

Розділ 4. Фізична культура, фізичне виховання різних груп населення

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Characteristics of Biostatic Body Indicators of Children of Senior Preschool Age with Various Body Postures

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Introduction. Preschool age is the most significant stage of forming the child's health, which provides the unity of physical, mental, psychological and intellectual development. The conditions of the child's health belong to the main factors that determine the child's ability to satisfy all the requirements specified [2, 4].

As shown in numerous researches, in the past decade the number of children having various health disorders has increased greatly. The prevalence of functional abnormalities among the children of preschool age runs up to 70 % and higher, over 20 % of children have weight deficit, motor education of more than 40 % of senior preschool aged children is below the average [1, 3]. Among the chronic pathology of preschool children the most wide-spread are the diseases of musculoskeletal, nervous, respiratory, digestive, genitourinary systems, as well as the allergic dermatopathy. The biggest alarm is caused by the data about the prevalence among the preschool children of various functional disorders of supporting-motor apparatus that amounts to 80 %. It is really warning sign, because it is the preschool age when the supporting-motor apparatus is intensively forming, the basis of harmonization of body built and its functional abilities is building up [3, 4].

The investigations, run by the number of specialists [1, 2], prove that the faults in postures (changes of biostatic indicators in particular) lead to functional disorders of supporting-motor apparatus that influences the level of the person's health and causes the appearance and development of pathologies.

However, the biostatic indicators that show the body's vertical stability of children and the quantitative characteristic of which allow, in our opinion, to increase the effectiveness of preventive and correctional measures oriented to elimination of unfixed disorders of supporting-motor apparatus are not studied properly in specialist literature.

The aim of the investigation: to study biostatic indicators of children of senior preschool age with different body postures.

To achieve the aim set we use the following **research techniques:** the analysis of specialist literature, pedagogical observation, anthropometric method, methods of estimating the localization of children's common centre of gravity (CCG) by graphic method and stability of children's body, methods of mathematical statistics.

The results of the research and their discussion. The results of the investigation showed that 12,5 % of children examined do not have abnormalities in body postures. 47,5 % of children have faults in frontal plane, 11,25 % – sway back, 7,5 % – kyphotic posture, 5 % – flat back, 2,5 % – lordotic posture, 13,75 % of children have combined disorders of body posture.

One of the main indicators that characterize vertical stability of a child's body is localization of CCG. In cases of faults of body posture the correlation of the spine's segments changes and we can suppose that in cases of faults of body posture CCG has different (from the standard one) spatial position.

During the research we discovered that the indicator of height of body CCG regarding the bearing area of children with correct body posture amounts to 0,59 m ($S = 0,01$ m). In cases of various posture abnormalities we can see slight decrease of the height of body CCG within 0,58 – 0,56 m ($S = 0,03$ – 0,02 m).

To estimate vertical stability of children we also defined stability criteria (stability radius, moment and angles).

Front stability radius among the children with correct body posture in average amounts to 0,14 m ($S = 0,02$ m). Among the children with different posture abnormalities it ranges from 0,14 m ($S = 0,01$ m) to 0,16 m ($S = 0,03$ m). Back stability radius among the children with correct body posture in average amounts to 0,07 m ($S = 0,01$ m), among the children with different posture abnormalities it ranges from 0,05 m

($S = 0,02$ m) to $0,07$ m ($S = 0,01$ m). Children with correct body posture have right stability radius of average $0,07$ m ($S = 0,01$ m), left one – $0,08$ m ($S = 0,01$ m). Among the children with different posture abnormalities right stability radius ranges from $0,06$ – $0,08$ m ($S = 0,01$ – $0,02$ m), left stability radius – from $0,07$ m ($S = 0,01$ m) to $0,09$ m ($S = 0,01$ m).

As a result of the research we discovered that the average index of front stability moment among the children with correct body posture in average amounts to $28,24$ Nwm ($S = 4,74$ Nwm). Significant changes ($p < 0,05$) occur among the children with sway back – $37,42$ Nwm ($S = 6,13$ Nwm) and lordotic posture – $38,21$ Nwm ($S = 3,24$ Nwm). Back stability moment among the children with correct body posture in average amounts to $14,49$ Nwm ($S = 4,28$ Nwm). Significant changes ($p < 0,05$) occur among the children with sway back – $10,97$ Nwm ($S = 2,06$ Nwm), with abnormalities of posture in frontal plane $10,65$ Nwm ($S = 2,04$ Nwm) and combined abnormalities of posture in frontal and sagittal planes $10,01$ Nwm ($S = 1,21$ Nwm).

Among the children with correct body posture right stability moment is in average $13,89$ Nwm ($S = 2,39$ Nwm), left one – $16,89$ Nwm ($S = 2,83$ Nwm). In cases of any posture abnormalities right stability moment ranges within $11,01$ – $15,71$ Nwm ($S = 2,05$ – $2,82$ Nwm), left stability moment – within $11,98$ Nwm ($S = 1,39$ Nwm) and $17,49$ Nwm ($S = 2,75$ Nwm). Significant changes ($p < 0,05$) occur in the index of left stability moment among the children with flat back, abnormalities of posture in frontal plane and combined abnormalities of posture in frontal and sagittal planes.

During the investigation we defined stability angles of children's bodies (front, back, right and left). Children with correct body posture have front stability angle of average $14,0^\circ$ ($S = 1,0^\circ$), back one – $1,2^\circ$ ($S = 0,2^\circ$). In cases of any posture abnormalities front stability angle ranges within $13,4$ – $14,7^\circ$ ($S = 1,52$ – $1,09^\circ$), back one – within $0,9$ – $1,3^\circ$ ($S = 0,18$ – $0,21^\circ$).

Right stability angle among the children with correct body posture in average amounts to $5,1^\circ$ ($S = 1,9^\circ$), left one – $5,7^\circ$ ($S = 0,96^\circ$). In cases of any posture abnormalities right stability angle ranges from $4,7^\circ$ ($S = 0,76^\circ$) to $5,8^\circ$ ($S = 0,89^\circ$), left one – from $5,8^\circ$ ($S = 0,98^\circ$) to $6,2^\circ$ ($S = 1,06^\circ$).

Conclusions

1. As a result of the investigation we discovered that $87,5$ % of children have the abnormalities of body posture. The most wide-spread faults are the ones that occur in the frontal plane.

2. We defined that in cases of different posture abnormalities we can see slight decrease of the height of body CCG ($p > 0,05$).

3. We found out that the faults of body posture influence the biostatic indicators of body stability of the children of senior preschool age, which are the most vividly reflected in the indicator of body stability moment. Thus, among the children with correct body posture the indicator of front stability moment in average amounts to $28,24$ Nwm ($S = 4,74$ Nwm), among the children with sway back – $37,42$ Nwm ($S = 6,13$ Nwm), with flat back – $24,79$ Nwm ($S = 1,99$ Nwm) and with lordotic posture – $38,21$ Nwm ($S = 3,24$ Nwm) ($p < 0,05$); the indicator of back stability moment among the children with correct body posture – $14,49$ Nwm ($S = 2,28$ Nwm), with sway back – $10,97$ Nwm ($S = 2,06$ Nwm), with lordotic posture – $10,9$ Nwm ($S = 1,65$ Nwm) and with abnormalities of posture in frontal plane – $10,65$ Nwm ($S = 2,04$ Nwm).

The List of References

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Annotation

Functional disorders of supporting-motor apparatus have an impact on the formation and physical development of the child's body, which is especially important for children of the senior preschool age. The aim of the investigation: to study biostatic indicators of children of senior preschool age with different body postures. Research techniques: the analysis of specialist literature, pedagogical observation, anthropometric method, methods of estimating the localization of children's common centre of gravity by graphic method and stability of children's body, methods of

mathematical statistics. Established that most children with posture, the most common of these is the posture in the frontal plane. Violation posture affect the stability of the body biostatic performance of children who most clearly reflected in terms of the moment resistance of the body.

Key words: disorders of the supporting-motor apparatus, children of the senior preschool age, biostatic and goniometric indicators.

Олена Бондар, Наталія Гончарова, Анна Бойко. Характеристика біостатичних показників тіла дітей старшого дошкільного віку з різними типами постави. *Порушення функцій опорно-рухового апарату створюють вплив на становлення й фізичний розвиток організму дітей, що особливо актуально для дітей старшого дошкільного віку. Мета дослідження – вивчити біостатичні показники тіла дітей старшого дошкільного віку з різними типами постави. Методи дослідження: аналіз науково-методичної літератури, педагогічне спостереження, антропометрія, визначення локалізації загального центру ваги тіла дітей графічним методом та методи визначення стійкості тіла дітей, методи математичної статистики. Установлено, що більшість дітей мають порушення постави, найбільш поширеними з них є порушення постави у фронтальній площині. Порушення постави впливають на біостатичні показники стійкості тіла дітей, які найбільш наочно відбиваються на показниках моменту стійкості тіла.*

Ключові слова: порушення опорно-рухового апарату, діти старшого дошкільного віку, біостатичні й гоніометричні показники.

Елена Бондарь, Наталья Гончарова, Анна Бойко. Характеристика биостатических показателей тела детей старшего дошкольного возраста с различными типами осанки. *Нарушения функций опорно-двигательного аппарата оказывают влияние на становление и физическое развитие детского организма, что особо актуально для детей старшего дошкольного возраста. Цель исследования – изучить биостатические показатели тела детей старшего дошкольного возраста с различными типами осанки. Методы исследования: анализ научно-методической литературы, педагогическое наблюдение, антропометрия, определение локализации общего центра тяжести тела детей графическим методом и методы определения устойчивости тела детей, методы математической статистики. Установлено, что большинство детей имеет нарушения осанки, самыми распространёнными из них являются нарушения осанки во фронтальной плоскости. Нарушения осанки влияют на биостатические показатели устойчивости тела детей, которые наиболее наглядно отражаются на показателях момента устойчивости тела.*

Ключевые слова: нарушения опорно-двигательного аппарата, дети старшего дошкольного возраста, биостатические и гониометрические показатели.