

## Basic Body Diameters and Their Proportions of Newborns in Sofia during 2001

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In the present study data about basic body diameters and their proportions in newborns are analyzed and the sexual differences are estimated as well. During the period of April — May 2001 a total of 219 full-term (38 — 42 G.W.) and healthy newborns (110 boys and 109 girls) are studied in the first 24 hours after birth. Seven body diameters are measured by the standard method and their proportions are calculated. The metrical data show that boys have bigger sizes of biacromial and pelvis diameters and proportional wider shoulders and pelvis than girls. The newborn boys and girls didn't differ significantly according to the two chest diameters, although the girls have wider chest and boys have deeper chest.

*Key words:* newborns, body diameters, proportions of body diameters.

### Introduction

Body diameters are a group of anthropometrical features characterizing body development and massiveness of different body parts: shoulders, chest, and pelvis. The body proportions give general notion about body physical type and its growth changes.

The aim of the present study is to analyze the basic body diameters and their proportions of newborns in Sofia at the beginning of the 21<sup>st</sup> century.

### Material and Methods

The present data are a part of detailed anthropological investigation, carried out during April-May 2001. The study includes 219 full-term and healthy newborns (110 boys and 109 girls). Thirty-eight anthropometrical features are measured in the first 24 hours after birth by Martin-Saller's classical method [1]. Data about seven diameters and their proportions are presented below.

The sexual differences are assessed by the Student's t-test ( $P < 0,05$ ) and by the Index of sexual differences ( $ISD = X_{\text{♀}} \times 100 / X_{\text{♂}}$ ).

For the estimation of secular changes of body structure in newborns during the past century are used the data of S l a n c h e v et al. [2] and T z i r o v s k i [3].

The statistical analysis of the data is made by SPSS program.

## Results and Discussion

The results obtained by the variation-statistical analysis are presented in Table 1 and Fig. 1.

Table 1. Basic body diameters of newborns in Sofia

Anthropometrical features	Boys (n = 110)		Girls (n = 109)		t ♂/♀	ISD (%)
	mean	SD	mean	SD		
Biacromial breadth	11.99	0.70	11.80	0.63	2.1*	98.42
Chest breadth	9.41	0.58	9.48	0.57	0.88	100.74
Chest depth	8.96	0.50	8.90	0.46	1.0	99.33
Waist breadth	10.55	0.73	10.53	0.67	0.21	99.81
Bicristal breadth	8.88	0.53	8.76	0.54	1.5	98.65
Bispinal breadth	7.98	0.54	7.85	0.43	1.91	98.37
Bitrochanterian breadth	9.37	0.57	9.30	0.46	0.94	99.25

\* Statistically significant differences ( $P < 0.05$ )

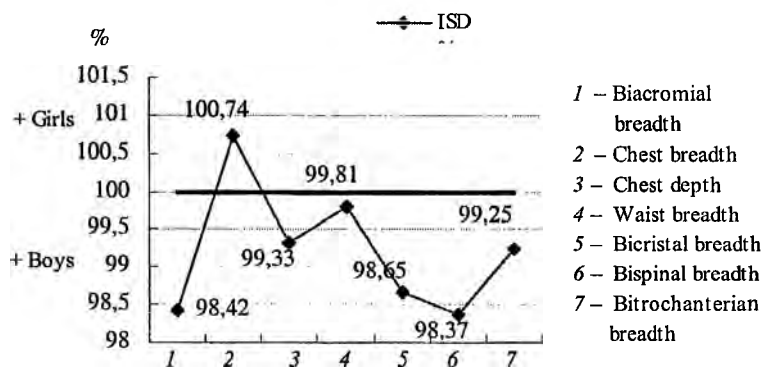


Fig. 1. Sexual differences in the basic diameters of newborns, according to the ISD data

The data of biacromial diameter give information about structure and massiveness of shoulders. The newborn boys have significantly wider shoulders with 0.19 cm or 1.58 % than the newborn girls.

The newborn boys and girls have approximately equal mean values of the two chest diameters (chest breadth and chest depth), that define child configuration of the chest typical for this period of postnatal ontogenesis. Nevertheless, the newborn girls have wider chest with 0.07 cm than the newborn boys, who have, however, deeper chest with 0.06 cm. The newborn boys and girls didn't differ significantly, as well in regard to the rate of waist breadth, although the boys have wider waist with 0.19 %, according to the ISD data.

The data about bicristal, bispinal and bitrochanterian diameters characterize the massiveness of pelvis and show presence of sexual dimorphism even at birth. The sizes of bicristal and bispinal diameters in newborn boys are bigger with 0.12 cm and 0.13 cm, respectively. According to the ISD data, the boys' pelvis is wider than the girls' one with 1.35 % (bicristal area) and 1.63 % (bispinal area). The bitrochanterian diameter is the widest from the external pelvis diameters. The newborns from both sexes have approximately equal sizes of this diameter, as difference between them is only 0.75 %.

The body proportions show the ratios between absolute values of every anthropometrical feature and stature. They characterize the proportionality in body structure.

The data about biacromial breadth proportions show that the newborn boys have relatively wider shoulders with 0.17 index units (IU) (ISD = 0.72 %) than the newborn girls, but the sexual differences are not statistically significant. According to the Brugsch' categorization [1], more than a half of boys (69.06 %) and girls (81.65 %) fall into category of individuals with wide shoulders. In regard to proportion of chest breadth, the girls have relatively ( $P < 0.05$ ) wider chest than boys with 0.30 IU, or with 1.61 % according to the ISD (Table 2, Fig. 2).

Regarding the rest four proportions the sexual differences are not significant. The chest depth and waist breadth are relatively bigger with 0.04 IU and 0.14 IU in the newborn girls, while the newborn boys have relatively wider pelvis approximately with 0.11 IU. According to the Brugsch' categorization [1] about bicristal diameter is established that 46.36 % of boys fall into the category "wide pelvis", 44.55 % – into the category "middle pelvis" and only 8.18 % – into the category "narrow pelvis". From the girls 54.13 % fall into the category "narrow pelvis", 30.28 % – into the category "middle pelvis", and 15.60 % – into the category "wide pelvis". In regard to the bitrochanterian diameter the girls have priority with 0.11 % (Table 2, Fig. 2).

Table 2. Proportions of body diameters of newborns in Sofia

Body proportions of	Boys (n = 110)		Girls (n = 109)		$\sigma/\delta$	ISD (%)
	mean	SD	mean	SD		
Biacromial breadth	23.73	1.20	23.56	1.21	1.06	99.28
Chest breadth	18.61	1.01	18.91	1.02	2.21*	101.61
Chest depth	17.72	0.89	17.76	0.84	0.30	100.23
Waist breadth	20.86	1.31	21.00	1.17	0.84	100.67
Bicristal breadth	17.57	0.88	17.47	0.96	0.82	99.43
Bispinal breadth	15.78	0.93	15.67	0.80	0.96	99.30
Bitrochanterian breadth	18.54	0.91	18.56	0.87	0.21	100.11

\* Statistically significant differences ( $P < 0.05$ )

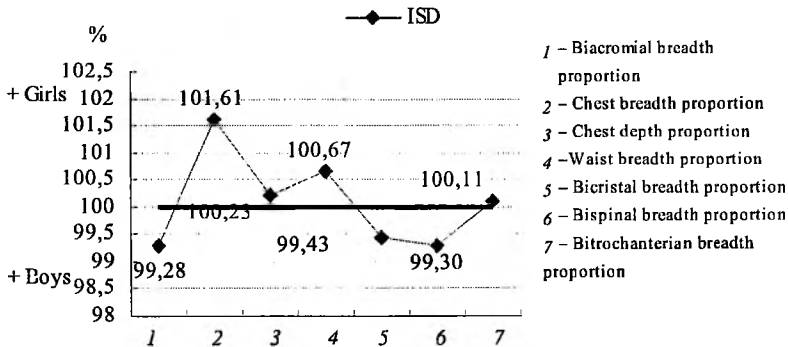


Fig. 2. Sexual differences in the proportions of basic diameters of newborns, according to the ISD data

The data about secular changes of the sizes of diameters and their proportions in the newborns show that boys and girls born in 2001 have significantly narrower chest and bitrochanterian breadths, and relatively wider biacromial diameter than the generation born during the period 1980-1982 [2]. The newborns in 2001 have significantly bigger sizes of chest, pelvis and shoulders compared to the newborns from Plovdiv during the period 1968-1986 [3].

## Conclusions

The results obtained show that even at birth exist sexual differences in body dimensions and structure of newborns similar to those in adults.

- The newborn boys have bigger sizes of biacromial and pelvis diameters and proportional wider shoulders and pelvis than girls.
- The newborn boys and girls didn't differ significantly according to the two chest diameters, although the girls have wider chest and the boys have deeper chest.
- The boys and girls born in 2001 have narrower chest and pelvis and relatively wider biacromial diameter compared to the boys and girls born in Sofia during the period 1980-1982 and wider chest, pelvis and shoulders compared to the generation born during the period 1968-1986.

## References

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