

Research Article

**Eruption Time of the First Primary Tooth and Related Factors in
Babol City of Iran (2015-2016)**

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ABSTRACT:

Introduction: Eruption time of primary teeth is influenced by genetic and environmental factors. The aim of this study was to determine the eruption time of first primary tooth and its related factors in children of Babol City in 2015-2016. **Materials and Methods:** In this cross-sectional study, 373 healthy children aged 4-36 months, referred to Babol Health Centers in 2015-2016 were selected and the oral examination was performed on them. The number of teeth was recorded in data collection form, and information about the eruption age of the first deciduous tooth and its related factors was collected through interview with their parents and growth monitoring card. The data were analyzed using Mann-Whitney and Kruskal-Wallis Tests. **Results:** The mean eruption age of first primary tooth was 7.6 ± 2 months. There was no significant difference between the mean eruption time of the first primary tooth and gender, birth weight, BMI percentile, the mean age of onset of walking and sitting alone, having a family history of delayed eruption of the first primary tooth, type of feeding in infancy, the mean beginning time of using supplementary food, gestational age and the mode of delivery. The eruption time of the first primary tooth was less in children exclusively breastfed for less than 6 months compared to the infants exclusively breastfed for at least 6 months. **Discussion:** There was significant relationship between duration of exclusive breastfeeding and the mean eruption time of the first deciduous tooth.

Keywords: Primary teeth, Eruption age, Children, Breastfeeding, Iran, eruption sequence

[I] INTRODUCTION

Tooth eruption is the movement of the tooth from alveolar bone to the oral cavity [1]. In the first

phase, the mandibular incisors erupt at 4-8 months and the last phase is the eruption of the

second molars at 24-36 months [2]. Based on the previous studies, if the first deciduous tooth is not erupted up to 12 months, it is considered delayed eruption [3, 4, 5]. The factors that have been linked to the eruption of the teeth are different, but genetic, hormonal and environmental factors can be effective in eruption time of each tooth [3]. Knowledge of the different stages of dental development and calcification and the tooth eruption sequence can respond to the causes of many structural defects, discoloration and development time of malformations and the dentist is a first person who discovers a systemic disease and can help to diagnose, treat and prevent from its possible complications [6].

The eruption pattern of teeth in various countries is different and is associated with genetic factors, nutrition, weather, gender, season of birth and duration of breastfeeding [7, 8, 9, 10, 11]. Several studies have shown that eruption time of teeth is different in different races [9].

Familial causes can lead to precocious eruption of primary teeth [3]. Delayed eruption of teeth can be related to the conditions such as malnutrition, low socioeconomic status, Down syndrome, neonatal diseases, low birth weight, hypothyroidism and [5, 7, 9]. Also, this information is important to analyze the growth and development of children [11], to diagnose and provide treatment planning, to perform caries prevention programs, to estimate the age in forensics and anthropology studies [1, 6, 9].

Since there is limited information about the eruption age of deciduous teeth and its relationship with environmental factors in Iranian children, so the aim of this study was to determine the mean eruption time of first deciduous tooth and its associated factors in the population of north of the country.

[II] MATERIALS AND METHODS

In this cross-sectional descriptive study, 373 children aged 4-36 months of Babol city (north of Iran) were referred to the four urban health care centers in 2015-2016 for growth monitoring and

vaccination and they were selected according to inclusion and exclusion criteria and were orally examined.

Sample size was determined based on Morgan table, health centers were selected according to multi-stage random and selection of children was conducted via census.

Inclusion criteria consisted of children with Iranian race, resident in Babol, healthy children without any systemic or allergic disease and parental consent for participating in the study. In addition, the exclusion criteria were lack of required information.

This research project proposal was confirmed by the ethics committee of Babol University of Medical Sciences. Oral examination was performed using a dental mirror at the room light by a senior dental student and the existing teeth were recorded in the information form.

Birth weight, gender, current height and weight of children, recorded in the growth monitoring card were entered into information form and data relating to the first erupted deciduous tooth and its eruption time, gestational age, delivery methods, consanguineous marriage, type and duration of breastfeeding were obtained from parents through interviews.

Children's BMI based on current height and weight, recorded in growth monitoring card was calculated and then BMI percentile was determined using children's BMI chart. Data were analyzed using SPSS 22 with Mann-Whitney Test and Kruskal-Wallis Test. $P < 0.05$ was statistically considered significant.

[III] RESULTS

In this cross-sectional research, 373 children aged 4-36 months were studied and 158 children were male with the mean age of 13.09 ± 2 months and 136 cases were female with the mean age of 12.96 ± 1.9 months.

Mean eruption time of the first deciduous tooth was 7.64 ± 1.9 months and 7.61 ± 2 months in boys and girls, respectively. Table 1 shows the

relation between discrete variables with eruption time of the first primary tooth.

		number	percent	The mean age of the first deciduous tooth eruption±SD(month)	Time First tooth / p value
Gender	Female	136	46.3	7.61±2	0.660*
	Male	158	53.7	7.64±1.9	
existence a family history of delayed eruption(month)	Yes	39	13.3	8.1±2.5	0.087*
	No	255	86.7	7.5±1.8	
Type of feeding in infancy	Breastfed	239	81.3	7.6±1.9	0.207**
	Milk powder	16	5.5	8.5±2.3	
	both	39	13.2	7.3±1.8	
Way of delivery	Natural	70	23.8	7.7±2	0.519*
	caesarean	224	76.2	7.5±1.9	
History of family marriage	Yes	36	12.2	7.7±2.1	0.782*
	no	258	87.8	7.6±1.9	
birth weight	<2500	17	6.96	7.24±1.9	0.441*
	≥2500	227	93.04	7.65±1.9	
exclusively breastfed	<6	17	5.9	6.3±2.7	0.003*
	≥6	271	94.09	7.7±1.9	
Gestational age	<37	14	4.7	7.9±2.05	0.630*
	≥37	280	95.3	7.6±1.99	
BMI percentile index	5<	58	16	7.3±1.9	0.675**
	5-84.99	216	62	7.7±2	
	85-94.99	23	6	8.07±2	
	>95	51	16	7.2±1.7	

*Based on NonParametric Tests, ANOVA Two way(Mann-Whitney Test)

** Based on NonParametric Tests, ANOVA One way(Kruskal-Wallis Test)

Table: 1. Relation between discrete variables with eruption time of the first primary tooth

Mandibular incisors erupted as the first teeth in 89.8% of children with the mean of 7.5 ± 1.9 months. In addition, first teeth were erupted as maxillary incisors in 10.2% of children with the mean of 8.3 ± 1.9 months. In the present study, 79 children (12 children were older than 12 months) had no teeth. Table 2 shows separately eruption pattern of primary tooth in studied children.

	Mandible				Maxilla			
	6>	6-12 months	12-18 months	18-36 months	6>	6-12 months	12-18 months	18-36 months
A	42	89	96	100	17	81	91	100
B	7	42	94	100	9	47	96	100
C	0	0	19	100	0	0	28	100
D	0	23	74	100	0	21	71	100
E	0	0	5	100	0	0	0	94

Table: 2. eruption pattern of primary tooth in studied children

[IV] DISCUSSION

The aim of this study was to determine the eruption time of first primary teeth and its related factors in children of Babol City in 2015-2016. Mean age of the first eruption of primary teeth was 7.6 months in the current study.

Mean age of the first eruption of primary teeth in the cross-sectional studies of Folyan et al. on Nigerian children, Soliman et al. on Egyptian children, Batayneh et al. on Jordanian children and Pavicin et al. on Croatian children was 7.8, 7.9, 8.2 and 7.3 months, respectively, which

indicated no significant difference compared to the standards of other populations [1, 5, 7, 9].

In the present study, there was a significant relationship between the eruption time of the first primary tooth and the duration of exclusive breastfeeding so that the mean eruption time of the first deciduous tooth was lower in children breastfed for less than 6 months than in children exclusively breastfed at least for 6 months, which is inconsistent with the results of Pavacin et al. and Koli et al. [1, 10].

Pavacin et al. suggested that the eruption age of the first deciduous tooth was significantly more in children whose breastfeeding had cut up to 6 months than children who were breastfed for more than 6 months [1].

In another study conducted on 256 Indian children by Kohli et al., the relationship between eruption timing of the first primary tooth, and frequency and amount of breastfeeding in two generations (parents and children) was studied. The results stated that the frequency of breastfeeding was more in the present generation while more delay of teething time was found in this generation compared to last generation [10].

EID et al. performed a study on 563 Sudanese children aged 4-40 months, No significant difference was observed in the mean age of the first eruption of the primary tooth between children exclusively breastfed for less and more than 6 months [16].

The eruption age of the first primary tooth was 8.1 in children exclusively breastfed for less than 6 months and 7.9 in infants exclusively breastfed for at least 6 months. In a study on 398 Nigerian children by Folyan et al., there was no significant relationship between duration of breastfeeding and the eruption time of first deciduous teeth [17].

Other examined factors of the present study had no significant relationship with the eruption time of the first primary teeth.

In this study, 81.3% of infants were exclusively breastfed for the first six months of life and the mean age of the first primary tooth eruption was 7.6 ± 1.9 months.

Only 5.5% of them were formula fed neonates due to a variety of reasons and the mean eruption age of the first deciduous tooth in this group was 8.5 ± 2.3 months. Moreover, other 13.3% of children were fed by a combination of both breastfeeding and bottle feeding (formula milk) and the mean eruption age of the first primary tooth in this group was 7.3 ± 1.8 months that this difference was not statistically significant.

In relation to birth weight, children were divided into two groups: a) less than 2500 gr and b) more than 2500 gr that no significant relationship was found between two groups in terms of the mean eruption age of the first primary teeth.

Vejdani et al. studied the relationship between birth weight and time of the first deciduous tooth eruption on 70 Rashti infants and they concluded that the first erupted tooth was 8.2 months and 7.7 months in neonates with weight less than 2500 gr and more than 2500 gr at birth, respectively and this difference was not statistically significant [15].

Bastos et al. studied on 359 Brazilian children and suggested that there was no significant difference between the neonates with weight more than 2500 gr and less than 2500 gr at birth in terms of eruption time of the first primary tooth [6].

However, Pavacin et al. and Khalifa et al. divided the infants into three groups according to birth weight (<1500, 1500–2500, >2500 g) and the delay of the first deciduous tooth eruption was observed in neonates less than 1500 gr [1, 4].

In connection with the delivery method, 23.7% and 76.3% of neonates were born through vaginal delivery and caesarean, respectively and the relationship between delivery method and eruption time of the first primary tooth was not statistically significant. Furthermore, in the studies of Folyan et al. and Bastos et al., no significant relationship was observed between the eruption time of the first deciduous teeth and mode of delivery [5, 6].

Moreover, gestational age was investigated in the current study and it was concluded that the

gestational age of 95.3% and 5.7% of mothers was ≥ 37 weeks and < 37 weeks, respectively that there was no significant difference between these two groups. Bastos et al. suggested there was no significant relationship between the eruption time of the first primary tooth and gestational age in their study on 359 Brazilian newborns [6], while Pavicin et al. stated that the eruption time of the first primary tooth was significantly more in the neonates born less than 37 weeks of gestation (preterm birth) [1, 6].

The mean eruption age of the first primary teeth was 8.4 in these children and was 7.05 months in neonates over 37 weeks of gestations [1]. This result was also observed in the study of Khalifa et al. In the present study, the mean eruption age of the first primary teeth was 9.3 months in preterm newborns and was 7.9 months in other neonates [4].

This can be attributed to the special cares of newborns after birth such as intubation, the need for medicaments and supplementary foods [4]. In the current study, this result was not debatable because of the limited information on the history of hospitalization in the neonatal intensive care unit (NICU) and special dietary supplementation in preterm neonates with birth weight less than 2,500 gr.

In this study, 12% and 88% of parents were with and without consanguineous marriage, respectively and there was no significant relationship between these two groups. It should be noted that no similar study was found for comparison and discussion in this field.

Based on the current height and weight recorded in the growth monitoring card, BMI was calculated and its percentile was estimated from the BMI chart [18]. BMI percentile had no significant difference between the four groups in terms of the eruption time of the first deciduous tooth.

[V] CONCLUSION

The relevant studies represented that the eruption time of the first deciduous tooth was different in

various generations and races. Training and providing knowledge for parents to take preventive measures can be planned by revealing the role of these factors in the eruption time of the first deciduous tooth among Iranian northern children.

However, the further studies need to be done across the country to prevent this problem. It is suggested to collect the information using medical records of neonates in addition to asking questions from the parents. In addition, it is suggested that the type and composition of infant formula or supplementary food should be meticulously investigated in connection with feeding up to 6 months in further studies.

REFERENCES

- 1- Pavićin I, Duman J, Badel J, Vodanović M. Timing of emergence of the first primary tooth in preterm and full-term infants. *Ann Anat.* 2016; 203: 19-23.
- 2- Gupta A, Hiremath SS, Singh SK, et al. Emergence of Primary Teeth in Children of Sunsari District of Eastern Nepal. *McGill J Med.* 2007; 10(1): 11-15.
- 3- McDonald E, David R, Jeffrey A, et al. *Dentistry for the Child and Adolescent.* Missouri: Mosby; 2010.
- 4- Khalifa A, Gendy R, Abd El-Mohsen MM, Hammour A, Lateef Aly R. Relationship between gestational age, birth weight and deciduous tooth eruption. *EPAG.* 2014; 62(2): 41-45.
- 5- Folayan M, Owotade F, Adejuyigbe E, Sen S, Lawal B, Ndukwe K. The Timing of Eruption of the Primary Dentition in Nigerian Children. *Am J Phys Anthropol.* 2007; 134: 443-448.
- 6- Bastos J, Peres M, Peres K, Barros A. Infant growth, development and tooth emergence patterns: A longitudinal study from birth to 6 years of age. *Arch Oral Biol.* 2007; 52: 598-606.
- 7- Soliman NL, El-Zainy MA, Hassan RM, Aly RM. Timing of deciduous teeth emergence in

- Egyptian children. *East Mediterr Health J*. 2011 Nov; 17(11): 875-81.
- 8- Magnússon TE. Emergence of primary teeth and onset of dental stages in Icelandic children. *Community Dent Oral*. 1982; 10(2): 91-97.
 - 9- Al-Batayneh O, Shaweesh A, Alsoreeky E. Timing and sequence of emergence of deciduous teeth in Jordanian children. *Arch Oral Biol*. 2015; 60: 126–133.
 - 10- Kohli M, et al. Changing Trend In Eruption Age and Pattern of First Deciduous Tooth: Correlation to Feeding Pattern. *J ClinDiagn Res*. 2014; 8(3): 199-201.
 - 11- Woodroffe S, Mihailidis S, Hughes T, et al. Primary tooth emergence in Australian children: timing, sequence and patterns of asymmetry. *Aust Dent J*. 2010; 55: 245–251.
 - 12- Mahmoodian J, Ghandehari M, Khujan M. Longitudinal study time and the eruption of primary teeth Children in Tehran. *JIDA*. 2005; 17: 34-39.
 - 13- Żądzińska E, Sitek A, Rosset I. Relationship between pre-natal factors, the perinatal environment, motor development in the first year of life and the timing of first deciduous tooth emergence. *Ann Hum Biol*. 2015; 12: 1-9.
 - 14- Żądzińska E, Niczoja-dwojaka J, Boroweska-starginska B. Primary tooth emergence in Polish children: timing, sequence and the relation between morphological and dental maturity in males and females. *AnthropolAnz*. 2013; 70(1): 1-13.
 - 15- Vejdani J, et al. The relationship between birth weight and eruption time of first teeth. 2016; 7(4): 31-35.
 - 16- Eid EA et al. Time and sequence of eruption of primary teeth in relation to breastfeeding in sudanese children. *Braz Dent Sci*. 2014; 17(3): 67-73.
 - 17- Folayan MO, Sowole CA. Association between breastfeeding and eruption of the first tooth in preschool children in Nigeria. *Eur J Paediatr Dent*. 2013; 14(1): 51-54.
 - 18- Hosseini m, Carpenter RG, Mohammad K, Jones ME. Standardized percentile curves of body mass index of Iranian children compared to the US population reference. *International Journal of Obesity*. 1999; (23): 783-787.