

Time of Eruption of Primary Dentition in Saudi Children

Nasser M. Al-Jasser, BDS, MS; Lanre L. Bello, BDS, MS



Abstract

The purpose of the present study was to determine the mean and standard deviation of eruption for primary dentition in children from Saudi Arabia and to compare it with another sample of full-term children who are clinically healthy between the ages of 4-40 months.

The results were significantly different from available literature on eruption patterns in children. Moreover, there is a slightly delayed eruption of primary teeth in Saudi children when compared to Caucasians. However, the order of eruption of primary teeth was the same as reported in other studies.

Keywords: Tooth eruption, dentition eruption

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Introduction

The ages at which the primary teeth erupt are of great significance in relation to growth and development of the child. Most parents consider tooth eruption an important event in the child's development; hence, they often are anxious about timing and the sequence of eruption. Several studies have shown variations in the ages at which individual primary teeth erupt¹⁻³ as well as variations of eruption patterns between different ethnic and racial groups.⁴⁻⁶ It is desirable to have suitable reference standards which ensure international comparability to assist clinicians in diagnosing cases of delayed or advanced tooth eruption.^{7,8} While mean ages of eruption for primary dentition have been determined for most population groups¹⁻⁶, a review of the literature revealed no reported data on Saudi Arabian children.



times with other population groups.

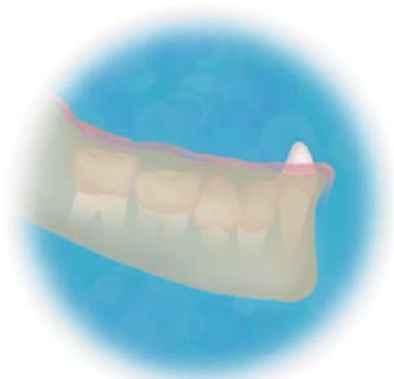
The purpose of this study was to determine the mean ages and standard deviation of eruption times for the primary dentition in Saudi children and to compare the eruption

Subjects and Methods

This study utilized a cross-sectional design. The study population was Saudi children attending the Child Health Services of King Khalid University Hospital and King Abdulaziz University Hospital, Riyadh, Saudi Arabia. The recruitment of children took place between June 1997 and May 1999. All selected children in this sample satisfied the following criteria:

- Full-term and clinically healthy
- Aged between 4 months and 40 months
- Saudi by nationality

The age of each child was ascertained from the birth certificate by calculating the chronological age in months from the date of birth. The nationalities of the children were verified from the place of birth using the national identity cards of both parents.



For purposes of this study, an erupted tooth was defined as any tooth with any part of its crown penetrating the gingiva and visible in the oral cavity. The determination of tooth eruption was carried out by Lanre L. Bello, BDS, MS, one of the authors, and a dental hygienist using a mouth mirror in a room with a good light source. The dental hygienist was adequately trained in the oral examination technique. The interrater reliability was determined in an initial examination of the first 20 children by the two examiners and the agreement was 100%.

The data was transferred into a microcomputer for statistical analysis using the Statistical Program for Social Sciences (SPSS, version 9.0) and subjected to probit analysis.⁷ For each tooth, the percentage of eruption at various age levels was obtained and transformed into probit values from which the mean age and standard deviation of tooth eruption were estimated for males and females. The student t-test for independent samples was used to assess the statistical significance of the difference in mean age of tooth eruption between males and females at the 5% probability level.



Results

There were a total of 728 children who met the inclusion criteria. The gender ratio of 1:1.09 favored male children. Tables 1a and 1b show the

mean time of eruption of primary teeth and their standard deviations for each category of tooth. For both the maxilla and mandible, there were no differences in the mean age of eruption of the teeth in the right and left sides; hence, they were combined. Thus, the summary statistics of the mean age of tooth eruption has been presented for both right and left sides.

The mandibular central incisors were the earliest category of teeth to erupt with a mean age of about 8.5 months for both genders. A standard deviation of 2.8 months suggests 68% of the children would have their teeth erupted between 5.7 months and 11.3 months. The maxillary central incisors erupted at about 11 months followed by the maxillary and mandibular laterals respectively. The first molars erupted on average earlier than the canines. The mandibular and maxillary second molars erupted at a mean age of about 28 months for both genders. The length of time from eruption of the first tooth to the last tooth was 19.5 months in the mandible and almost 17 months in the maxilla.

The phases of eruption of primary teeth were divisible into 4 active periods: incisors; first molars; canines; and second molars, with an interval of rest between the phases (Table 2). The first phase comprised central and lateral incisors that erupted within 6 months in both jaws for boys and girls (Table 1a and 1b). An interval of about 2.6 months in the mandible and 3.7 months in the maxilla followed before eruption of the first molars (phase 2). The third phase commenced with eruption of canines after a resting period of 3.9 months in the mandible and 4.2 months in the maxilla. The last phase was the eruption of the second molars that occurred after a pause of about 6.9 and 7.1 months in the mandible and maxilla respectively (Table 3).

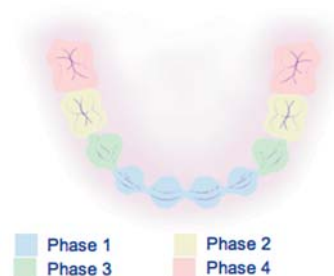


Table 1a. Mean ages (months) at eruption ± standard deviation (s.d.) of maxillary primary teeth in Saudi children.

Tooth*	Boys		Girls		Both Genders	
	Mean	S.d.	Mean	S.d.	Mean	S.d.
51, 61	11.19	1.90	11.20	1.90	11.20	1.90
52, 62	13.09	2.71	13.31	2.72	13.20	2.72
53, 63	21.14	3.65	21.03	3.66	21.09	3.66
54, 64	16.88	3.36	16.90	3.36	16.89	3.36
55, 65	28.16	4.17	28.25	4.19	28.21	4.18

Table 1b. Mean ages (months) at eruption ± standard deviation (s.d.) of mandibular primary teeth in Saudi children.

Tooth*	Boys		Girls		Both Genders	
	Mean	S.d.	Mean	S.d.	Mean	S.d.
81, 71	8.44	2.80	8.49	2.81	8.47	2.81
82, 72	14.44	3.60	14.61	3.60	14.53	3.60
83, 73	21.03	3.72	21.10	3.73	21.07	3.73
84, 74	17.17	2.72	17.13	2.73	17.15	2.73
85, 75	27.92	4.06	27.97	4.06	27.95	4.06

* Tooth numbered according to FDI system

There is a tendency for the teeth to erupt earlier in boys in both the maxilla and mandible. However, the difference was not statistically significant at the 5% confidence level.

The results of this study were compared to those of similar studies involving varying racial and ethnic groups. The results are presented in Tables 3a, 3b, 4a, and 4b; they suggest a slightly delayed eruption of the teeth in Saudi children compared to those of Caucasian children, but the results were similar to those reported for Iraqi children. The order of eruption of the primary teeth was the same as reported in all other studies.

Discussion

The mean times for eruption of primary teeth have been determined for most population groups. However, no reported data could be found for Saudi Arabia, and the standards for the eruption of deciduous teeth are based on non-Saudi population groups. A review of the literature shows there are differences in eruption times between populations. This is apparently due mainly to variations in the constitutions and environment of the groups investigated, thus, it becomes important to consider normal values of eruption for each population group.

The age of emergence of each primary tooth was established for both genders (Table 1 and Table

Table 2. Time intervals (months) between phases of teeth eruption in the maxilla and mandible in Saudi children.

	Maxilla			Mandible		
	Boys	Girls	Both Genders	Boys	Girls	Both Genders
Phase 1- Phase 2	3.8	3.6	3.7	2.7	2.5	2.6
Phase 2- Phase 3	4.3	4.1	4.2	3.9	4.0	3.9
Phase 3- Phase 4	7.0	7.2	7.1	6.9	6.9	6.9

Table 3a. Mean ages (months) at eruption of maxillary primary teeth in boys.

Tooth	Saudi	Iraq	Iceland	U.S.
51, 61	11.19	10.70	8.99	9.36
52, 62	13.09	10.10	10.38	12.00
53, 63	21.14	18.80	17.59	21.00
54, 64	16.88	16.30	15.10	17.52
55, 65	28.16	26.00	26.13	30.96

Table 3b. Mean ages (months) at eruption of mandibular primary teeth in boys.

Tooth	Saudi	Iraq	Iceland	U.S.
81, 71	8.44	9.20	8.03	7.20
82, 72	14.44	14.00	12.08	13.08
83, 73	21.03	19.00	19.16	20.88
84, 74	17.17	16.90	16.16	16.56
85, 75	27.92	26.00	25.62	30.00

Table 4a. Mean ages (months) at eruption of maxillary primary teeth in girls.

Tooth	Saudi	Iraq	Iceland	U.S.
51, 61	11.20	10.60	9.21	8.76
52, 62	13.31	11.40	10.16	11.76
53, 63	21.03	19.90	17.98	20.76
54, 64	16.90	16.40	14.95	16.32
55, 65	28.25	27.00	25.11	31.44

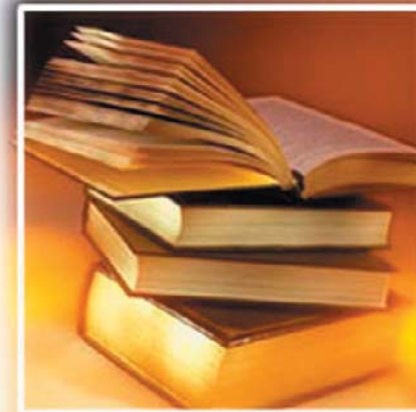
Table 4b. Mean ages (months) at eruption of mandibular primary teeth in girls.

Tooth	Saudi	Iraq	Iceland	U.S.
81, 71	8.49	8.40	6.89	7.68
82, 72	14.61	14.30	11.75	13.32
83, 73	21.10	20.30	18.14	20.52
84, 74	17.13	17.00	15.43	16.44
85, 75	27.97	25.10	23.74	29.52

2), and the mean age and standard deviation for tooth eruption of all primary teeth in this study were compared with the results obtained in similar studies of other populations.

Tables 3a and 3b, Tables 4a, and 4b show the results published by other authors in primary teeth eruption, including our own results. The results suggested slightly delayed eruption of teeth in Saudi children compared to Caucasian children; but were similar to the findings from the Iraqi group. The order of eruption of primary teeth was the same as reported in all other studies.

Several studies have considered influential factors such as nutrition, socio-economic status, climate, and premature extraction of deciduous teeth on the time and order of the emergence of teeth, but the results were inconsistent.^{8,9} For example, Clemens et al. (1953) claimed the mean emergence times of children in a higher socio-economic group tended to be earlier than those in other children.¹⁰ Furthermore, other studies suggested a genetic origin for early or late emergence of teeth.¹¹⁻¹⁴ But Lee et al. (1965) emphasized the inter-population differences seemed to have little meaning in themselves unless the socio-economic conditions, nutritional



status, and other environmental factors in the survey were defined.¹⁵ Environmental factors such as the fluoride content in drinking water should be considered in evaluating differences in deciduous tooth emergence times between various geographic areas; even though Friedlaender and Bailit (1969) pointed out the relative unimportance of environmental influences in permanent dental emergence.¹⁶

With regard to the comparison between sexes, some authors do not find any significant differences in the population they investigated.¹⁷⁻²⁰ But many other authors refer to statistically significant sex

differences, at least for some teeth.²¹⁻²⁴ We found a tendency for teeth to erupt earlier in boys for both jaws, although the difference was marginal. This is in agreement with the findings of some other authors.²⁵⁻²⁶ Also, all authors agree with our findings in regards to the sequence of eruption within the jaws. Many authors also agree the second molars most frequently erupt first in the mandible.



Nutrition



Socio-Economical Status



Climate



Premature Extraction

Conclusion

The main purpose of the present paper was to provide baseline data of eruption for primary dentition in children from Saudi Arabia. A delay in deciduous teeth eruption could be a sign of a systemic disease, and its observation may lead to a diagnosis of such diseases as hypothyroidism. Dental eruption ages have also been utilized in the study of the relationships between dental and skeletal maturation rates.²⁷ The information obtained may also be important in a study of caries incidence as a guide to the length of time for which teeth have been exposed to possible attack by caries.²⁸

If the results of this research prove valuable to dentists, physicians, and all those involved in the health care delivery of children, the objective of the paper would have been met. It is also our hope this paper would prove a useful basis of comparison for anthropologists.

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About the Authors

Nasser M. Al-Jasser, BDS, MS



Dr. Al Jasser is an Associate Professor in the Division of Orthodontics of the Department of Preventive Dental Sciences at the King Saud University College of Dentistry in Riyadh, Saudi Arabia.

e-mail: njasser@ksu.edu.sa

Lanre L. Bello, BDS, MS



Dr. Bello is an Assistant Professor in the Division of Pediatric Dentistry of the Department of Preventive Dental Sciences at the King Saud University College of Dentistry in Riyadh, Saudi Arabia.

e-mail: bellolanre@hotmail.com