

PHYSICAL AND MOTORIC DEVELOPMENT OF CHILDREN IN YOUNGER SCHOOL AGE PARTICIPATING IN EXERCISES OF CORRECTIVE GYMNASTICS

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Abstract

In contemporary school, children more and more frequently appear with different faulty postures. This phenomenon is still dangerously expanding because XXI century civilization changes in our lifestyle encourage them to be non active. Children spent more time watching TV and using computers than participating in physical exercises. In Polish schools, at classes' I-III, children with faulty postures participate in obligatory corrective gymnastics exercises. In this work, the results of research carried out in preliminary schools of West Pomeranian Province are shown. In this research 288 pupils of younger school age (7-12 y.o.) are examined. In this group anthropometrical measurements are collected (body mass and body height) and the level of motoric efficacy is determined by the Test of Physical Fitness (developed by the International Committee on the Standardization of Physical Fitness Tests). The statistical analysis of the obtained results shows the differentiation in levels of physical fitness. This is related to the kind of faulty posture. Lower levels of physical fitness are presented by pupils with over- or underweight of body mass.

Key words: *physical, motoric development, children, corrective gymnastics.*

Introduction

In a modern school, children with different faulty postures appear more and more frequently. This phenomenon is still dangerously expanding because XXI century civilization changes in human lifestyle encourage them to be non active. Children spend more time watching TV and using computers than participating in physical exercises. Many studies of health behavior and healthy lifestyle issues confirm this phenomenon (Kolip& Schmidt, 1999; Curie et al., 2000; Brandl-Brendenbeck et al., 2008). According to Dega (1983) one of the basic features of normal human development is body posture - the individual manner of particular body sections in a standing position. Body posture can be normal or defective. From the physiological point of view, body posture is a movement habit shaping itself on a determined morphological and functional substructure and connected with a daily activity of a given individual. Body posture is characterized by its individuality and variability not only throughout development, but also during a day (Dega, 1983). Body posture is changed during ontogenesis under the influence of internal

determinants (e.g. hereditary features) and external ones, like life mode, health status or a way of nutrition.

In Polish schools, in I–III classes, children with faulty postures participate in obligatory corrective gymnastic exercises. Pupils from IV–VI classes can participate in additional compensatory exercises and these exercises are not obligatory. Corrective gymnastics are very often arranged as a form of activity in fitness clubs or private out-patient and rehabilitation clinics.

Aims

The basic aim of this research is to find an answer to the following questions: *What is a level of physical efficiency of children with faulty posture? What is a level of somatic development of children with faulty posture? What is a number of children with faulty posture in the population examined?*

Material and Methods

In this work, the results of research carried out in preliminary schools of the West Pomeranian Province are shown. In this study 299 pupils (172 girls and 137 boys) aged 8–12 y.o. are examined. These are inhabitants of a big city (110 pupils), small towns (91 pupils), and villages (98 pupils). In this group anthropometrical measurements are collected (body mass and body height), and the BMI is calculated. To measure the level of motoric efficiency the Test of Physical Fitness (developed by the International Committee on the Standardization of Physical Fitness Tests) is used (Pilicz et al., 2002). The battery of six tests has been chosen without run tests (at short and long distance) because some pupils have introduced medical contraindications to undertake this type of exercises. Faulty postures have been characterized on the basis of expert medical opinion analysis included to the medical documentation of pupils.

Results of Research

The greatest number of faulty postures has been noticed in 11 y.o. girls and 12 y.o. boys (percentage of children with faulty postures: 8 y.o. - 21.74% girls, 17.39% boys; 9 y.o. - 31.58% girls, 26.32% boys; 10 y.o. - 25.00% girls, 17.86% boys; 11 y.o. - 38.46% girls, 26.92% boys; 12 y.o. - 23.08% girls, 34.62% boys; 13 y.o. - 11.11% girls, 27.78% boys). Differences caused by gender determinants are statistically significant at the level of $\alpha = 0.05$.

The greatest number of faulty postures is flat feet (platypodia) and lateral spinal curvature (scoliosis). Defective feet have been observed more often in younger children (I–III classes), thus scoliosis – in older children (IV–VI classes). Defective feet and scoliosis are not differentiated by gender or size of inhabited agglomeration (Tab. 1).

A somatic development profile (Tab. 2) shows a greater dispersion of body height in children. This is proven by the standard deviation value. A size of inhabited agglomeration is diversified by the BMI because in a village environment fewer children with the first degree of obesity and more with body mass deficiency are observed. However, gender has no influence on dispersion of results inside a sample because percentage of children with deficiency or excess of body mass is similar in both groups. In children with higher values of the BMI, a more frequent occurrence of faulty postures has been noticed in the area of lower extremities. These differences are thus not statistically significant.

The BMI (kg/m^2) calculated among the children examined is as follows: 8 y.o. - girls 17.40 and boys 17.12; 9 y.o. - girls 16.89 and boys 16.27; 10 y.o. - girls 18.47 and boys 18.17; 11 y.o. - girls 18.26 and boys 18.02; 12 y.o. - girls 17.40 and boys 14.61; 13 y.o. - girls 18.02 and boys 17.08.

Table 1. Percentage of faulty postures in examined children (%).

Faulty posture	Age (years)					
	8	9	10	11	12	13
lateral spinal curvature (scoliosis)	13.64	26.47	16.67	41.18	45.45	57.14
rounded back (hyperkiphosis)	13.64	-	8.33	17.65	-	14.29
knock knee (genu valgum)	4.55	-		23.53	9.09	14.29
winged shoulder-blade (scapula alata)	9.09	8.82	12.50	5.88	-	-
flat fee (platypodia)	59.09	64.71	62.50	11.76	45.45	14.29

Following the Przewęda and Dobosz (2003) division of physical efficiency into three levels (low <up to 40.00 points>, medium <from 40.01 to 60.00 points> and high <above 60.01 points>), research results of the West Pomeranian pupils can be characterized. The girls examined have achieved a medium level of physical efficiency in an unquestionable majority of tests. The lowest result was noticed in 9 y.o. girls in a standing broad jump – 38.37 points. The highest results have been attained in sit ups in 12 y.o. girls – 64.72 points and 10 y.o. girls – 63.05 points, and also in bent arm hang in 13 y.o. girls – 62.53 points. The greatest dispersion of results was observed in bent arm hang – from 7.811 to 35.633 points.

Table 2. Body height and body mass of examined children with faulty postures.

Group	Girls				Boys			
	Body height (m)		Body mass (kg)		Body height (m)		Body mass (kg)	
AGE (years)	mean	SD	mean	SD	mean	SD	mean	SD
8	1.27	0.036	26.66	6.494	1.26	0.042	26.95	4.033
9	1.32	0.041	29.13	4.716	1.33	0.044	30.17	6.863
10	1.39	0.064	33.35	10.443	1.34	0.032	31.36	5.894
11	1.40	0.046	33.77	1.750	1.41	0.041	35.69	7.415
12	1.50	0.061	38.85	5.380	1.48	0.061	32.00	3.600
13	1.57	0.106	44.30	6.100	1.61	0.021	44.00	1.400

In boys, a slightly higher differentiation of results in the executed tests was noticed. In three tests, they achieved medium results below 40.00 points, and in nine – above 60.01 points. The highest medium results for 13 y.o. boys was achieved in bend trunk – 86.21 points, and in bent arm hang 13 y.o. boys attained 75.41 points and 11 y.o. boys – 72.92 points. The lowest medium level was noted in hand grip in 12 y.o. boys (37.71 points) and in bent arm hang in 8 y.o. and 9 y.o. boys (38.80 and 39.31 points, respectively). In nine tests boys achieved results above 60.01 points. Whereas, in sit ups 13 y.o. boys have attained the highest medium result from all measured tests – 86.21 points.

The level of physical efficiency is not statistically significantly differentiated by a size of inhabited agglomeration. Thus, a significant influence on its level is exerted by the gender of examined children and their age. In older children, there is the greater predominance of boys over girls; as is noticed in 13 y.o. pupils – in all tests boys are better than girls. A similar predominance has been observed in examined 9 y.o. and 12 y.o. pupils. Only the youngest girls have better results in five (out of six) tests than boys.

Discussion

The statistical analysis of the results obtained highlights that differentiation of physical efficiency level is dependent on a type of a faulty posture. Pupils with an excess or deficiency of body mass often present a lower physical efficiency. Calculated statistical indices do not show the significance of these differences.

Comparing research carried out in 1999 (Umiastowska, Makris, 2001) in the West Pomeranian Province, results obtained in efficiency tests by children from this study are higher than by children examined earlier. Somatic parameters in the current group are lower than in an analogical group examined seven years ago.

A comparison of the BMI calculated by Palczewska and Niedźwiedzka (2001) and somatic parameters characterizing children from the West Pomeranian Province show that in 12 and 13 y.o. children from the current study this index is lower than in children from Warsaw in a cited report. However, the rest of the values in 8–11 y.o. pupils are higher.

Diminishing participation of physical activity in the daily activity of pupils causes an increase in the child population with developmental dysfunctions. More frequently observed obesity and overweight, frequently leading to posture failures, involves a bigger and bigger percentage of the studied pupils (Marshall et al., 2004; Todd, Currie, 2004; Woynarowska, Mazur 2000).

Conclusions

1. Gender determinant and size of agglomeration do not differentiate the occurrence of faulty postures in 8–13 y.o. children.

2. Physical efficiency of children participating in corrective gymnastics is maintained at the medium and high level. This is an effect of the additional special exercises.

3. A level of physical efficiency is differentiated by gender and age determinant, and it is not dependent on a size of agglomeration inhabited by the children examined.

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