

## Comparison of primary mandibular central incisor teeth eruption time in preterm and fullterm infants in Lahore

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### Abstract

**Background:** This study was proposed to address the effects of preterm birth and low birth weight on eruption of primary mandibular central incisors in Lahore city.

**Objective:** To compare the time of eruption of primary mandibular central incisor teeth in preterm and full-term infants.

**Design:** This was a descriptive study. A total of 60 infants were included in the study. These infants were divided into two groups. Group 1 with 30 full-term infants (born at 38-42 weeks of gestation) further divided into two sub-groups, Group 1A (>2500 g) and 1 B (<2500 g). Group 2 with 30 preterm infants (born before 37 weeks of gestation) was also divided into two sub-groups, Group 2A (>2500 g) and 2 B (<2500 g). The oral cavity of infants was first examined at the age of 6 months till the time of eruption of the primary mandibular central incisor teeth.

**Result:** The time of eruption was compared by ANOVA between and within groups, the difference was statistically significant among the groups ( $P < 0.05$ ).

**Conclusion:** The results help us to understand the reasons of delayed teeth eruption. Low birth weight was related to the delayed time of eruption of the first deciduous tooth. Preterm infants were delayed in their first deciduous tooth eruption in comparison to full term infants. There was no significant correlation found between gender and time of eruption of the deciduous tooth.

**Keywords:** Full-term, preterm, tooth eruption, infant, gestation

### INTRODUCTION

Preterm infant is defined as an infant, born before 37 weeks of gestation according to the World Health Organization (Preterm

Birth, n.d.). The incidence lies between 5% and 10% in Europe, North America, Australia and parts of South America, whereas it lies between 10% and 30% in

many countries in Africa and in Southeast Asia (Paulsson et al., 2004). Most common reason of low birth weight is the preterm childbirth. Development and growth of preterm infants with low birth weight may affect physical growth (Seow, 1997). Environmental factors can be exposure to pollutants or toxins, active and passive cigarette smoking, alcohol and drug induction. In about half the cases, there are unknown etiological factors (Schendel & Bhasin, 2008). Preterm infants may face many systemic and neurological developmental problems such as cerebral palsy, learning and behavioral problems, lung diseases, mental retardation and vision and hearing loss (Limperopoulos et al., 2008). Human beings have two sets of teeth in their life time. Primary/deciduous teeth erupt at the age between 6 to 24 months (ADA Primary Tooth Dev\_Eng.Pdf, n.d.) while secondary/permanent teeth erupt later at the age of 6 to 9 years (ADA Permanent Teeth Dev\_Eng.Pdf, n.d.). Time of eruption is defined as the time at which part of the crown of tooth has emerged through the gingival surface (Nagata et al., 2019). There are five stages of tooth eruption: pre-eruptive stage, intra-osseous stage, mucosal penetration, pre-occlusal and post-occlusal stages (Nanci, 2017).

Deciduous and permanent tooth eruption time may be delayed in preterm infants. Delayed tooth eruption can be due to the general slow growth of preterm infants, short gestation, low birth weight ('Effects of Premature Delivery and Birth Weight on Eruption Pattern of Primary Dentition among Beijing Children', 2019) and duration of oral intubation (Kim et al., 2019). Weight gain after birth, nutritional factors and growth of the child may also have an impact on the eruption of the deciduous teeth (Viscardi et al., 1994). Aktoren et al. 2010 compared eruption time between

premature, low birth weight and full-term infants. Results showed delayed primary first tooth eruption among premature and low birth weight infants (Aktoren et al., 2010). Seow in 1996 proved that in infants with very low birth weight, permanent dentition can be delayed and viewed with the help of panoramic x-ray (Anbiaee et al., 2013). Harla Kaira et al. 2002 studied effects of prematurity on dimensions of crowns of permanent teeth. The subjects were 328 prematurely born white and black children and 1804 controlled children. Sagittal occlusion of permanent molars and canine relationship was recorded by examination and measurement of hard stone casts. Results suggested that there were small crown dimensions in some preterm children (Harila-Kaera et al., 2002).

## **MATERIALS AND METHODS**

### **Sample Size:**

In present study sample of 60 infants aged 5 months to 9 months old of both genders were included from Children Hospital and Institute of Child Health, Lahore. This research was conducted after taking formal approval of ethical committee, PGMI and Children Hospital, Lahore. A formal consent was taken from parents/ guardians of infants

### **Procedure:**

60 infants were selected as per selection criteria already approved from Advanced Board, University of Health Sciences Lahore among those who attended the Children Hospital, Lahore accompanied by their parents/ guardian. In order to collect data; a form was especially designed for research. Data was collected from medical records, immunization records and pediatric records. Out of 60 infants, 30 were full-term. These full-term infants were divided into further two groups, out of which 15 were of birth weight more than 2500 grams, while rest of 15 were of low birth weight that is less than 2500 grams. Further 30

infants were selected to be checked which were all preterm. They were further divided into two subgroups .one group of 15 infants were having birth weight more than 2500 grams while rest of 15 had low birth weight.

### Dental Check Up:

History of all infants was taken using predesigned Proforma. The oral cavity of infants was first being examined at the age of 6 months. Oral cavity was examined by operator with sterilized gloves and dental instruments. Infants were being seated in the laps of their mothers, on dental chair under proper light. There was dental examination of all individuals after every 15 days till there was evidence of eruption of incisal edge of first primary mandibular central incisor tooth. Time of eruption (in months) of the first erupted mandibular deciduous incisor tooth whether it is left or right, was noted for the study.



**Figure -1: Showing eruption of P and O.**

### STATISTICAL ANALYSIS

The data was entered and analyzed using SPSS 20 Mean  $\pm$  S.D will be given for quantitative variables. ANOVA test was applied to observe the mean differences among normal and late groups at different

weeks. P-Value of  $< 0.05$  was considered statistically significant.

### RESULTS

Out of 60 infants, 30 were full-term. These full-term infants were divided into further two groups, out of which 15 were of birth weight more than 2500 grams, while rest of 15 were of low birth weight that is less than 2500 grams. Further 30 infants were selected to be checked which were all preterm. They were further divided into two subgroups. One group of 15 infants were having birth weight more than 2500 grams while rest of 15 had low birth weight.

Time of eruption was compared by ANOVA between and within groups. According to multi-comparisons time of eruption of P, group 1A was earlier when compared with other groups. Comparison of group 1 A with rest of groups was statistically significant ( $P < 0.05$ ). When group 1B was compared with groups 1 A, 2 A and 2 B, statistically the difference was significant ( $P < 0.05$ ). Similarly, comparison of group 2 A and group 2 B was significant ( $P < 0.05$ ) with rest of groups [Table-2& 2a].

Time of eruption of O of preterm weight less than 2500gm (group 2B) was more than all the groups. Time of eruption of O of 1A was statistically significant when compared with group 2 A and 2 B but not significant with group 1B (p-value 0.723). Similarly, when group 1 B was compared with rest of groups, difference was statistically significant with group 2 A and 2 B ( $P < 0.05$ ) but not significant with group 1 A (p-value 0.723) [Table-3 and 3a].

**Table - 1: Showing details of neonatal groups.**

GROUPS	NUMBER OF NEONATES	REMARKS
1A	15	Full-term with weight more than 2500 gm.
1B	15	Full-term with weight less than 2500 gm.
2A	15	Preterm neonates with weight more than 2500 gm.
2B	15	Preterm neonates with weight less than 2500 gm.

**Table -2: Comparison of time of eruption of P.**

Groups	Mean	Std. Deviation	95% Confidence interval for mean		Min.	Max.
			Lower Bound	Upper Bound		
1 A	6.90	.2236	6.622	7.178	6.5	7.0
1B	7.67	.2582	7.396	7.938	7.5	8.0
2 A	8.75	.2739	8.463	9.037	8.5	9.0
2 B	9.08	.5845	8.470	9.697	8.0	9.5
<b>Total</b>	<b>8.15</b>	<b>.9346</b>	<b>7.748</b>	<b>8.556</b>	<b>6.5</b>	<b>9.5</b>

**Table -2a: Comparison of time of eruption of P (ANOVA)**

	Sum of squares	Df	Mean square	F	Sig.
Between groups	35.383	3	11.794	161.05	<0.001
Within groups	4.100	56	0.73		
Total	39.483	5			

**Table-3: Comparison of time of eruption of O.**

Groups	Mean	Std. Deviation	95% Confidence interval for mean		Min.	Max.
			Lower Bound	Upper Bound		
1 A	7.80	0.2739	7.46	8.14	7.5	8.0
2 A	8.17	0.2582	7.90	8.44	8.0	8.5
1 B	9.42	0.4916	8.90	9.93	9.0	10.0
2 B	9.83	0.4082	9.41	10.26	9.0	10.0
Total	8.85	0.9224	8.45	9.25	7.5	10.0

**Table-3a: Comparison of time of eruption of O(ANOVA).**

	Sum of squares	Df	Mean square	F	Sig.
Between groups	27.443	3	9.144	48.008	<.005
Within groups	10.667	56	.190		
Total	38.100	59			

**DISCUSSION**

In this study eruption time of primary mandibular central incisors (P and O) was observed. Among full term infants with birth weight more than 2500 gms (1 A group) mean eruption time of P and O was  $6.9 \pm 0.22$  and  $7.80 \pm 0.27$  months respectively. Eruption time of P when compared with rest of groups was statistically significant ( $\leq 0.05$ ) but eruption time of O was insignificant when compared with 1 B (p-value = 0.723). Both groups were having full term infant, but difference is birth weight showing that birth weight difference may not be significant in tooth eruption of primary left mandibular central incisor (O). Eruption time of P in preterm infants with birth weight more than 2500 gm (group 2 A) was  $8.75 \pm 0.27$  months and mean eruption time of O was  $9.42 \pm 0.49$  months. Similar results were observed by Wang et al. (2019) in which eruption time of primary mandibular central incisors was almost  $8.4 \pm 1.7$  months. Author suggested nutritional factors and other complications related to prematurity may contribute to delayed eruption ('Effects of Premature Delivery and Birth Weight on Eruption Pattern of Primary Dentition among Beijing Children', 2019). In another study by Poureslami et al. (2015) first eruption tooth was central mandibular incisor and the eruption time was  $6.9 \pm 2.9$  months for girls and  $8.5 \pm 3.2$  months among boys. Mean average eruption time was  $7.8 \pm 3.2$  months as that in present study results depicting changes in the timing of tooth eruption could be due to genetic, rather than environmental factors (Poureslami et al., 2015). Soliman et al. (2011) determined eruption time of deciduous teeth in a cross-sectional study with sample of 1132 infants with age ranging from 4 to 36 months selected from different areas of Egypt. Results described that the mandibular right and left incisor teeth had erupted earlier at a mean of 7.9

months and 8.0 months in girls and boys respectively (Soliman et al., 2011).

In full term infants with birth weight less than 2500 gm (group 1 B), mean eruption time of P and O were  $7.67 \pm 0.26$  and  $8.17 \pm 0.26$  months respectively. Mean eruption time of preterm infants with birth weight lower than 2500 gm (group 2 B) was  $9.08 \pm 0.58$  months (P) and  $9.83 \pm 0.41$  months (O). Khalifa et al. (2014) found that the time of eruption of first deciduous tooth was delayed in low birth weight infants. Results suggested that factors leading to neonatal illness and level of prematurity might had affected timing of primary tooth eruption (Khalifa et al., 2014). Similar finding was observed in a study done by Seow in 1997 who concluded that infants with the lowest birth weight and shortest gestational ages had the lowest rates of dental development (Seow, 1997). Neto and Falcon, (2014) in a longitudinal study having 40 preterm infants of both genders, observed the lower central incisors as first erupted tooth. The average eruption for males and female was  $9.7 \pm 1.9$  and  $9.5 \pm 1.9$  months respectively (F Neto & Falcão, 2014). Results were correlated to present study. Results observed by Wang et al. (2019) were homogeneous with Neto and Falcon, (2014) as eruption time of premature infants was 8.4 months and showed a significant relation between the time of eruption of the first tooth and the birth weight ('Effects of Premature Delivery and Birth Weight on Eruption Pattern of Primary Dentition among Beijing Children', 2019). Total of 148 infants were selected by Sajjadian et al. (2010). Among them 5.5% of infants was less than 2500 grams and 19.9% were above 3500 grams in weight. The mean age of eruption of first tooth (primary mandibular central incisor) was  $7.68 \pm 1.84$  months. In this study it was proved that delayed tooth eruption might be related to birth weight. Reason diagnosed was malnutrition (Sajjadian et al., 2010).

In present study eruption time was also compared among preterm infants relevant to the birth weight. Eruption time of P and O in preterm infants with birth weight less than 2500gm (group 2 B) was  $9.08 \pm 0.58$  months and  $9.83 \pm 0.40$  months and was delayed among all groups. This correlates low birth weight and prematurity to delayed tooth eruption. Neonatal diseases (respiratory distress, prolonged oral intubation, neonatal infection and prematurity) may necessitated NICU (Neonatal intensive care unit) admission and may cause delayed tooth eruption. Malnutrition may also attribute significantly to the time of tooth eruption (Salama et al., 2012).

Dannemiller, (2004) also manifested significant delayed primary tooth eruption in a study including 210 preterm and low birth weight infants and 201 full term infants having weight equal or more than 2500 grams (Dannemiller, 2004). Ramos et al. (2006) examined the effects of birth weight and gestational age of newborn on tooth eruption. They compared the eruption time of the first primary tooth. Groups of infants were preterm infants (<38 weeks) and full-term infants (38 and 42 weeks). Time of eruption of 146 infants was observed, out of which 77 were preterm and 69 were full-term infants with age from 5 to 36 months of both genders. Results proved that tooth eruption was delayed in preterm and very low birth weight infants (Ramos et al., 2006).

## CONCLUSION

Eruption of the primary teeth may be the first step to the development of occlusion. Low birth weight was related to the delayed time of eruption of the first deciduous tooth. Preterm infants were delayed in their first deciduous tooth eruption in comparison to full term infants. There was no significant correlation between gender and time of eruption of the deciduous tooth.

## LIMITATIONS

This study was done in one of the hospitals of Lahore district having subjects from the local community, so it depicts the results for local community and studies may be performed in other districts to justify the outcome. Sample size was also limited making it difficult to generalize the results for whole country.

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