

Eruption sequence of first permanent teeth in some Nigerian children

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Abstract The aim of the study was to determine eruption sequence between lower first molars and lower central incisors in some Nigerian children. The study population consisted of healthy Nigerian nursery school children in Ibadan, Nigeria. Intra-oral examinations were done out door under natural lightening conditions and only children who had either the lower permanent central incisor(s) or lower first molar(s) were included in the study. Ninety-four children met the inclusion criteria with their mean age at 5.77 ± 0.61 years. Sixty-seven percent of the children were 6 years old, while 23.4% were 5 years old. Only 3.2% were 4 years old. One hundred and seventy six teeth were erupted as at the time of the study. Fifty-seven point ninety-five percent of the erupted teeth were central incisors while 42.05% were lower first molars. It is hoped that the observed reversal in the trend of eruption of the first permanent teeth will afford an opportunity of establishing the trend of dental development in Nigerian children.

Key words

Eruption sequence,
Nigerian children,
Permanent teeth

Introduction

Eruption of teeth is a normal physiological process which occurs in children at different ages.

Earlier studies have shown that while order of eruption of teeth as determined from mean eruption times is relatively constant, the times of eruption of individual teeth are very variable, and consequently individual children may be expected to vary greatly in the order in which their teeth erupt¹.

The lower first molars (LFM) and lower central incisors (LCI) are the first permanent teeth to erupt in children with the LFM known to be ahead of the LCI in an earlier study¹. Also the LFM play a central role in the formation of the permanent dentition and are called the “6 year molars”^{2,3}.

Over the years, a reversal in the sequence of eruption has been observed with LCI erupting ahead of the LFM in many countries by different researchers^{1,4-6}.

The objective of this study was to determine eruption sequence between LFM and LCI in some Nigerian children.

Subjects and Methods

Subject selection

Study population consisted of cross sectional sample of 347 healthy Nigerian school children randomly selected from 10 private and 10 state nursery schools in Ibadan, Nigeria. The children were aged 4–7 years as at their last birthday and these ages were confirmed by their class teachers from the school records. Any child with a history of serious systemic disease was excluded from the study. Prior consent to examine the children was obtained from their parents and school authorities.

Intraoral examination

At the respective school, intra-oral examinations were done under natural lightening condition out door with the aid of a wooden spatula. Only the lower jaw of each child was examined for the

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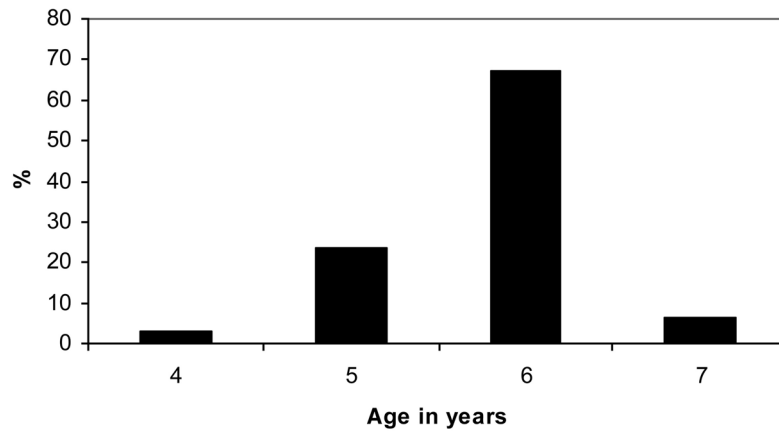


Fig. 1 Percentage distribution of age in years

presence of permanent lower central incisor (LCI) or the lower first molar (LFM) and only children who have erupted either of these teeth were included in the study. Eruption of either of the teeth was defined as when any part of either of the teeth has emerged or penetrated the gingiva and hence was clinically detectable. Otherwise the tooth was classified as unerupted. Examination of the children was done between the months of June and July 2004 just prior to the end of the school session.

Data was subjected to simple descriptive and statistical analysis using chi-square test with SPSS version 11.0. Differences were considered statistically significant at the level of $P < 0.05$.

Results

Ninety-four out of the 347 children examined for the eruption of either LCIs or LFMs met the inclusion criteria. Their age range was 4–7 years with mean age at 5.77 ± 0.61 years. Forty-eight (51.06%) were boys while 46 (48.94%) were girls. From Fig. 1, 3.2% were 4 years old, 23.4% were 5 years old, 67% were 6 years old while 6.4% were 7 years old.

Figure 2 shows the gender distribution in relation to the erupted teeth between the right and left sides of the lower jaw. Girls erupted their lower left and right first molars ahead of boys while boys erupted their lower left and right central incisors ahead of the girls. Chi-square for trend was found to be significant $P < 0.05$.

One hundred and seventy six teeth had erupted in the mouth of the children examined and the mean number of teeth per child was found to be 1.87.

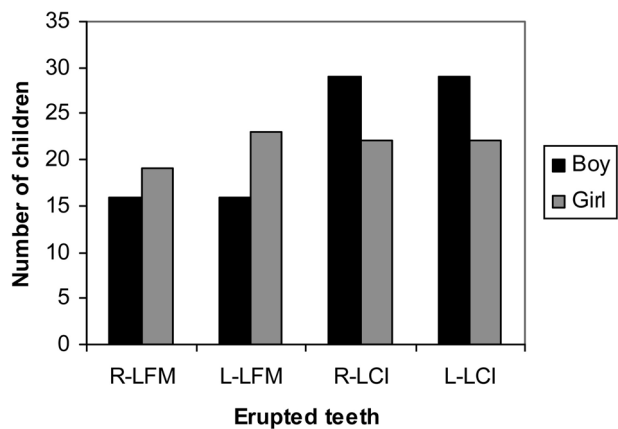


Fig. 2 Gender distribution in relation to erupted teeth
 R-LFM: Right side LFM, R-LCI: Right side LCI
 L-LFM: Left side LFM, L-LCI: Left side LCI
 χ^2 for trend = 12.38, $P < 0.05$

Sixty-eight point eighteen percent of the erupted teeth occurred at age 6 years, while 22.16% erupted at age 5 years. The least number of teeth erupted at 4 years (Table 1). A higher percentage of the erupted teeth were LCIs (57.95%) while 42.05% were LFMs (Table 2).

Discussion

Lower first molars are called 6 year molars because they erupt at 6 years. Eruption dates for LCIs and LFMs had always been put at between 6–7 years. It has always been the belief of many that eruptions of LFMs actually precede the LCIs. The present study confirms age 6 as the common age of eruption

Table 1 Frequency distribution of erupted teeth

Age in years	No. of children	LFM No. (%)	LCI No. (%)	Total No. (%)
4	3	2	3	5 (2.8)
5	22	17	22	39 (22.2)
6	63	45	75	120 (68.2)
7	6	10	2	12 (6.8)
Total	94	74 (42.1)	102 (57.9)	176 (100)

LFM: Lower first molar, LCI: Lower central incisor
 $\chi^2=9.46, P<0.05$

Table 2 Distribution of erupted teeth among the ages of the children seen

Age in years	No. of children	R-LFM	L-LFM	R-LCI	L-LCI	Total No. (%)
4	3	1	1	2	1	5 (2.8)
5	22	8	9	12	10	39 (22.2)
6	63	21	24	36	39	120 (68.2)
7	6	5	5	1	1	12 (6.8)
Total	94	35	39	51	51	176 (100)

of these permanent teeth as over 60% of these teeth had erupted by age 6 years. Earlier eruption dates of teeth have been observed in most clinical practices today and this is substantiated by the observation in this study whereby over 25% of the children had erupted their first permanent teeth by age 5 years. With this observation therefore, eruption date of the first permanent teeth for the children in this study can be put at between 5–6 years ± 1 rather than 6–7 years ± 1 . A larger study will be needed to confirm this. Prematurity has been associated with early eruption⁷⁾ although this was not ascertained in the present study.

Differences in the development of the permanent dentition and in the order of tooth mineralization and emergence between the sexes have been observed with girls preceding boys in reaching the crown mineralization stages, root development and tooth eruption⁸⁾. Such was observed with the eruption of the first molars and the trend changed with the eruption of the LCIs. Although this trend was found to be significant, no explanation can be given for the change in trend, but an earlier study⁷⁾ has assumed that the determinants of the timing of tooth eruption

are more genetically determined.

A higher percentage of the children erupted the LCIs ahead of the LFMs. This is in agreement with many previous studies carried out in many countries⁴⁻⁶⁾ and this has been reported as a global phenomenon with a reversal in the order of eruption between the LFMs and LCIs. Interestingly this phenomenon had been reported as far back as 1756 by Pfaff, an 18th century dental pioneer who wrote that the two LCIs were the first permanent teeth to erupt in German children⁹⁾. However by 1920s, 164 years later, it was found that among German children, the first permanent teeth to erupt had changed from the LCIs to the LFMs.

In the global phenomenon of reversal in the order of the first teeth to erupt, no differences were observed concerning race, climatic conditions or environment²⁾. Therefore in conclusion, it is hoped this study will be a useful basis of comparison for anthropologists and others interested in dental development. Furthermore it will afford an opportunity of establishing the trend of dental development in Nigerian children.

References

- 1) Clements, E.M.B: Order of tooth eruption of the permanent human dentition. *Br Med J* **1**: 1425–1427, 1953.
- 2) Nakahara, S. and Sekimoto, T.: Global phenomenon in eruption of first permanent teeth: A survey of 50 countries. *Dent in Japan* **39**: 133–137, 2003.
- 3) Tilakray, T.N.: Essential of Pedodontics. 1st ed. Jaypee Publishers, 2003, pp.36–47.
- 4) Haavikko, K.: The formation and alveolar and clinical eruption of the permanent teeth. An orthopantomographic study. *Proc Finn Dent Soc* **66**: 165–170, 1970.
- 5) Valsik, J.A.: Changes in eruption of the first permanent teeth. *Scripta Medica* **48**: 191–194, 1975.
- 6) The Japanese Society of Pedodontics: The chronology of deciduous and permanent dentition in Japanese children. *Jpn J Ped Dent* **26**: 1–18, 1988. (English abstract)
- 7) Harila-Kaera, V., Heikkinen, T. and Alvesalo, L.: The eruption of permanent incisors and first molars in prematurely born children. *European J Ortho* **25**: 293–299, 2003.
- 8) Harris, E.F. and Mckee, J.H.: Tooth mineralization standards for blacks and whites from the middle southern united states. *J of Forensic Sciences* **35**: 859–872, 1990.
- 9) Pfaff, P.: Abhandlung von den Zahnen des menschilchen Korpers und deren Krankheiten. Berlin, 1756, p.30. (cited by Nakahara, S. and Sekimoto, T.: Global phenomenon in eruption of first permanent teeth: A survey of 50 countries. *Dent in Japan* **39**: 133–137, 2003.)