

# The effect of an infant's environmental conditions and state of health on the teething of the primary incisors

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*The objective of this research was to determine the relationship between the time when an infant's first incisor teething occurred, the infant's state of health and selected environmental and living conditions. 483 infants participated in this research and their health development was monitored monthly in a local hospital in Wrocław. The teething of the infants was studied from the time of their birth until the age of 18 months. The descriptions of the infants' living and environmental conditions and their developmental stages were analysed on the basis of 10 standardised characteristics. The results of this study showed that there were strong relationships between the teething of infants' incisors, their living conditions and individual progress in health development.*

**Key words: teething of incisors, infant development**

## INTRODUCTION

This study was conducted to determine whether the environmental conditions of infants and their health development could influence the teething of their primary incisors. The teething of the infants was studied from the time they were born until the age of 18 months. The evaluation of the teething of the primary incisors in their early development was shown to be a very useful characteristic in determining microevolutionary changes such as acceleration and retardation of teething in the stomatognathic system. These changes were influenced by a number of genetic [5] and paragenetic (environmental) factors [8]. However, the paragenetic factors varied and constantly changed throughout the entire period of human growth. Therefore, defining these factors and their impact on the development of teeth in the early phase of ontogenesis may play a crucial role in the process of modifying any malfunctions of the stomatognathic system.

## MATERIAL AND METHODS

The research involved 483 healthy infants (238 boys and 245 girls), who were medically examined every month from birth to the age of 18 months. The medical examination took place in a NZOS general hospital, Wrocław-Psie Pole.

The general evaluation of the infants' living conditions and state of health was based on a modified indicator known as "the favourability of the environment" ( $I_E$ ), which was described and studied by Sawicki [6]. This indicator was defined as the average mean of all of the standardised characteristics of infants such as the social and economic status of the family and general health conditions.

The descriptions of the characteristics of the infants studied are designated by a score of 3 points for each characteristic studied and are summarised in Table 1. The infants' characteristics tested in this study were evaluated as follows:

**Table 1.** Descriptions of infants' characteristics with a designated score of 3 points for each characteristic

Characteristics	Scores		
	1	2	3
Age of infants' parents (years)	18–35	Other than 18–35	N/A <sup>1</sup>
Education of infants' parents	Higher	Secondary	Primary
Occupation of infants' parents	Professional	Non-professional	N/A
Location where infants were raised <sup>2</sup>	City with population over 50,000	Town with population below 50,000	Village
State of health of parents	Other than listed in the score 2	Smoking, chronic illness, harmful working environment	N/A
Breastfeeding and its duration	Only breast feeding	Formula feeding in addition to breast feeding for more than 4 months	Only formula feeding for more than 4 months
Infant state of health	Occasional infection	Frequent illness with antibiotic therapy, chronic illness	N/A
Infant upbringing	By both parents	Other than by both parents	N/A
Number of children in family	1	2	3 and more
Formation of anterior fontanelle	Normal	Not conforming to the norm	N/A

<sup>1</sup>Not applicable, <sup>2</sup>Noise and pollution included

1. Age of parents: from 18 to 35 years — 1 point; other ages — 2 points.
2. Education of parents: higher — 1 point; secondary — 2 points; primary — 3 points.
3. Occupation of parents: professional — 1 point; non-professional — 2 points.
4. Location of infant upbringing (levels of pollution and noise were taken into consideration): city with a population of over 50,000 — 1 point; town with a population of less than 50,000 — 2 points; village — 3 points.
5. Parents' state of health: smoking, chronic illnesses, harmful working conditions — 2 points; all other cases — 1 point.
6. Breastfeeding and duration: only breast feeding — 1 point; formula feeding in addition to breast breastfeeding for more than 4 months — 2 points; formula feeding for more than 4 months — 3 points.
7. Infant's general state of health: occasional infections — 1 point; frequent illnesses with antibiotic therapy, chronic illnesses — 2 points.
8. Infant upbringing — by both parents — 1 point; in other cases — 2 points.
9. Number of children in family: 1 child — 1 point; 2 children — 2 points; 3 and more children — 3 points.
10. Formation of the anterior fontanelle: closing normally — 1 point; not closing normally — 2 points.

All the numerical values from each of the characteristics studied were averaged and the mean for

each characteristic was obtained. In the present study the development of infants' environmental conditions and state of health was analysed in 2 extreme ranges which represented the average of the all the characteristics tested (both positive and negative). The criteria to describe a child's living conditions and state of health were those outlined in the works of Sawicki [6] and Szpringer-Nodzack [7].

## RESULTS AND DISCUSSION

As was expected, the teething of the incisors started from the first lower central incisor, regardless of the gender of the infant (Table 2). No teething of any other incisors was observed at the age of 6 months. The occurrence of first right and left incisor teething for infants at the age of 6 months and with low economic status was 17% and 9% for boys and girls respectively. However, for those with high economic status the occurrence of the first lower incisors was greater at this stage when compared to those of low economic status and reached 22% and 14% for boys and girls respectively. A similar trend was observed for the first and second right and left upper and lower incisors. The results of the present research showed that the time when teething of the primary incisors occurred was inconsistent and varied from individual to individual. It was noticed that the teething of incisors was lower among infants with poor health development and low social and economic status when compared to those with the high social status and a good state of health. Addi-

**Table 2.** Effect of infants' living conditions<sup>1</sup> on the frequency of their primary incisors teething

Month	The order and frequency (in %) in which teething of primary incisors occurred (5)					
	Boys	Economic status <sup>1</sup>		Girls	Economic status <sup>1</sup>	
		Low	High		Low	High
6	First right and first left lower incisors	17	22	First right and first left lower incisor	9	14
7	First right and first left upper incisors Second right and second left upper incisors	13	16	Second right and second left upper incisors First right and first left upper incisors	16	20
8	Second right and second left lower incisors	8	12	Second left and second right lower incisors	10	11

<sup>1</sup>For detailed description of the living conditions and economic status see material and method

tionally, incisor teething in girls was observed during a specific period of time.

There are a limited number of studies on the effect of environmental conditions on the teething of incisors in the early childhood [6]. The results of this study are in agreement with the work of Sawicki [6] who reported that the time and order for the teething of incisors were inconsistent and varied significantly. However, it was postulated that the gender of the child has no significant effect on the teething of primary incisors. There are published studies [1–3, 7] that have shown some variability in the time when the first incisors occur. Bogdanowicz [2] reported that the teething of the first central lower and upper incisors occurred at the age of 7.5 months and the teething of second upper and lower lateral incisors occurred at the age of 11.5 and 13 months, respectively. In the same research [2] the typical duration of primary incisor teething were studied. These periods ranged from 5.5 to 10.0 months for the first central lower incisors; 7.5 to 11.5 months for first central upper incisors; 8 to 14.5 months for second upper lateral incisor and 10–17 months for second lower lateral incisor.

This research demonstrated that infants' living conditions and their health development had a significant effect on the time when the teething of their primary incisors occurred.

## REFERENCES

1. Berkovitz BKB, Holland GR, Moxham BJ (2002) Oral anatomy, embryology and histology. Mosby, Edinburg.
2. Bogdanowicz J (1999) Właściwości rozwojowe wieku dziecięcego 1996. In: Łaska-Mierzejewska T. Rozwój osobniczy człowieka (Ontogeneza). Antropologia, Akademia Wychowania Fizycznego, Warszawa.
3. Malinowski A, Bożiłow W (1998) Podstawy antropometrii. PWN, Warszawa-Łódź.
4. Netter FH (2002) Atlas anatomii człowieka. Urban & Partner, Wrocław.
5. Pelsmaekers B, Loos R, Carels C, Derom C, Vlietinck R (1997) The genetic contribution to dental maturation. *J Dent Res*, 76: 1337–1340.
6. Sawicki K (1988) Charakterystyka środowiska i behawioru bliźniąt wrocławskich. Część 1, Porównanie środowisk, w których wychowywały się bliźnięta mono- i dyzygotyczne. *Materiały i Prace Antropologiczne*, 108: 91–118.
8. Szpringer-Nodzak M (1999) Stomatologia wieku rozwojowego. PZWL, Warszawa.
9. Wolański N (1983) Zmiany środowiskowe a rozwój biologiczny człowieka. Ossolineum, Wrocław.