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## Functional Features Of Children With Cerebral Palsy Having Low Physical Activity.

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### ABSTRACT

An important indicator of the well-being of society in economically developed countries is the level of health of children with pathology. In this category, as an important social marker, includes children with infantile cerebral palsy. Purpose: to assess the overall level of health of children with cerebral palsy, who are not regularly engaged in physical training. The study took 33 children aged 11-12 years with infantile cerebral palsy of mild severity. The control group is represented by 31 healthy children aged 11-12 years. Children of both groups had low physical activity. Functional tests were applied, statistical processing of the results was carried out. All children were examined at the end and after 6 months. After 6 months. Observations in the experimental group noted a shift in the relationship between sympathetic and parasympathetic influences in the body to the apparent prevalence of the former. In children with cerebral palsy, an increase in the weight-to-height ratio was found, which ensured their transition to the status of excessive body weight. This was accompanied by an increase in the tension in the adaptation of the circulatory system, which ensured that it reached a level of unsatisfactory adaptation. A comprehensive assessment of the overall physical development made it possible to establish a negative dynamics in children with cerebral palsy at the end of the observation period. The obtained result was inferior to the control values by 42.7% and indicated the achievement in the experimental group of a low level of general physical development. It becomes clear that for children with infantile cerebral palsy systematic and dose-related physical loads are required that can provide a health-improving effect and are designed to slow down negative changes in their body caused by pathology.

**Keywords:** child age, cerebral palsy, functional features, health.

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## INTRODUCTION

An important indicator of the welfare of society in economically developed countries is the level of health of children with various pathologies [1,2]. In this category, as an important social marker, is the state of children with infantile cerebral palsy [3]. It is known that the level of their health depends not only on their medical care, but also on the level of their motor activity [4,5]. The complexity of this issue is related to the fact that children with infantile cerebral palsy are heavily burdened by many diseases [6]. Their course often has a progressive character and is difficult to compensate [7]. Serious impact on their overall level of health is the degree of existing disorders in the central nervous system and cardiovascular pathology, which very often limit life expectancy [8,9].

Modern medicine has an urgent need to continue collecting and comprehending information about the biological features of a person in childhood, having a serious pathology [10,11]. The most complete assessment of these manifestations is possible on children with infantile cerebral palsy who have not experienced physical exertion above the household. In this connection, the goal is to assess the overall level of health of children with cerebral palsy who do not regularly engage in physical activity.

## MATERIALS AND METHODS

The study was approved by the local ethics committee of the Russian State Social University on September 15, 2016 (protocol No. 9). The study was conducted on the basis of the Russian State Social University. The study took 33 children aged 11-12 years with infantile cerebral palsy of mild severity. The control group is represented by 31 healthy children aged 11-12 years. Children of both groups had low physical activity. They did not attend the sports sections and avoided physical exertion in physical education classes at school. All children were examined at the end and after 6 months. During the time between the two examinations, the children in both groups remained clinically healthy.

To assess the condition of the examinees in the outcome and six months later, the following methods were used in the work:

### Assessment of the state of the circulatory system.

Measure the height and body weight, determine the pulse rate and the level of blood pressure. To quantify the level of the functional state (FS) of the circulatory system in points, the following formula is used:  $PS = 0,011 (HR) + 0,014 (SBP) + 0,008 (DBP) + 0,014 (Rev.) + 0,009 (MT) - 0,009 (DT - 0,27)$ , Rev. - age in years; SBP and DBP - systolic and diastolic blood pressure in mmHg; Heart rate - heart rate in bpm; MT - body weight in kg; DT - body length in cm. The evaluation of the level of adaptation of the circulatory system in the examined subjects was evaluated according to the scale below (Table 1).

**Table 1: Scale for assessing the functional state of the circulatory system**

No	Adaptation status	Values of FS in points
1	Satisfactory adaptation	to 2,60
2	The tension of adaptation mechanisms	2,60-3,09
3	Unsatisfactory adaptation	3,10-3,60
4	Disruption of adaptation	above 3,60

The functional state of the autonomic nervous system (vegetative Kerdo index) was calculated using the formula:  $(1-DD / HR) \times 100$ , where DD is the diastolic blood pressure; Heart rate - heart rate. The following criteria were used for evaluation. The magnitude of the vegetative index of Kerdin ranges from -15 to +15 indicates a balance of sympathetic and parasympathetic influences.

The value of vegetative index Kerdo above + 15 indicates the predominance of the sympathetic tone of the autonomic nervous system. The value of the vegetative index of Kerdo is less than - 15, indicating the predominance of the parasympathetic tone of the autonomic nervous system. With a vegetative Kerdo index of zero, vegetative equilibrium takes place.

**Evaluation of the weight-growth index.** The weight-growth index is an integral characteristic of development and reflects the formed level of metabolic processes. The criteria for its evaluation are presented in Table 2.

**Table 2: The scale of body weight by weight-growth index**

Weight-growth index (g / cm)	Body weight estimation
<310	Deficit
310-369	Reduced
370-480	Norm
481 - 540	Increased
>540	Excess

**Assessment of the level of general physical development (indicators of the vegetative-vascular system).** A number of simple definitions of indicators were used, which were introduced into the following formula:  
 $Y = -0,615 \times X1 + 0,259 \times X2 - 0,322 \times X3 - 0,124 \times X4 + 0,148 \times X5 - 0,023 \times X6 + 54,21$   
 where Y is the general physical state; X1 - age, years; X2 - body length, cm; X3 - body weight, kg; X4 -Heart rate at rest, bpm; X5 - systolic blood pressure, mmHg; X6 - diastolic blood pressure, mm Hg. The evaluation criteria are presented in Table 3.

**Table 3: Scale of assessment of general physical condition**

The level of general physical development	Values in points
High	More than 51
Average	38-51
Low	Less than 38

The results of the study were mathematically processed with the calculation of the arithmetic mean (M), the error of the arithmetic mean (m) and the level of reliability in the t-test of the Student ( $p < 0.05$ ).

**RESULTS OF THE SURVEY**

The data of the evaluation of the scores of the examined children with infantile cerebral palsy are systematized in Table 4.

**Table 4: Results of the evaluation of the health status of children taken into the study**

indicators	Observation groups			
	Children with infantile cerebral palsy, M±m, n=33		Control, M±m, n=31	
	outcome	at the end of observation	outcome	at the end of observation
AutonomicKerdo index, points	14.7±0.36	15.9±0.29 $p < 0.05$	3.7±0.18	3.6±0.25 $p_1 < 0.01$
Weight-growth index, g/cm	510.2±1.12	543.8±0.62 $p < 0.05$	380.1±0.54	385.1±0.67 $p_1 < 0.01$
Functional state of the circulatory system, points	2.92±0.31	3.16±0.35 $p < 0.05$	2.44±0.27	2.50±0.39 $p_1 < 0.01$
General physical development, scores	39.5±0.39	37.0±0.29	53.0±0.37	52.8±0.42 $p_1 < 0.01$

Conventions: p - reliability of differences in baseline values and values at the end of the observation in both groups; p1 - reliability of differences in indicators at the end of observation between groups. The reliability of differences between groups in terms of outcomes was not obtained.

In the examined children with cerebral palsy, an increased level of weight-to-height ratio was noted, which was aggravated by the stress of the mechanisms of adaptation of the circulatory system. This was accompanied in children with infantile cerebral palsy by the risk of the prevalence of sympathetic influences over parasympathetic. In addition, they had a general physical state corresponding to the borderline between the middle and low levels.

Observation of the dynamics of children in both groups made it possible to identify the features of changes in their indicators taken into account. In the control group, the stability of the Kerdo index was noted in half a year, which indicated the stability of the balance between sympathetic and parasympathetic influences in the body of healthy children. This was accompanied by the invariance of the magnitude of the weight-to-height ratio, which indicated the harmony of their growth and development processes [12, 13]. Also in the children of the control group, after six months, the circulatory system retained its satisfactory adaptation to external factors. This indicated a stable normal development and its adequacy to environmental impacts [14]. Even with low physical loads on the body of healthy children, their overall physical development remained at a high level.

Observations carried out for children with infantile cerebral palsy made it possible to identify their tendency to worsen the indicators taken into account. So, after 6 months. Observations in the experimental group noted a shift in the relationship between sympathetic and parasympathetic influences in the body to the apparent prevalence of the former. As a result of low physical activity in children with cerebral palsy, an increase in weight-and-growth rates of 5.7% was found, which ensured their transition to the status of overweight. This was accompanied in these children by an increase in the intensity of the adaptation of the circulatory system (by 7.2%), which ensured its reaching a level of unsatisfactory adaptation [15] and a general weakening [16,17]. A comprehensive assessment of the overall physical development made it possible to establish a negative dynamics in children with cerebral palsy at the end of the observation period. The obtained result was inferior to the values of the control by 42.7% and indicated the achievement in the experimental group of a low level of general physical development highly threatening with its consequences [18, 19].

Thus, low physical activity in children with infantile cerebral palsy has a pronounced negative effect on health in general.

## CONCLUSION

The problem of preserving and restoring the health of children with infantile cerebral palsy is becoming increasingly important in developed countries due to the increase in their share in the population structure. For this contingent, the decrease in motor activity becomes common, which increases the number of dysfunctions and complex pathology in it. In this regard, it becomes necessary to further search for rational forms of therapeutic and preventive and health-improving work with children with cerebral palsy with the help of physical exercises. In assessing the health status of children with infantile cerebral palsy, the risk of low physical activity in this category of children was shown with the help of integral indices. After 6 months. observations of physically inactive children with infantile cerebral palsy revealed a loss of balance of sympathetic and parasympathetic influences and a deepening of weight-growth disorders. This was accompanied by their achievement of an unsatisfactory adaptation of the circulatory system and a low level of general physical development. Based on the study, we can say that for children with infantile cerebral palsy systematic and dose-related physical loads are required that can provide a health-improving effect designed to slow down negative changes in their body caused by pathology.

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