Qualitative and Quantitative Assessment of the State of the Posture of Junior School Children

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Abstract: The article discusses the necessity of a single unified and accessible for mass screening classifications of types of posture. Presents a classification of types of posture, to account for possible options for the development of sagittal curvatures of the spine, as well as age, sex and length of the spine. The basis of allocation types were based on the average size and signal deviations the depth of the cervical and lumbar lordosis. The classification of the 5 major conventional types of posture and 4 so-called transition. Transition types are characterized by the change of one of the curves of the spine or increases in the normal state of a second. Deviations posture differentiated according to qualitative and quantitative assessment zones, which gives the opportunity informative evaluate its status in the Junior school age and monitor the growth of children.

Key words: Posture · Incorrect posture · Sagittal bends · Length of the spine · The classification of types · External signs posture

INTRODUCTION

Nature and evolution of man formed to ensure his life unique in its capabilities and the importance of the physiological system of the support - motor apparatus (ODA). The complexity of anatomical and biomechanical structure ODE, a large number of its units, the importance of executable functions necessitates adequate for its development, conformity to certain age periods of human life especially in the period of adaptation of the children to the learning process in school [1-6]. Teaching load of the primary school age has a significant impact on the formation and development of the spine. Long retained negative working postures cause various deviations of external signs posture, the asymmetry of muscle tone, keep the spine in an upright position. In result, this leads to the formation of incorrect posture and can contribute to the development of pathological forms [7-10].

Bearing defects deserve special attention, because this is the most common deviation in the physical development of the students [10-13] and serve as a prerequisite for the appearance of certain functional and morphological changes in health status [9, 13, 14, 15].

Long-term observation of the state of the musculoskeletal system schoolchildren showed not only high prevalence, but the diversity of the detected deviations of external signs posture [7, 8, 12]. It is not rare combination of violations of posture with various deformities of the foot [11, 16].

Great, the sex-age and individual variability posture with its multi-faceted ties with the level of biological activity of the organism and health status, create certain difficulties for the development of common approaches to diagnostics of the bearing. In this regard there is an urgent need to systematize the most common disorders, creation of the unified classification of types posture available for mass screening.

Objectives of the Study: We have delivered the following research objectives:

- Study of anatomical and physiological, sex and age peculiarities in the state of curvatures of the spine in the sagittal plane;
- Develop clear criteria for the classification of types of posture with quantitative characteristic for children of 7-10 years.

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The Methodology: For objective assessment of posture children we used the method kifoskoliozometrii, which allows to receive a comprehensive description of the state of posture in the initial positions sitting and standing. The specific feature of our approach is that the sagittal spine curves are studied and evaluated based on its length. Moreover, the measure of length of the spine is not traditionally on and in view of its physiological bends (odometer - from Atlanta to toe the line of the spinous processes). Assess the state of physiological bends we offer depending on age, sex and length of the spine on the assessment scales for the classification of types of posture, developed by us on the basis of statistically processed individual data 1104 children of 7-10 years.

The Results of the Study: The basis of allocation types were based on the average size (M) and signal deviations (G) the depth of the cervical and lumbar lordosis. Depending on the combination of low, medium and high values of indicators of the depth of the cervical and lumbar lordosis allocated 9 types. The classification of the 5 major conventional types of posture and 4 so-called transition. Transition types are characterized by the change of one of the curves of the spine or increases in the normal state of a second.

The average type is characterized by moderately severe lumbar and cervical lordosis and quantitative characteristics of bends is within PITCH 0,75G.

Rectified type of posture is diagnosed with a decrease of the natural bends of a backbone, as in the cervical and lumbar spine within M-0,75G to M-1,5G.

Little stoop-shouldered type of posture have children with hard expressed cervical lordosis (M+0,75G to M+1,5G) and poorly expressed lumbar (from M-0,75G to M-1,5G).

Kyphotic type is intensively expressed both bending of the spine (M+0,75G to M+1,5G).

Lordotic type characterized by increased development of lumbar curve (M+75G to M+1,5G), at the poorly expressed cervical (from M-0,75G to M-1,5G).

When cervical- lordotic type of lumbar lordosis is moderately expressed within PITCH 0,75G and cervical strenuously pronounced (from M + 0,75G to M+1,5G).

Cervical- rectified type of posture is characterized by normal development of lumbar lordosis (PITCH 0,75G) and poorly expressed neckband (from M-0,75G to M-1,5G).

In lumbosacral lordotic type notes intensively expressed lumbar curve (M+0,75G to M+1,5G) and normally developed cervical spine (PITCH 0,75G).

Lumbosacral rectified type is characterized by a moderately expressed cervical lordosis (PITCH 0,75G) and poorly expressed lumbar (from M-0,75G to M-1,5G).

For each type of posture in addition to the descriptive characteristics of typical deviations we have developed specific digital modes in the form of rating scales (30 pieces) that take into account gender, age and length of the spine.

For practical use of this classification, you must have the following initial data: 1) the length of the spine, measured taking into account its bends (in cm) from the first cervical vertebra (Atlant) until the end of the coccyx; 2) the depth of the cervical lordosis (in mm); 3) the depth of lumbar lordosis (in mm). After measurement of these indicators should find a scale corresponding to the age, sex and index length of the spine of the subject of the child. Then horizontally, to determine in which the digital range gets a number, corresponding to the depth of cervical bending of the child and the vertical find the assessment of the status of lumbar lordosis. At the intersection of these values find quality assessment - type posture. So, for example, Coldayeva Mary (8 years) cervical lordosis in the source standing amounted to 44 mm and lumbar - 37 mm at length of the spine 54 see the Length of the spine Marina is estimated by our scale as "average", so the results we look in the table for girls with an average length of the spine. Indicator cervical lordosis, equal to 44 mm falls in the range of 41,9 - 47,5 mm and corresponds to the strongly pronounced cervical. Lumbar lordosis she equal to 37 mm, also falls within the range of 32,1 - 38,4 mm with a qualitative assessment of "stronger". At the intersection of the vertical and horizontal we find assessment type. Thus, Coldayeva Maria has kyphotic type of posture.

We consider it possible to include all children, with the average type of posture, to a group of children with a normal posture. Children eight other types whose cervical and lumbar go beyond averages, is considered as having initial functional disturbances of posture in the sagittal plane. All children with enlarged or reduced physiological bends more than + 1,5G from the average (M), we conditionally attributed to the group of persistent or pathological abnormalities of the spine in the sagittal plane (in Figure 1, this area is highlighted in grey).

neck	M-1,5G	M± 0,75G	M+1,5G	neck
lumbar lordosis	24,-30,4	30,5-41,8	41,9-47,5	lordosis

	lumbar		
	lordosis		round-shouldered
		straightened	
	neck		neck
	lordotic	middle	lordotic
	lumbosacral		
	lordotic	lordotic	kyphotic

Left scale: lumbar lordosis — 12,9 | 19,2 (M-1,5G); 19,3 | 32 (M± 0,75G); 32,1 | 38,4 (M+1,5G)

Right scale: lumbar lordosis — 12,9 | 19,2 (M-1,5G); 19,3 | 32 (M± 0,75G); 32,1 | 38,4 (M+1,5G)

neck lordosis	24,-30,4	30,5-41,8	41,9-47,5	neck lordosis
	M-1,5G	M± 0,75G	M+1,5G	

Fig. 1: Evaluation scale for the classification of types of posture girls 8 years with the average long spine (53-58cm)

CONCLUSIONS

Moreover, our available classification of types of carriage, take into account all the possible options for the development of sagittal curvatures of the spine, systematizes qualitative assessment zones of its rejection in the sagittal plane and gives the opportunity informative assess the upper section of the ODE in the Junior school age. This approach to measurement of physiological bends allows focusing on children who are particularly in need of correction of violations. In turn, the availability of quantitative and qualitative assessment of the status of external signs posture allows to plan and methodology of physical exercises in physical education classes in school, watching its dynamics.

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