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AN ERUPTION PATTERN OF DECIDUOUS TEETH IN CHILDREN BORN WITH FETAL MACROSOMIA DURING THE FIRST YEAR OF LIFE

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At the present time, one of the problems of interest in medicine is the study of causes and effects associated with the birth of a child with fetal macrosomia. The fetal macrosomia diagnosis can be made when child's birth weight is equal to or to more than 4,000 g [16].

The number of children born with macrosomia has increased against the background of a general rise in the average weight of the body among the population of economically advanced countries [8,12,15,22]. The children with fetal-macrosomia make up to 20% of the total number of newborns [12,13,15,16]. The fetal macrosomia is known not only due to the immediate consequences but also owing to the long-term effects [26].

The processes of tooth eruption, tooth root formation, and the maturation of the dentogingival complex are the stages of maxillofacial system development, while the terms and patterns of deciduous and permanent tooth eruption are one of the indicators of children's general somatic health [25].

It is known [6] that, at the age of one year, the child should normally have, on average, 8 teeth. Numerous scientific publications prove that the occurrence of tooth eruption in pairs, in specific terms, and in a specific sequence are influenced by a lot of such factors as preterm birth, the course of antenatal period, mother's and father's ages and level of health [21], their diet, and the consequences of past illnesses [10,19]. Gender and race also have an impact.

Breast-feeding, bottle-feeding, or mixed one (the availability or absence of masticatory load) during the first year of child's life is also a known factor impacting the terms of deciduous tooth eruption [1,3]. Regional features are known to occur in the mean terms of deciduous tooth eruption [4].

Our previous investigation [2] has revealed that the birth height-weight parameters significantly influence the terms of deciduous tooth eruption in children in Kharkiv City population, which agree with the results obtained for other areas [18,23,24].

The information in the literature on the terms of deciduous tooth eruption in children born with a body weight high for gestational age is very scarce and contradictory (e.g., [7,14]). Khuraseva [7] has pointed at the existence of delayed deciduous tooth eruption, while some studies (e.g., [14]) emphasize early tooth eruptions in children born with fetal macrosomia.

The fact that a lot of factors influence the terms of tooth eruption results in the deviations from the standard terms of deciduous and permanent tooth eruption both towards early and delayed eruption [19].

It is common to distinguish between the biological and chronologic delay of tooth eruption.

In the case of eruption not taking place in the presence of 2/3 or more of formed tooth's root, the delay is defined as biological. The degree to which the root system is formed is determined by using an X-ray examination, which does not belong to the accepted techniques for examining children during their first years of life [11]. The chronologic delay of deciduous tooth eruption is considered to be an eruption, which occur later than 2 standard deviations from the mean of the norm for eruption time in the population [20,25].

Evidence for deviations from the generally accepted norms of deciduous tooth eruption is the basis for developing preventive programs and determining terms for starting the treatment of maxillofacial area, thereby the chronological norms are used for deciduous teeth.

The facts mentioned above give reasons to consider the study of the terms of deciduous tooth eruption in children born with fetal macrosomia to be relevant.

The aim of this research is to study the impact of body overweight at birth on the dental health of children during their first year of life. The paper deals with the following tasks:
1. The examination the possible reasons for macrosomia in a group of children.
2. The determination of the correlation between the states of a child at birth (macrosomia/normosimia) and terms of deciduous tooth eruption (the delayed/timely/early eruption) expressed in a number of teeth at the age of one year.

The database has been collected at one of the Kharkiv City clinic (Kharkiv City, Ukraine).

Material and methods. A retrospective analysis of medical records of patients in the first department at the 23 Municipal Children's Clinic of Kharkiv City has been carried out. In the course of the study, we have analyzed the medical records of the children born between 2001 and 2013. The medical records have been binned into two groups. The main group is comprised of the medical records of the children born within the normal term range of 37 to 42 weeks' gestation age with fetal macrosomia. The comparison group is comprised of the medical records of the children born within the normal term range of 37 to 42 weeks' gestational age with height and weight that correspond to the gestational terms (fetal normosomia).

The degree of the development of the maxillofacial system is evaluated using the chronological norms of deciduous tooth eruption, specifically, using the number of teeth erupted before the age of one year.

The data from children's development histories for the number of teeth, which they had between the ages of 4 and 12 months, have been analyzed in order to determine the average terms of the commencement of tooth eruption and the average growth rates. These results have been utilized to find the differences in the children with fetal macrosomia and the children born with normal height-weight parameters. To determine the average time of first tooth eruption and deciduous growth rate for each of the groups under study, we have used the hypothesis about a linear dependence between the number of teeth erupted and the age of the child. Processing the data and testing this hypothesis by the multiple linear regression analysis are performed with the STATISTICA 6.0 software package.

Results and their discussion. In total, we have studied 3236 children's medical records, among them 248 (7.66%) medical records of the children born with fetal macrosomia. The medical records of 234 children with fetal normosomia are also studied. Table 1 shows the parameters of the data available for the analysis.

Data on the Pregnancy Number of the Mothers of the Children in the Survey Sample. The main group (data on 240 mothers are available) has 85 (35.4%) children who are born of the first pregnancy, the comparison group (data on 223 mother are available) has 108 (48.4%) children who are born of the first pregnancy. The main group has 67 (27.9%) children who are born of the second pregnancy, and the comparison group has 31 (13.9%) children. The main group has 42 (17.5%) children who are born of the third pregnancy; the comparison group has 31 (13.9%). The main group has 23 (9.6%) children born of the fourth pregnancy, and the comparison group has 12 (5.4%) children born of the fourth pregnancy. The main group has 9 (3.8%) children who are born of the 5th pregnancy, and the comparison group has 9 (4%). The main group has 14 (5.8%) children who are born of the six and higher order pregnancy, and the comparison group has 4 (1.8%) children.

Data on the Labor Number of the Mothers of the Children in the Survey Sample. The information about the number of labors is available for 277 mothers in the main group and for 216 mothers in the comparison group. The main group consists of 123 (54.2%) firstborn children, while the comparison group is comprised of 153 (70.8%) firstborn children. The main group contains 77 (33.9%) second-born children and the comparison group 49 (22.7%).

Eighteen (7.9%) children in the main group and eleven (5,1%) children in the comparison group are born in the third labor. Four (1.8%) children in the main group are born in the fourth labor. Three (1.3%) children in the main group and one child in the comparison is born in the fifth labor.

Table 1. Data on the number of newborns whish take part in the research, the number of children born in specified year, the number of examined medical records for different years and group distribution

Year of birth	Number of children born with macrosomia (boys/girls)	Number of children born with normosomia (boys/girls)	Total number of children born in specified year	Number of examined medical records	Total number of registered children
2001	12 (7/5)	21 (11/10)	426	191	10,141
2002	12 (5/7)	16 (9/7)	434	212	10,200
2003	11 (7/4)	16 (10/6)	425	216	8,801
2004	11 (8/3)	22 (11/11)	411	212	7,200
2005	13 (9/4)	14 (8/6)	419	264	7,149
2006	15 (9/6)	16 (9/7)	388	254	7,168
2007	19 (17/2)	25 (17/8)	394	278	7,088
2008	30 (21/9)	24 (16/8)	424	271	7,213
2009	28 (21/7)	19 (13/6)	389	270	7,005
2010	23(16/7)	16 (11/5)	410	292	7,100
2011	28 (22/6)	16(14/2)	398	313	7,164
2012	27 (11/6)	16 (10/6)	420	337	7,207
2013	19 (11/8)	14 (8/6)	404	296	7,282

Table 2. Statistical data on the gestation duration in the mothers of children with both fetal macrosomia (Main group) and normosomia (Comparison group)

Gestation duration (week)	Mothers in main group (number/%)	Mothers in Comparison group (number/%)
37	1/0.4%	10/4.7%
37–38	1/0.4%	5/2.3%
38	14/6.3%	23/10.7%
38–39	8/3.6%	17/7.9%
39	29/13%	46/21.5%
39–40	24/10.8%	29/13.6%
40	75/33.6%	61/28.5%
40–41	28/12.6%	6/2.8%
41	37/16.6%	15/7%
41–42	4/1.8%	1/0.5%
42	2/0.9%	1/0.5%

In the sixth and higher order labors, two (0.9%) children are born in the main group and two (0.9%) children are born in the comparison group.

The data presented above agree with the results [17] and support their conclusion that the number of pregnancies and labors affects an increase in the probability of delivering a macrosomic baby.

The average value of mother's age in the main group is equal to 28.31±0.65, and 27.28±0.75 in the comparison group. The average value of father's age in the main group is 31.93±0.91, and 30.85±0.98 in the comparison group. Although the average age of parents of children with fetal macrosimia is slightly higher than the average age of parents of children with normosomia, the difference is not reliable.

According to the available data, twenty eight (11.8%) of 237 mothers of children with macrosomia are over 35 years old, while the mothers of children with normosomia are over 35 years old in 23 (10.2%) of 255 cases. Twenty four (11%) of 217 fathers of children in the group with fetal macrosomia are over 40 years old, and 23 (11%) of 209 fathers of children with fetal normosomisa are over 40 years old. Hence, our research do not support the data in [17] that fetal macrosomia occurs more often in children of older parents.

Table 2 shows that the gestation period of mothers in the second group lasted slightly longer than the gestation period of mothers in the second (comparison) group (data are available for 223 mothers in the main group and for 214 mothers in the comparison group).

Sixty four (25.8%) children in the main group and forty two (17.9%) in the comparison group are delivered via a Cesarean section.

Five-minute Apgar scores are available for 224 children in the main group and 200 children in the comparison group. Two (0.9%) children in the main group and four (2%) children in the comparison group have a score of 10. Eighty three children (37%) in the main group and ninety one (45%) children in the comparison group have a score of 9. One hundred and thirty two (59%) children in the main group and ninety four (48%) children in the comparison group have a score of 8. Six (2.7%) children in the main group and six (3%) children in the comparison group have a score of 7. One child (0.4%) in the main group and four (2%) children in the comparison group are have a score of 6. The data show that, on average, children with fetal normosomia are enduring the birth process better rather than the children with fetal macrosomia, which also agrees with other studies (e.g., [17]).

Twenty (0.8%) children in the main group and thirty (1.3%) children in the comparison group are born with perinatal hypoxic-ischemic encephalopathy.

Table 3 shows the total amount of statistical sampling of weight-height parameters in the newborns for both groups and their year of birth.

The statistical data presented above for the 13 year period do not confirm, on average, an increase in the height-weight parameters at birth for children with fetal macrosomia and normosomia, which contradicts other studies [9,12,15].

The expectation of body weight of the children in the main group at birth is equal to 4.19±0.03 kg, and of the children in the comparison group 3.34±0.04 kg. The average value of the newborns height in the main group is 54.79±0.28 cm, and in the comparison group 51.86±0.25 cm. The average value of the head circumference of the children in the main group is 36.3±0.18 cm, and of the children in the comparison group 34.69±0.15cm. The average value of the children chest

Table 3. Average children weight, height, head and chest circumference at birth with both fetal macrosomia and normosomia

Year of birth	Body weight (kg) Macrosomia Normosomia	Height (cm) Macrosomia Normosomia	Head circumference (cm) Macrosomia Normosomia	Chest circumference (cm) Macrosomia Normosomia
2001	4.22 ± 0.14 3.32 ± 0.11	55.5 ± 1.13 51.95 ± 0.98	36.58 ± 0.83 34.71 ± 0.66	36.73 ± 0.61 33.76 ± 0.57
2002	4.21 ± 0.11 3.17 ± 0.44	54.36 ± 1.73 51.13 ± 1.27	36.36 ± 0.86 34.64 ± 0.66	35.73 ± 0.85 34.5 ± 0.84
2003	4.17 ± 0.11 3.29 ± 0.11	55.09 ± 2.09 51.81 ± 1.34	36.13 ± 0.94 34.25 ± 0.67	36.13 ± 0.94 33.29 ± 0.75
2004	4.21 ± 0.18 3.3 ± 0.1	53.45 ± 0.63 51.86 ± 0.73	36.5 ± 0.77 34.65 ± 0.49	35.88 ± 1.04 33.89 ± 0.64
2005	4.14 ± 0.16 3.24 ± 0.1	53.15 ± 1.41 50.93 ± 0.8	36.12 ± 0.65 34.29 ± 0.48	35.85 ± 1.13 33.5 ± 0.44
2006	4.26 ± 0.12 3.41 ± 0.15	55 ± 1.09 52.13 ± 1.18	36.38 ± 1.06 34.93 ± 0.49	36.31 ± 1.09 34.13 ± 0.55
2007	4.2 ± 0.15 3.36 ± 0.08	55.42 ± 1.43 51.83 ± 0.58	36.38 ± 0.85 34.98 ± 0.62	35.88 ± 0.98 33.95 ± 0.7
2008	4.17 ± 0.05 3.42 ± 0.11	54.87 ± 0.86 52.083 ± 0.92	36 ± 0.58 35.18 ± 0.38	35.96 ± 0.42 34.23 ± 0.39
2009	4.19 ± 0.08 3.29 ± 0.14	54.96 ± 0.93 51.84 ± 0.84	36.65 ± 0.42 34.46 ± 0.53	36 ± 0.5 33.75 ± 0.72
2010	4.2 ± 0.08 3.49 ± 0.12	54.74 ± 0.97 52.38 ± 0.93	36.16 ± 0.63 34.43 ± 0.81	35.95 ± 0.52 34.71 ± 0.89
2011	4.13 ± 0.064 3.42 ± 0.14	54.29 ± 0.67 52.56 ± 0.91	36.4 ± 0.65 34.87 ± 0.51	35.9 ± 0.5 34.13 ± 0.51
2012	4.21 ± 0.09 3.31 ± 0.17	54.81 ± 0.76 51.06 ± 0.88	36 ± 0.69 34.32 ± 0.71	36.1 ± 0.59 33.6 ± 0.79
2013	4.2 ± 0.11 3.29 ± 0.18	55.95 ± 0.68 52.36 ± 1.19	36.4 ± 0.5 34.58 ± 0.63	35.87 ± 0.41 33.75 ± 0.67

circumference in the main group is 36±0.18 cm, and of the children in the comparison group 33.96-±0.17cm. The difference in the parameters under consideration for the main group and the comparison group is reliable.

Table 4 shows the weight-height parameters for the same children at the age of one year in each group.

The expected value of body weight for one-year-old children in the main group is 11.2±0.17 kg and 10.36±0.15 kg for children in the comparison group. The average value of children height at the age of one year in the main group is 77.68±0.54 cm and75.96±0.43 cm in the comparison group. The average value of the children head circumference at the age of one year in the main group is 46.89±0.32 cm and 46.29±0.32 cm in the comparison group. The average value of the children chest circumference is 48.29±0.42 cm in the main group, while it is 47.55±0.4 in the comparison group. Hence, the expected value of children height and weight in the main and comparison groups are reliably different, while the difference between average values of head and chest circumference is not perceptible.

The Data on Deciduous Tooth Eruption.

The data on the number of teeth in the 6-month children with fetal normosomia is available in 121 medical records. Twelve (10.7%) records indicate that tooth eruption started at the age of 4.5 – 5.5 months. Sixty two (51.2%) children have not had a single tooth at the age of 6 months.

Two hundred eighteen children with fetal normosomia have data on the number of teeth erupted till the age of 11 – 12 months, among them 188 (86.%) children have 6 – 10 teeth at the age of one year, which is considered normal, and only five (2.3%) children with fetal normosomia have two teeth at the age of one year. Four (1.8%) children have eleven or more teeth. According to [5], the acceleration of child development leads to early deciduous tooth eruption in the generation of healthy children, which does not agree with this study.

The data on the number of teeth at the age of 6 months are available for 121 children with fetal macrosomia. Among them, eight (6.6%) children have tooth eruption started at the age of 4-5 months. Till the age of 6 months, eighty five (70.2%) children have not had a single tooth.

Data on the number of teeth at the age of 11-12 months are available for 125 children with fetal macrosomia. One hundred (65,4%) children have 6-10 teeth at the age of 11-12 months, four (2.6%) children have not a single tooth at the age of one year, and three (2%) children with fetal macrosomia have 2 teeth at the age of 1 year. Five (3.3%) children have 11 or more teeth at the age of one year.

To determine the difference between macrosomic and normosomic children in the average time of *first tooth eruption* and the deciduous teeth growth rate, the children's medical record data on the number of teeth that the children have at the age of 4 to 12 month have been analyzed. The parameters of the linear regression models that predict the number of teeth at a certain age have been calculated. The data on girls and boys are calculated separately.

Table 5 shows the amount of statistical data for children with both fetal macrosomia and normosomia at birth.

The number of records for macrosomic vs normosomic boys and for macrosomic vs normosomic girls shows a variation that does not exceed a factor of 3in all age groups under consideration.

Table 4. Average children weight, height, head and chest circumference at the age of one year for children with both fetal macrosomia and normosomia at birth

Year of Birth	**Body weight (kg)** **Macrosomia** **Normosomia**	**Height (cm)** **Macrosomia** **Normosomia**	**Head circumference (cm)** **Macrosomia** **Normosomia**	**Chest circumference (cm)** **Macrosomia** **Normosomia**
2001	11.65 ± 0.63 10.36 ± 0.52	80 ± 3.03 76.06 ± 1.78	47.5 ± 1.45 46.26 ± 1.01	50 ± 1.88 46.59 ± 1.46
2002	11.07 ± 0.66 10.39 ± 0.74	76 ± 4.79 76 ± 1.26	46.9 ± 2.14 46.15 ± 1.13	48.13 ± 2.09 46.9 ± 1.79
2003	11.16 ± 1 10.43 ± 0.62	76 ± 4.5 76.12 ± 1.55	47.33 ± 2.87 46.42 ± 1.28	49.67 ± 7.99 48.27 ± 1.3
2004	10.91 ± 0.73 10.68 ± 0.48	77 ± 1.55 76.06 ± 1.9	48.44 ± 3.54 46.72 ± 0.62	48.5 ± 3.9 48.91 ± 1.38
2005	11.63 ± 0.85 10.42 ± 0.69	79.83 ± 2.71 75.33 ± 2.21	47.63 ± 2.71 46.13 ± 0.88	49.89 ± 2.79 48.63 ± 1.39
2006	11.99 ± 1.64 10.49 ± 0.7	78.13 ± 4.59 74.4 ± 1.66	47 ± 1.63 45.75 ± 2.19	49.33 ± 2.45 47.3 ± 3.65
2007	11.45 ± 0.55 10.47 ± 0.62	78.95 ± 1.61 76.61 ± 1.81	47.18 ± 1.08 46.94 ± 0.81	48.55 ± 1.14 47.31 ± 0.82
2008	11.1 ± 0.5 10.27 ± 0.46	76.83 ± 1.81 75.58 ± 1.25	46.81 ± 1.14 46.69 ± 1.87	47.75 ± 1.09 47.31 ± 1.26
2009	11.2 ± 0.55 9.96 ± 0.57	77.63 ± 2.06 77.04 ± 1.46	46.31 ± 1.24 46.13 ± 1	48.31 ± 1.64 47.13 ± 1.18
2010	11.42 ± 0.47 10.48 ± 0.53	78.06 ± 1.68 75.46 ± 1.38	47.28 ± 0.84 45.42 ± 2.19	48.84 ± 0.92 46.8 ± 1.57
2011	10.92 ± 0.44 10.13 ± 0.96	77.11 ± 0.96 76.9 ± 2.37	46.36 ± 0.63 46.4 ± 1.48	47.11 ± 1.46 47.35 ± 2.15
2012	10.98 ± 0.66 9.75 ± 0.48	77.24 ± 2.02 75.44 ± 1.44	46.65 ± 0.76 45.72 ± 1.39	47.14 ± 1.05 46.94 ± 1.25
2013	10.69 ± 0.74 10.67 ± 0.64	77.27 ± 1.85 75.9 ± 1.04	46.09 ± 0.97 46.5 ± 0.88	47.91 ± 1.23 48.44 ± 1.04

Table 5. Summarized data on the amount of statistics for children with both fetal macrosomia and normosomia at birth

Groups	**Macrosomia**		**Normosomia**	
Participants	Boys	Girls	Boys	Girls
Total number of medical records	168	83	147	88
Number of data in medical records for 4–12-month-old children	606	272	541	296
Number of data in medical records for 4-month-old children	53	-	-	-
Number of data in medical records for 5-month-old children	53	33	46	21
Number of data in medical records for 5.5-month-old children	52	32	45	22
Number of data in medical records for 6-month-old children	77	40	81	33
Number of data in medical records for 7-month-old children	69	37	58	39
Number of data in medical records for 8-month-old children	58	27	46	31
Number of data in medical records for 9-month-old children	62	24	54	31
Number of data in medical records for 10-month-old children	52	27	49	25
Number of data in medical records for 11-month-old children	46	15	38	19
Number of data in medical records for 12-month-old children	84	37	124	75

The straight lines obtained from the regression analysis are as follows:

$z = (0.939 \pm 0.030)\, n - (4.891 \pm 0.246)$
(1)
for boys with fetal macrosomia,

$z = (1.039 \pm 0.027)n - (5.451 \pm 0.242)$
(2)
for boys with fetal normosomia,

$z = (0.894 \pm 0.043)n - (5.077 \pm 0.356)$
(3)
for girls with fetal macrosomia,

$z = (1.009 \pm 0.037)n - (5.519 \pm 0.338)$
(4)
for girls with fetal normosomia,

where z is the number of the teeth, n is the age of the corresponding children in months.

The coefficients of determination have turned to be sufficiently large and to vary in the range of 0.61 – 0.73, which shows that the relationship between the dependent variable (number of teeth) and the predictor (age) is adequately represented by the linear regression.

The third row in Table 6 shows the average age (i.e., n) until the child has no teeth, which is estimated from Equations (1 – 4) for z = 0.

Table 6. Multiple linear regression analysis of the data on the children with both fetal macrosomia and normosomia at birth

Groups	**Macrosomia**		**Normosomia**	
Participants	Boys	Girls	Boys	Girls
n, month (average age the child has no teeth, month)	5.21 ± 0.43	5.68 ± 0.67	5.24 ± 0.37	5.47 ± 0.54
Teeth growth rate, teeth per month	0.939 ± 0.030	0.894 ± 0.037	1.039 ± 0.027	1.009 ± 0.037
Average age the child has 1 tooth, month	6.15 ± 0.46	6.57 ± 0.71	6.28 ± 0.4	6.48 ± 0.58
Average number of teeth at the age of one year	6.34 ± 0.61	5.65 ± 0.87	7.02 ± 0.57	6.59 ± 0.78

The fourth row in Table 6 shows the average teeth growth rate (coefficient at n) in Equations (1 – 4).
The fifth row in Table 6 shows average age (i.e., n) of the child when they have one tooth (z = 1 in Equations (1 – 4)).
The sixth row in Table 6 shows the average number of teeth at the age of one, which is estimated from Equations (1 – 4), i.e., z for n = 12.

All estimates in Table 6 are presented with the corresponding 0.95 confidence intervals.

The estimates in the third row in Table 6 suggest that children usually have no teeth before the first or second week in the sixth month of their life, and the boys usually have the time of first tooth eruption slightly earlier than the girls, yet this estimate is not reliable because it falls within the confidence interval. The difference between the age when the first tooth eruption occurs in the children of the same gender with fetal macrosomia and in the same children with fetal normosmia is considerably lower than the difference for the same children of opposite gender.

Consider the differences in the teeth growth rate in the girls and boys with both fetal macrosomia and normosomia at birth. Table 6 (forth row) shows that the difference in the teeth growth rate in the boys and girls with macrosomia or normosomia is insignificant: the rate for the boys is slightly higher than for the girls although the difference is above a significance level of 0.05. The teeth growth rate in the boys (girls) with macrosomia is less than the teeth growth rate in the boys (girls) with normosomia, and the difference of approximately 0.1 teeth per month is below a significance level of 0.05.

Table 6 (fifth row) shows that the average age when the child has 1 tooth falls within the 6.15 – 6.57 months range when the 0.95 confidence intervals overlap.

Table 6 (sixrth row) shows that the average number of teeth at the age of one year in the boys (girls) with macrosomia is less approximately by 1 tooth than the average number of teeth at the age of one year in the boys (girls) with normosomia, although the 0.95 confidence intervals overlap.

The difference between the number of teeth observed and the number of teeth determined from the regression model (residual) is a random variable. The normal distribution of these residuals is a necessary and sufficient condition for the regression analysis to be applied correctly. The data are binned with regard to the residuals and the corresponding histograms have been computed and analyzed. Figure 1 and Figure 2 show the histograms for girls and boys, respectively.

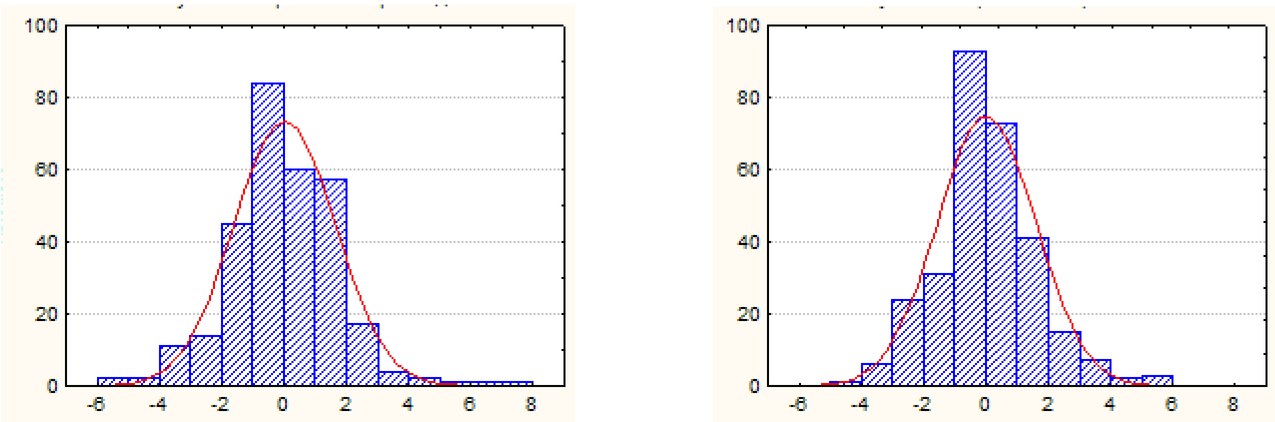

Fig. 1. Residual distribution for macrosomic girls (left panel) and normosomic girls (right panel)

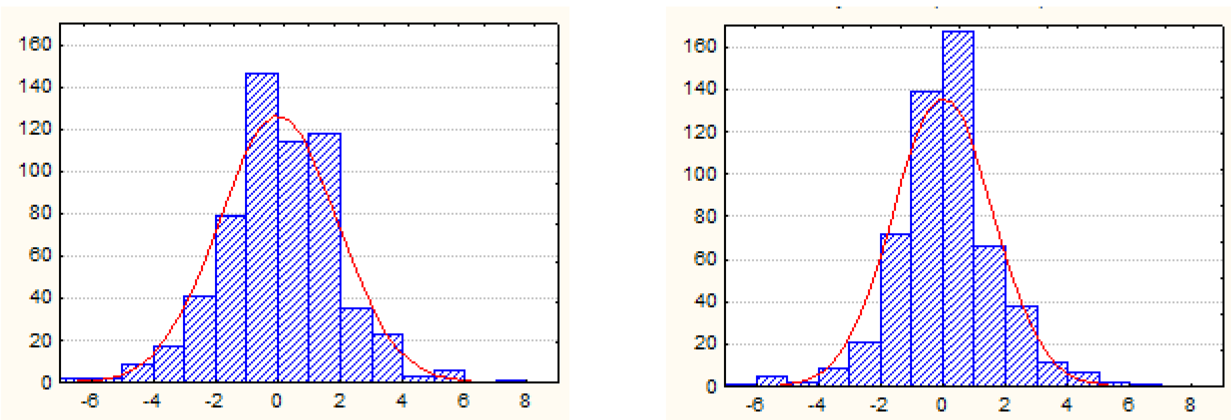

Fig.2. Residual distribution for macrosomic boys (left panel) and normosomic boys (right panel)

The left panels in Figures 1 and 2 show histograms for children with fetal macrosomia, and the right panels for children with fetal normosomia. The red lines in the panels represent expected normal distributions of the residuals. The chi-square goodness-of-fit test has shown that our sample of data has a normal distribution with a significance level of 0.05. This result also confirms the applicability of the regression analysis in our case.

Nevertheless, it is necessary to mention that there is a difference between histograms showing the distributions of the residuals obtained for the children with fetal macrosomia and for the children with fetal normosomia. Specifically, the standard deviation for macrosomic boys and girls is greater than for normosomic boys and girls, and a second maximum appears in the histogram for macrosomic girls.

The latter can suggest that the processes acting intrauterinely exert their effects and result in macsomia due to either the intrauterine obesity, or greater intrauterine body growth rate, or a balanced increase in intrauterine body weight and height.

Hence, this retrospective statistical study shows the existence of particularity in the process of odontogenesis in both girls and boys born with fetal macrosomia.

Altogether, the study requires an increase in statistical data to clarify particular properties and to find new features in the processes that are associated with high body weight at birth.

Conclusions.

1. This study have confirmed that the number of pregnancies and deliveries influence the likelihood of having a child with fetal macrosomia. At the same time, evidence for a greater likelihood of having a child with fetal macrosomia in the older parents has not been found.
2. The data analyzed do not confirm an increase in height-weight parameters at birth for children with fetal macrosomia and normosomia when averaged over a period of 13 years.
3. The difference in the expectations of height and weight for the children in the macrosomic and normosomic groups remains reliable until the age of one year, while the difference observed in the averaged values of children's chest and head circumference at the age of one year is not reliable.
4. The retrospective statistical study has also shown that fetal macrosomia leads to the disruption in the development of the maxillofacial system. Children born with fetal macrosomia have, on average, a lower rate of teeth growth and a greater spread in the number of teeth that have erupted by a certain age.

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SUMMARY

AN ERUPTION PATTERN OF DECIDUOUS TEETH IN CHILDREN BORN WITH FETAL MACROSOMIA DURING THE FIRST YEAR OF LIFE

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The paper aims at studying the effect of body overweight at birth on the dental health of 482 children in the Kharkiv City (Ukraine) during their first year of life over the 2001 and 2013 interval.

The macrosomia set is comprised of the medical records of the children born with fetal macrosomia, and the normosimia set of the medical records of the children born with weight and height that correspond to the gestation age. The gestation age of all children is 37 to 42 weeks'.

To determine the average time of first tooth eruption and deciduous teeth growth rate for each of the sets under study, we have used the hypothesis about a linear dependence between the number of erupted teeth and the age of the child.

Processing statistical data is performed applying the multiple linear regression analysis.

The reasons for macrosomia in the children are examined. The number of pregnancies and deliveries influence the likelihood of having a child with fetal macrosomia. A greater likelihood of having a child with fetal macrosomia in the older parents is not found.

The correlation between the states of a child at birth (macrosomia/normosimia) and terms of deciduous tooth eruption (the delayed/timely/early eruption) expressed in a number of teeth at the age of one year is determined.

The difference in the teeth growth rate between the boys and girls within the both sets are insignificant. The children born with macrosomia have a lower rate (approximately 0.1 tooth per month) of teeth growth and a greater spread in the number of teeth that erupt by a certain age.

Keywords: fetal macrosomia, deciduous tooth eruption time.

РЕЗЮМЕ

ОСОБЕННОСТИ ПРОРЕЗЫВАНИЯ ВРЕМЕННЫХ ЗУБОВ У ДЕТЕЙ ПЕРВОГО ГОДА ЖИЗНИ, РОЖДЕННЫХ С МАКРОСОМИЕЙ

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Целью исследования явилось изучение влияния избыточного веса тела при рождении (макросомии) на процесс прорезывания зубов в течение первого года жизни у детей Харьковской популяции. Одна из задач исследования – изучение причин, приведших к макросомии, а также определение корреляции между статусом ребенка при рождении (макросом или нормосом) и сроками прорезывания временных зубов (раннее, запаздывающее или своевременное), которые отражаются на числе зубов ребенка в возрасте одного года.

Статистический материал собран в №23 городской детской клинике г. Харькова. Проанализировано

482 истории развития детей, рожденных в период 2001-2013 гг. Основную группу составили записи из медицинской документации детей, рожденных в срок (гестационный возраст от 37 до 42 недель) с макросомией плода. Группа сравнения состоит из медицинской документации детей, рожденных в срок, однако с нормальными для гестационного возраста (нормосомия) массо-ростовыми параметрами. Для определения средних сроков прорезывания первого зуба, а также средней скорости роста зубов для каждой из исследуемых групп использована гипотеза о том, что после начала прорезывания число прорезавшихся зубов линейно зависит от возраста ребенка. Обработка статистических данных и проверка состоятельности гипотезы осуществлены с использованием программного пакета STATISTICA 6.0 (модуль “множественная регрессия”).

Результаты исследования показали, что с увеличением количества беременностей и родов матери увеличивается вероятность рождения ребенка с макросомией. Данные о том, что ребенок-макросом чаще рождается у родителей старшего возраста результаты проведенного исследования не подтвердили.

Разница между темпами роста зубов у мальчиков и девочек как в группе макросомов, так и в группе нормосомов незначительна. Дети, рожденные с макросомией плода, имеют в среднем более низкую скорость роста зубов (приблизительно на 0,1 зуба в месяц) в сравнении с детьми соответствующего пола, однако с нормальными массо-ростовыми параметрами при рождении. У них также наблюдается больший разброс в количестве прорезавшихся к определенному возрасту временных зубов.

რეზიუმე

დროებითი კბილების ამოჭრის თავისებურება მაკროსომიით დაბადებულ წლამდე ასაკის ბავშვებში

ო. გარმაში

ხარკოვის ეროვნული სამედიცინო უნივერსიტეტი, თერაპიული სტომატოლოგიის კათედრა, უკრაინა

კვლევის მიზანს წარმოადგენდა დაბადებისას ჭარბი წონის (მაკროსომია) გავლენის შეფასება დროებითი კბილების ამოჭრის პროცესზე ხარკოვის პოპულაციის ბავშვებში. კვლევის ერთ-ერთ ამოცანას შეადგენდა მაკროსომიის გამომწვევი მიზეზების განსაზღვრა, აგრეთვე, კორელაციის გამოვლენა დაბადების დროს ბავშვის სტატუსის (მაკრო- თუ ნორმოსომია) და დროებითი კბილების ამოჭრის ვადებს (ნაადრევი,დაგვიანებული თუ დროული) შორის,რაც აისახება კბილების რაოდენობაზე წლამდე ასაკის ბავშვებში.

სტატისტიკური მასალა შეგროვილია ქ. ხარკოვის ბავშვთა №23 კლინიკაში; გაანალიზებულია 2001-2013 წწ. დაბადებული ბავშვების განვითარების 482 ისტორია. ძირითადი ჯგუფი შეადგინა დროულად დაბადებულმა ბავშვებმა (გესტაციის ასაკი - 37-42 კვირა) დაბადებისას მაკროსომიით,შედარების ჯგუფი შეადგინა დროულად დაბადებულმა ბავშვებმა გესტაციის ასაკისთვის ნორმალური წონა-სიგრძის პარამეტრებით (ნორმოსომია).

პირველი კბილის ამოჭრის და მისი ზრდის სიჩქარის საშუალო ვადების განსაზღვრის მიზნით ორივე ჯგუფში გამოყენებული იყო ჰიპოთეზა,რომ კბილთა ამოჭრის დაწყების შემდგომ მათი რაოდენობა ხაზოვან დამოკიდებულებაშია ბავშვის ასაკთან.

სტატისტიკური მონაცემების დამუშავება და ჰიპოთეზის სარწმუნოობის შემოწმება განხორციელდა პროგრამული პაკეტით STATISTICA 6.0 (მოდული “მრავლობითი რეგრესია”).

კვლევის შედეგებმა აჩვენა,რომ დედის ორსულობის და მშობიარობის რიცხვის ზრდასთან ერთად მატულობს ბავშვის მაკროსომიით დაბადების ალბათობა. მონაცემი იმის შესახებ, რომ ბავში მაკროსომიით უფრო ხშირად იბადება ასაკოვანი მშობლების შემთხვევაში,წარმოდგენილ კვლევაში არ დადასტურდა.

განსხვავება კბილების ზრდის ტემპში ბიჭებსა და გოგონებს შორის როგორც მაკროსომთა,ასევე ნორმოსომთა ჯგუფში უმნიშვნელოა. მაკროსომიით დაბადებულ ბავშვებს შედარებით იგივე სქესის და წონა-სიგრძის ნორმალური პარამეტრების ბავშვებთან ახასიათებს კბილების ზრდის ნაკლები სიჩქარე (დაახლოებით თვეში 0,1 კბილით) და გარკვეული ასაკის მიღწევისას განსხვავება ამოჭრილი კბილების რაოდენობაში.