared with those of other ethnic groups is presented in Tables 3 & 4. All the comparative studies referred in literature are cross-sectional except the study of English population by Kocher and Richardson.[21]

1. Eruption of maxillary 1st premolar was seen earlier in our population than English,[21] while later as compared to eruption ages of children in American,[20] Hong Kong Chinese,[22] Iraqi,[23] Kenyans[24] of Asian and African origin, and Zulu Negros.[25]
2. Maxillary 2nd premolar eruption was earlier than the English,[21] Americans,[20] Iraqi,[23] Honkong Chinese[22] and was found erupted later than the Kenyan24 African and Zulu[25] Nigro's.
3. Mandibular 1st premolar mean eruption age in our population was earlier than the English while erupted later as compared to the America,[20] Hong Kong Chinese,[22] Iraqi,[23] African[24] and Zulu[25] Negro's population.
4. Eruption of Mandibular 2nd premolar was earlier in our population than in English,[21] American,[20] Hong Kong Chinese,[22] Iraqi[23] and Kenenyen[24] Asian while later than Kenyan24 Africans and Zulu[25] Negro population.

Our results are in accordance with literature with differences of mean ages due to socioeconomic and other factors, as the circumstances among populations are different.

CONCLUSION

1. The premolars erupted slightly earlier than the standards used in our practice of text books.
2. Maxillary premolars erupted earlier than mandibular premolars.
3. Local standards should be applied while planning preventive and interceptive orthodontic measures and treatment modalities in other specialties.

Recommendations:

1. Study provided mean eruption age norms of local population, providing base line idea.
2. Local standards should be used in different disciplines of dentistry regarding the tooth eruption ages.
3. It is recommended that such studies should be conducted in different parts of Pakistan.
4. Eruption norms of deciduous and other permanent teeth should also be established in local population.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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