

Features of Determining the Degree of Pelvic Bone Maturity in Female University Students Involved in Physical Education and Sports

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Abstract

The article presents the materials of the research and their analysis concerning the study of the process of completion of the maturation of the pelvic bones in female students of different courses of the University, who are engaged in physical culture. To conduct the study, a method was used to determine such morphofunctional value as the pelvic bone index (ICT), proposed by N.I. Kovtyuk.

Key words: female students; adolescence; physical culture; pelvic bones; degree of maturity; morphofunctional index

Introduction

Studying issues related to the individual medical and biological characteristics of young people, incl. student youth, is very relevant and constantly in demand when studying their morphological changes in the process of ontogenesis. In our opinion, the problem of age gradation of the completion of the process of maturation of the bone structures of the female pelvis, among representatives of adolescence, incl. among female students of different university courses, during their active physical education. The problem of the study is that female students are representatives of the urban and rural population, with varying degrees of preparedness for physical work, with varying degrees of physical activity and having access to physical education classes, as part of the main group.

Aim of study

The purpose of the study is to establish age criteria for the degree of maturation of the bone structures of the female pelvis among female university students of the first and fourth years who are actively involved in physical education and sports.

Research hypothesis

For junior students, aged 18-19.5 years, in most cases, the process of maturation and formation of the bone structures of their pelvis is active, but not yet fully completed. For representatives of older courses, aged 20-23 years, this process is almost complete, with rare exceptions.

Research objectives

To achieve the research goal, we set the following tasks: 1. Select, on a voluntary basis, a group of female students of I-IV years of the university, who, according to the results of a medical examination, are included in the main group, to participate in physical education classes at the university. 2. Carry out the anthropometria and pelvimetria measurements necessary for this study. 3. Based on the results of the measurements obtained, carry out individual and then group calculations of the pelvic bone index (PBI). 4. Conduct an analysis of the results obtained, identify compliance/confirmation or refutation/negation of the hypothesis of the conducted research and the implementation of the purpose of the research.

Material and methods

To conduct the study, we used a method for determining such a new morphofunctional index value as the pelvic bone index (PBI), proposed in 2004 by N.I. Kovtyuk [2-4]. This method was proposed and tested many times by the author in her research, which formed the basis of her Ph.D. thesis "Comprehensive assessment of the development of school-age girls in the Chernivtsi region" [4]. The advantage of this technique is its non-invasiveness and ease of determination. PBI is determined by the following formula: $PBI = a \cdot X / IS$, where a is the transverse size of the bone pelvis (distantia trochanterica), cm; c – external conjugate (conjugata externa), see [4]; IS - Solovyov index, see Determination of the size of the bone pelvis (pelviometry), was carried out in a standard way, using a Martin pelvis meter. Determination of Solovyov index indicators using a centimeter tape in the area of the radiocarpal joint, normally - from 14 to 16 cm [1-3.5-7]. For

normative versions of the measured indicators, their standard values for these age groups, used in anatomy, morphology, obstetrics and gynecology, were taken: *distantia trochanterica* - transverse external size, defined as the distance between the two large trochanters of the femurs, normally 30-32 cm [1-3,5-7]; *conjugata externa* is the external, straight size of the bony pelvis, which is determined from the middle of the upper edge of the pubic symphysis to the suprasacral fossa and, normally, is 20-21 cm [1-3,5-7]. After obtaining the necessary results of pelviometry and anthropometry, a mathematical calculation of the PBI values was carried out, according to the author's formula N.I. Kovtyuk [4]. According to the author's criteria, values of 30.0-40.0 were considered normative. Indicators less than 30.0 indicate incompleteness of the process of formation (maturation) of the bone structures of the pelvis under study, or a decrease in the process of bone maturity. The cause of this process may be disorders of the endocrine and reproductive systems of the subjects of various origins [2-4]. Values above

40.0 indicate the completion of the maturation process of the pelvic bones in the examined women [2-4].

To conduct this study, using a random sampling method, 239 female students of I-IV years of the university were selected, engaged in physical education at the university, and belonging, according to the results of the medical study, to the main medical group. Of these, 1st year students – 65 people, 2nd year students – 61 people, 3rd year students – 59 people, and 4th year students – 54 people. All female students involved in this study gave their voluntary consent to participate in it.

Results and discussion

After carrying out all the necessary anthropometric and pelviometric measurements, followed by mathematical recalculation of individual and group, taking into account the course and age of the students under study, we obtained the PBI values, which are presented in the table, with $p < 0.05$:

Indicator name	Pelvic Bone Index (PBI) value	The value of the Solovyov index (IS)
First year female students (n=65)	26,74±0,73	14,14±0,61
Second year female students (n=61)	29,24±0,57	14,47±0,33
Third year female students (n=59)	34,68±0,33	15,35±0,52
IV year female students (n=54)	43,14±0,93	15,58±0,29

Table: The value of the pelvic bone index in different age groups of female students

Analysis of the obtained ICT indicators for female students of different courses and age groups showed that as they grow older and move to an older age group, female students undergo an ontogenetically dependent process of ossification/maturity of the pelvic bones. And, if among the students of the first and second years there were still girls with an incomplete and close to completion process of maturation, ossification of the pelvic bones, then among the older students (third and, especially fourth year) - the age group of 21-23 years, ICT values indicates 100% completion in all female students of the process of maturation/ossification of the bones of their pelvis, with the formation of a bone pelvis characteristic of a reproductively mature woman who is ready for pregnancy and childbirth [2-4]. Also, the positive dynamics/increase in the obtained values of the Solovyov index, as a morphofunctional index value, also indicates positive, physiological processes of ossification in female students of different age groups [2-4].

In our opinion, an important aspect of the process of physiological formation and maturation of the pelvic bone structures in female students was the active participation of these students in conducting and participating in physical education classes at the university, as the most important and dominant factor in physical activity among female students.

Conclusions

1. The results of the study confirmed the hypothesis of our study that senior female students – III-IV (n=113), aged 21-23 years, have fully completed the process of maturation of the bone structures of their pelvis, with ICT indicators within from 34.68±0.33 to 43.14±0.93.
2. In 11 (16.92%) first-year students, aged 18-18.5 years, the process of maturation of the bone structures of their pelvis has not yet been completed, and has values in the range of 26.74±0.73.
3. In 6 (9.84%) second-year students, aged 18.5-20 years, the process of bone maturation of the bones of their small pelvis is not yet fully completed, but is already close to the lower acceptable limit, and is - 29. 24±0.57.
4. The positive dynamics of establishing the values of the Solovyov index, noted in all age groups, within the physiological norm, and the correlation with the processes of maturation of the pelvic bones in them, indicates the

positive processes of formation and maturation of the skeletal system in all the studied female students.

5. We believe that according to the results of the study and their analysis, the goal of the study was achieved and the research hypothesis was fully confirmed.
6. We believe that all female students of the main medical group, engaged in physical education at the university, and who took part in the study, undergo a natural, physiological process of maturation of the bone structures of their pelvic bones, in full accordance with their age period.

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