Absolute content of bone component in the body of Kyrgyz children with different somatotypes in the early childhood

Abstract. Background. Improving pediatric observation globally and in Kyrgyzstan is essential for early detection of developmental issues and monitoring normal physical parameters. The purpose of the study was to investigate the indicators of bone composition in children of Kyrgyz nationality of both sexes in the early childhood period. Materials and methods. To achieve the goal, 800 children from 4 to 7 years old were examined using anatomical-anthropometric and bioimpedance methods. Results. It was revealed that the absolute content of bone component in male respondents at the age of 4 years ranges from 3.24 to 5.17 (4.10 ± 0.01) kg, 5 years — from 3.27 to 5.81 (4.26 ± 0.01) kg, 6 years — from 3.34 to 5.87 (4.39 ± 0.01) kg and 7 years — from 3.23 up to 6.02 (4.59 ± 0.01) kg. The absolute index of the bone component in 4-year-old girls has an individual variability of 3.04–5.17 (3.97 ± 0.01) kg, 5-year-old — 3.27–5.61 (4.20 ± 0.01) kg, 6-year-old — 3.34–5.77 (4.34 ± 0.01) kg and 7-year-old — 3.43–6.02 (4.40 ± 0.01) kg. Conclusions. The highest bone content was found in individuals with muscular somatotype, while the lowest values were in asthenoid and thoracic somatotypes for both males and females. Boys had higher bone component index at ages of 4 and 7.

Keywords: postnatal ontogenesis; physical development; pediatric observation; age norms of development; anthropometry; bioimpedance examination

Introduction

High-quality pediatric practice is an obligatory link between primary and secondary medical care in the country, the purpose of which is maintaining the normal physical (PD), mental, and social development of the child, early detection of pathologies, and quality management of patients at all stages of treatment. To date, the protocols for the management of pediatric patients lack a single standard and mandatory studies to assess the overall physical development of the body [1]. General clinical recommendations include a wide range of possible physical and instrumental techniques, but the scope and completeness of their use depends on the individual decisions and approaches of the doctor in charge [1–3]. Basic parameters, according to H. Vlaardingerbroek et al. [4], still remain the measurement of body weight, height, chest and limb circumference, which rarely include ethnicity. Thus, the development of new supplemented protocols for conducting pediatric monitoring of the development of a child’s somatic status is an urgent issue in pediatric practice, especially considering ethnicity. In Kyrgyzstan, improving pediatric surveillance is relevant from the standpoint of early detection of congenital hypothyroidism due to wide endemic regions [5], ethnic characteristics of populations living in high-altitude areas and in order to improve the hygienic control of school-age children in the public health system [6, 7]. According to statistics, effective screening of physical development of pediatric patients within the framework of state programs increases the early diagnosis of functional disorders of the musculoskeletal, endocrine, digestive, and visual systems by more than 20 % [5–7].

For an objective assessment of the degree and nature of physical development of patients in pediatric practice, a basic method of anthropometry is used, which is mainly based on measuring the overall parameters of the patient’s body [8]. Anthropometry uses descriptive approaches to evaluate
body parts, limbs, or the overall development of the body, and, as indicated by practitioners [9], it is especially valuable in the initial detection of metabolic syndrome and irritable bowel syndrome in pediatrics [10]. However, in isolation, this method cannot give complete information about physical development since it does not fully inform about the objective somatic status. In addition to anthropometry, the overall development of the body is assessed using functional techniques such as dynamometry [11], measurement of the vital capacity and evaluation of standing strength [12]. Comprehensive anthropometric approach is the key for assessing the physical development of patients, which is the basis for the management of children of different ages in pediatrics. But today, there are also new research methods that, in addition to anatomical and physical parameters, allow obtaining the component content of the body of the subject, which significantly expands the informativeness of physical data about the patient. Currently, the observation is supplemented by the bioelectrical impedance analysis [13] to measure the absolute and relative ratio of the parameters of the fat, skeletal muscle and bone components in the patient’s body, and by somatotyping [14, 15] with the determination of the somatotype (ST) of the patient. Somatotyping is actively used in scientific research of the pediatric profile in Kyrgyzstan and other countries to study the sex and age characteristics of PD [16, 17].

Considering the urgency of improving the protocols for assessing the physical development of patients in pediatrics in the focus of effective early screening, the purpose of this study was to conduct a comprehensive assessment of the body component composition (the ratio of bone, fat and muscle tissue) of Kyrgyz children aged 4 to 7 years.

Materials and methods

Eight hundred patients were included in the study. These are children of both sexes between the ages of 4 and 7 who are of Kyrgyz nationality and live in Osh or its immediate vicinity. The quantitative distribution of subjects depending on age and gender is presented in Table 1. For the processing of personal and medical data, informed consent was obtained from parents who were instructed about the goals and protocols of the study.

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Number of examined patients</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>100</td>
<td>100</td>
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<tr>
<td>6</td>
<td></td>
<td>100</td>
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</tr>
<tr>
<td>7</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>800</td>
<td></td>
</tr>
</tbody>
</table>

During the study, a physical examination of patients, measurement of anthropometric parameters of the body was carried out. To distribute patients by age, the approach of conventional age periodicization was used. According to the rules of the generally accepted age-stratification system, the examined patients in the in-line study belong to the first childhood age, that is, the category from 4 to 7 years. The average age of the female subjects was 5.50 ± 0.02 years, while the male was 5.4 ± 0.2 years. Since intensive physiological processes of development, growth and differentiation of tissues and organs occur in this period of postnatal ontogenesis of a person, the study actually took into account each year of the first period of childhood. Thus, the parameters were studied separately in patients aged 4, 5, 6, and 7 years.

The somatotyping method was used considering the general clinical recommendations. During somatotyping, the classifying features were the shape and morphological features of the back, chest, abdomen, upper and lower extremities, skeletal muscles of the body, and the nature of fat deposition. These signs were evaluated by gradation of points. The total number of points of each subject determined a specific ST: thoracic, digestive, asthenoid, or muscular. In some cases, it was impossible to identify a specific ST due to the distribution of points. Such variants of the study were evaluated as an indefinite ST. The obtained anthropometric data, and the scores with the ST variant were recorded in the individual registration cards of the subjects.

The analysis of morphometric characteristics of the subjects was carried out using computer programs. The digital data of all the methods used were entered into Microsoft Excel databases with subsequent analysis in the Statistica 6.0 software suite. The analysis of the results is presented as the arithmetic mean of the received digital data (x) in accordance with their permissible error (Sx). In addition to the range of permissible errors, the maximum and minimum ranges of all the parameters studied were considered, which determined the amplitude and variation of the indicators. Qualitative identifiers were measured based on the determination of absolute and relative values. These included the content of fat, musculoskeletal, and bone tissue.

Results

It was found that the absolute content of bone component (ACBC) in male subjects aged 4 years has individual characteristics and is prone to variation in the range from 3.2 to 5.2 (4.10 ± 0.01) kg; in the age of 5 — from 3.27 to 5.81 (4.30 ± 0.01) kg; 6 years — from 3.34 and up to 5.87 (4.40 ± 0.01) kg; 7 years — from 3.23 to 6.02 (4.60 ± 0.01) kg (Table 2). It was also found that the absolute content of bone component in female subjects aged from 4 years has individual characteristics and is prone to variation in each of the examined age ranges of physical development. Thus, girls of 4 years had the absolute content of bone component in the range from 3.04 to 5.17 (4.00 ± 0.01) kg, 5 years — from 3.3 to 5.6 (4.20 ± 0.01) kg, 6 years — from 3.34 to 5.77 (4.34 ± 0.01), and at the age of 7 — from 3.43 to 6.02 (4.40 ± 0.01) kg.

A characteristic feature of the male subjects was the predominance of the bone component in the body of the muscular type, which is confirmed statistically. This indicator was 1.53 times lower in patients with asthenoid and thoracic ST than in representatives of muscular ST (p < 0.05), and also lower than in boys with digestive ST (1.34 times; p < 0.05), and with an indefinite variant (1.31 times; p < 0.05). Among male patients aged 5 years, the bone component was 1.06
times higher in respondents with asthenoid ST compared to thoracic ST (p < 0.05) and 1.6 times lower than in those with muscular ST. In addition, the content of the bone component in boys with asthenoid ST was 1.32 times lower than in respondents with digestive ST (p > 0.05), but less compared to indefinite ST by 1.31 times (p < 0.05). In 6-year-old male subjects, the content of the bone component in the body was high with asteroid ST and exceeded this indicator in respondents with thoracic ST by 1.6 times (p > 0.05), but was lower compared to boys with muscular ST by 1.59 times (p < 0.05), digestive ST by 1.31 times (p < 0.05), indefinite variant by 1.32 times (p < 0.05). Among 7-year-old male subjects, the content of the bone component in the body was 1.06 times higher in asthenoid ST than in thoracic ST (p > 0.05), but significantly less in respondents with muscular (1.52 times; p < 0.05) and digestive ST (1.28 times; p < 0.05). The content of bone tissue in asthenoid ST was 1.28 times less than in the indefinite ST (p < 0.05). The minimum and maximum ACBC in male respondents had a specific distribution in age categories. Thus, in boys aged 4 to 7 years, the content of the bone component was the lowest in asthenoid and thoracic ST, while the highest indicators were with muscular ST. The indefinite ST in boys did not show peak values.

In the examined girls aged 4 years, the content of the bone component with thoracic and asthenoid ST was 1.55 times lower than in the respondents with the muscular variant (p < 0.05), but less than in the digestive (1.32 times; p < 0.05), and the indefinite ST (1.31 times; p < 0.05). In the age category of 5 years, the content of the bone component of the body in patients with diagnosed asthenoid ST was higher than in those with the thoracic variant by 1.05 times (p > 0.05), but less than in the muscular (1.6 times; p < 0.05), digestive (1.3 times; p < 0.05), and indefinite ST (1.3 times; p < 0.05) (Table 3).

Among girls aged 6 years, the content of the bone component of the body in cases of asthenoid ST was 1.04 times higher compared to those with thoracic ST (p > 0.05), but less than in the respondents with the muscular (1.57 times; p > 0.05), digestive (1.33 times; p < 0.05) and indefinite variant (1.33 times; p < 0.05). In the examined girls in the age category of 7 years, the content of the bone component of the body with asthenoid ST was higher compared to thoracic ST (1.06 times; p > 0.05), but less than in the muscular (1.54 times; p < 0.05), digestive (1.31 times; p < 0.05) and indefinite variant (1.3 times; p < 0.05). The minimum and maximum ACBC in female respondents had a specific distribution in age categories. Thus, in girls in the age category from 4 to 7 years, the indicators of the bone component were lowest with asthenoid and thoracic variants, and the highest data were obtained for muscular ST.

The age dynamics of the ACBC was traced: it was one-directional in representatives of different variants of ST. In male respondents with an asthenoid ST, ACBC at the age of 5 years exceeded this indicator at 4 years by 1.04 times (p > 0.05), at the age of six by 1.08 times (p > 0.05), and at the age of seven by 1.15 times (p > 0.05). Thus, the maximum ACBC of the body was observed at the age of 7 years. Among boys with thoracic ST, this body parameter gradually increased: in 5-year-old respondents by 1.01 times (p > 0.05), at the age of six by 1.01 times (p > 0.05), 7 years by 1.09 times (p > 0.05). In boys with muscular ST, the ACBC in the body at the age of 5 exceeded the indicators of 4-year-olds by 1.09 times (p > 0.05), 6-year-olds by 1.12 times (p > 0.05), and 7-year-olds by 1.14 times (p > 0.05). In female respondents with digestive ST, the ACBC at the age of 5 exceeded the indicators of 4-year-old subjects by 1.02 times (p > 0.05), 6-year-old by 1.05 times (p > 0.05), and 7-year-old by 1.10 times (p < 0.05). In boys with indefinite ST, the ACBC of the body at the age of 5 exceeded the indicators of 4-year-olds by 1.04 times (p > 0.05), was increased in respondents aged six (1.08 times; p < 0.05) and seven years (1.13 times; p < 0.05). One-directional changes of the ACBC in male respondents indicates a gradual increase in this index from 4 to 7 years of age, regardless of the identified ST.

Among the surveyed female respondents, the body ACBC increases by 1.06 times (p > 0.05) in those aged 5 years compared to the data of 4-year-old respondents, by 1.09 times (p > 0.05) at 6 years and by 1.12 times (p > 0.05) at 7 years. In girls with the thoracic ST, the content of the bone component of the body increases at the age of 5 compared to the data of respondents of 4 years by 1.01 times (p > 0.05), at 6 years by 1.05 times (p > 0.05) and by 1.06 times at 7 years (p > 0.05). In girls with a muscular ST, the ACBC of the body increases at the age of 5 compared to the data of respondents aged 4 years by 1.08 times (p > 0.05), 1.10 times at the age of six (p > 0.05), and 1.11 at the age of seven (p > 0.05). In female subjects, the ACBC with the digestive ST at the age of 5 years increases by 1.05 times compared to the indicators of 4 years of age (an increase of 1.05 times;...
Table 3. The content of the bone tissue component in the body of the female subjects aged 4–7 years, depending on the identified somatotype, X = Sx, min-max, kg

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Somatotype</th>
<th>Asthenoid</th>
<th>Thoracic</th>
<th>Muscular</th>
<th>Digestive</th>
<th>Indefinite</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>3.31 ± 0.03</td>
<td>3.31 ± 0.02</td>
<td>5.07 ± 0.02</td>
<td>4.45 ± 0.04</td>
<td>4.34 ± 0.03</td>
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<tr>
<td>5</td>
<td></td>
<td>3.45 ± 0.03</td>
<td>3.35 ± 0.03</td>
<td>5.52 ± 0.05</td>
<td>4.54 ± 0.03</td>
<td>4.53 ± 0.02</td>
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<tr>
<td></td>
<td></td>
<td>3.27–3.67</td>
<td>3.29–3.67</td>
<td>5.07–5.81</td>
<td>4.27–4.72</td>
<td>4.26–4.73</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>3.56 ± 0.03</td>
<td>3.36 ± 0.03</td>
<td>5.67 ± 0.04</td>
<td>4.67 ± 0.03</td>
<td>4.68 ± 0.03</td>
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<td></td>
<td></td>
<td>3.34–3.87</td>
<td>3.34–3.8</td>
<td>5.34–5.87</td>
<td>4.34–4.99</td>
<td>4.43–4.95</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>3.81 ± 0.03</td>
<td>3.61 ± 0.07</td>
<td>5.76 ± 0.04</td>
<td>4.89 ± 0.03</td>
<td>4.89 ± 0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.43–4.12</td>
<td>3.23–4.1</td>
<td>5.49–6.02</td>
<td>4.57–5.12</td>
<td>4.49–5.15</td>
</tr>
</tbody>
</table>

Both age and sex characteristics of the bone component content were evaluated in respondents aged 4–7 years. Thus, in male compared to female subjects with asthenoid, thoracic and indefinite variants of ST, this indicator increased by 1.06 times ($p > 0.05$) at the age of five, 1.11 times at the age of six ($p < 0.05$) and by 1.12 times at the age of seven ($p < 0.05$). The minimum and maximum ACBC in female respondents had a specific distribution in age categories. There is a tendency to increase in the content of bone tissue in the body with increasing age. Peak indicators were respectively found in 7-year-old respondents, which is shown in Fig. 1.

Both age and sex characteristics of the bone component content were evaluated in respondents aged 4–7 years. Thus, in male compared to female subjects with asthenoid, thoracic and indefinite variants of ST, this indicator increased by 1.06 times ($p > 0.05$), with the muscular variant it increased by 1.01 times ($p > 0.05$), with the digestive variant by 1.03 times ($p > 0.05$), with the muscular variant it increased by 1.12 times ($p > 0.05$) at the age of five, 1.06 times ($p > 0.05$) at the age of six, and 1.07 times ($p > 0.05$) at the age of seven. The minimum and maximum ACBC in female respondents had a specific distribution in age categories. There is a tendency to increase in the content of bone tissue in the body with increasing age. Peak indicators were respectively found in 7-year-old respondents, which is shown in Fig. 1.

The study of ST is currently relevant in pediatric practice in many countries of the world [7, 10]. Due to the constant demand for improving standardized approaches to assessing the physical development of children, which serves as an auxiliary tool for determining whether a patient had a specific ST [3]. A research by N.T. Rahmawati and J. Hastuti [18] who studied ST in Indonesian children and adolescents (the total number of respondents was more than 2,000 persons) in the age range of 7–15 years has been published. Significant differences in boys and girls were found in the parameters of height, total body weight, body mass index, and all components of ST (fat, muscle, bone). In the current study, higher parameters of bone component growth were revealed in boys (namely, in the period of 4 and 7 years), whereas in the study by the researchers this trend was revealed in female respondents (both children and adolescents).

The anthropometric study of constitutional characteristics is one of the main methods for assessing the physical development of a child, which serves as an auxiliary tool for evaluating and describing the physical and somatic status of children in different age periods [17]. PD is one of the fundamental criteria for assessing the health status of patients. The level and severity of pathologies of physical development are directly proportional to the risks of diseases of different origin and course.

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Similar results were obtained in the population study by L.B. Japhet et al. [19]. The male respondents were mostly ectomorphic mesomorphs, while the female respondents belonged to the balanced mesomorphic type, prevailing in the values of body weight, height, and body mass index. This fact confirms the importance of considering the patient’s ethnicity during the assessment of development indicators, especially with the use of average values for both age and gender characteristics, and population. It is also important that the study of the physical development of children, compared to the existing national and regional norms, is an important confirmation of its compliance with standards and in many aspects reflects the level of health of the population [20]. Especially considering the fact that the anatomical and physiological qualities of a developing organism (for example, in the first childhood period) is the most meaningful indicator of the health of children and, accordingly, the population health of the next generations of the nation.

The results obtained during this study of ST in Kyrgyz children of both sexes showed that the indicator of the muscular component of the body in children depends on the type of physique and age and gender dynamics. Data were
published by M.A. Bari et al. [21] according to which the determination of ST in children of the first childhood age from the standpoint of regular medical examinations within the school helps improve early detection of visual impairments and carry out timely correction of pathologies. The data obtained showed that among visually impaired children examined, more than 80% had ectomesomorphic ST, which makes this cohort vulnerable in the focus of the development of changes in the visual apparatus. Among the studied variants of ST components (endomorph, mesomorph, and ectomorph), the average values of mesomorphy prevailed, while endomorphy showed the lowest rates in children with visual impairment. Considering the urgency of introducing the study of ST in young children, further research on this topic involves respondents with concomitant pathologies of vision, endocrine system and physical development, since in-line participants did not have background conditions.

The conducted study of body components with correlation of ST variants of children in Algeria did not show significant gender differences in each of the age groups. The study by B. Mohamed et al. [22] emphasized the muscular component, while the current study considered the bone component of the body during development. However, similar to the data obtained for ethnic Kyrgyz children, ethnic Algerian children of the early school age also did not show statistically significant differences in the predominance of fat and muscle components, depending on ST. As in the in-line, the studied body components increased gradually in parallel with the age of the subjects. The specific distribution of adipose tissue in female respondents was revealed, while the proportional ratio in this age group was similar to male respondents.

L.B. Rokoff et al. [23] also studied the bone component in the focus of anthropometric assessment of the development in the early childhood period, but in addition to the methods used in the in-line study, the methods of dual-energy X-ray absorptiometry and anthropometry minus the mineral density of the bones of the head were used to assess the relationship of total body weight, components of total body weight and components of total fat mass. A similar number of respondents took part in the study — more than 850 children. They were aged 6 to 10 years. The total body weight, especially its fat-free component, showed a positive correlation with bone mineral density. The relationship between trunk fat and bone mineral density turned out to be nonlinear, and with a negative relationship only in children with the digestive ST. Published data suggest that central obesity may correlate with lower bone mineral density only in children with the highest levels of abdominal fat, mainly with the digestive ST. Thus, it is possible to determine the physiological threshold above which the central adipose tissue can become metabolically active and adversely affect the growth and differentiation of bone tissue during the general development of children in the first and second childhood periods [24, 25]. In the in-line study, in male compared to female respondents with asthenoid, thoracic and indefinite ST, this indicator of the bone component increased, but with maximum values in the digestive variant, which correlates with the data obtained by the researcher [23]. Individual indicators of ACBC in male respondents of the examined age group of 4 to 7 years were found to be slightly higher than in females, which was not revealed in this study using additional imaging techniques and bone analysis. In the age period from 5 to 6 years, the gender characteristics of the peak bone component content did not show statistically significant differences, and there was also no effect of adipose tissue on the bone component in the respondents, which can be included in the further continuation of the study on this topic.

A comprehensive anthropometric study of children is a methodological basis for determining the qualitative characteristics of physical development, which in modern realities is complemented by the capabilities of bioimpedance analysis to assess absolute and relative indicators of the content of fat, muscle, and bone components of the body [26–28]. The obtained results are recommended to be implemented in the practice of specialists in the field of hygiene, pediatrics, and social medicine for the development and improvement of standards (protocols, percentile tables, nomograms) of physical development of the Kyrgyz ethnic population.

Conclusions

The somatic, gastrointestinal and physical status of 800 children of Kyrgyz nationality of both sexes in the early period of childhood was analyzed for the first time by the method of comprehensive anthropometry in combination with bioimpedance analysis. The study revealed a number of specific features of postnatal ontogenetic development for this ethnic group in terms of the dynamics of growth, weight, and size of the physique and its component composition. Individual features of sex- and age-related somatic development and individual variability of morphometric and anthropometric body parameters were also studied. The ACBC in the body of the subjects of both sexes showed unidirectionality in the dynamics of growth from 4 to 7 years. In the studied period of childhood, this index showed maximum values in respondents with muscular somatotype, both boys and girls, which exceeded the indicators of children with asthenoid and thoracic somatotype. The relative content of bone tissue in the body of the examined children was the highest in respondents with a muscular somatotype, and the lowest in thoracic somatotype. From the age of 4 to the age of 7, the relative amount of the bone component in the examined children of all somatotypes gradually decreased. This feature was most pronounced in children with asthenoid somatotype and less with muscular somatotype. This study does not confirm the classical theory of increased bone component content in boys during the entire period of the first childhood (from 4 to 7 years) compared to girls. Thus, this study provides new data on the features of the physical development of Kyrgyz children in early childhood in terms of absolute and relative indicators of the content of the bone component. The obtained data can be used to improve the percentile tables of ethnic regions during pediatric monitoring of the development of children aged 4–7 years. Further research of this clinical issue involves the study of a larger cohort of children of both the first and second childhood age.

References

Абсолютний уміст кісткової складової в організмі киргизьких дітей із різними соматотипами в ранньому дитинстві

Резюме. Актуальність. Поліпшення педіатричного спостереження в усьому світі та в Киргизстані має важливе значення для раннього виявлення проблем розвитку та моніторингу нормальних фізичних параметрів. Метою дослідження було вивчити показники кісткового складу в дітей киргизької національності обох статей у ранньому дитинстві. Матеріали та методи. За допомогою анатомо-антропометричних методів та біоімпедансного аналізу обстежено 800 пацієнтів віком від 4 до 7 років. Результати. Виявлено, що абсолютний уміст кісткової складової у хлопчиків віком 4 роки коливається від 3,24 до 5,17 (4,10 ± 0,01) кг, 5 років — від 3,27 до 5,81 (4,26 ± 0,01) кг, 6 років — від 3,34 до 5,87 (4,39 ± 0,01) кг і 7 років — від 3,23 до 6,02 (4,59 ± 0,01) кг. Абсолютний показник кісткової складової в чотирирічних дівчаток має індивідуальну варіабельність 3,04–5,17 (3,97 ± 0,01) кг, п’ятирічних — 3,27–5,61 (4,20 ± 0,01) кг, шестирічних — 3,34–5,77 (4,34 ± 0,01) кг і семирічних — 3,43–6,02 (4,40 ± 0,01) кг. Висновки. Найвищий вміст кісткової тканини спостерігався в осіб з м’язовим соматотипом, а найнижчі значення зафіксовано при астеноїдному і грудному соматотипах як у хлопчиків, так і в дівчаток. Хлопчики мали вищі значення кісткового компонента у віці 4 і 7 років.

Ключові слова: постнатальний онтогенез; фізичний розвиток; педіатричне спостереження; вікові норми розвитку; антропометрія; біоімпедансне обстеження