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**Physical Education in Early Childhood
Education and Care
Researches – Best Practices – Situation**

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Editors

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– Situation**

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Development of Physical Exercises for Children with Diseases of Vessels

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Abstract

The aim of the study was to establish how using special physical exercises can improve the condition of children with vascular disease. To achieve this goal, the methods of physical examination of children, pedagogical experiment and statistical processing of the obtained data were used. The results of the study showed that in most cases it is possible to significantly improve the health of children with certain diseases of the vascular system through the use of special complexes of physical exercises. This study was carried out during 2 years (from 2016 to 2018). It was attended by 124 children of the early childhood, who were suffering from diseases of the vascular system. The same complexes of physical exercises were applied for a group of practically healthy children of the same age with similar anthropometric data (Armout, 2013). For two years, rehabilitation therapists were engaged with sick children, who used special physical exercises aimed at achieving harmonious physical development for children, despite the fact that they had vascular diseases. At the final stage of the study, they assessed the level of development of physical qualities among sick and practically healthy students. It was found that the degree of lag in terms of the physical development of children with vascular diseases from practically healthy children decreased significantly.

Key words: Early childhood, Diseases of vascular system, Special physical exercises.

Introduction

The results of statistical analysis of indicators of the state of health of the population convincingly show that in many countries around the world the number of children with various diseases, in particular pathological changes in the elements of the vascular system of the body (vasculitis, vascular dystonias, aneurysms, etc.) is gradually increasing.

Therefore, in our time it is extremely important to search for effective methods to maintain the health of these children at an appropriate level. In addition to the use of drugs, it is rational to use special complexes of physical exercises that contribute to the achievement of a harmonious physical development of the child, despite the presence in their organisms some kind of cardiovascular disease (Stoll, 2016).

Development of a system for using physical exercises for children to improve their health is one of the most important scientific tasks. In this regard, in many countries of the world a large number of research works are carried out, the main purpose of which is to find new ways to solve this problem (Alfrey, 2012).

Analysis of modern scientific literature shows that many publications are devoted to the problem of finding effective ways to improve the health of children through physical exercise (Reinolds, 2016).

Scientific studies conducted in recent years confirm the idea of the need to improve the system of physiotherapy exercises for children (Zeichner, 2008).

This article is devoted to the use of special physical exercises for children with impaired functions of the organs of the cardiovascular system, in particular with pathological changes in the state of peripheral vessels.

The presence of a tendency to a gradual increase in the number of children suffering from various diseases (in particular, peripheral vascular diseases) makes it extremely important for scientific research in this area and confirms the critical importance of solving this problem.

Methods

In the course of performing the tasks of this study, the following scientific methods were applied:

- method of analysis and synthesis of scientific literature data (more than 56 sources of scientific information on a given topic were studied);
- the method of questioning during which detailed information was obtained from the parents of those children who have diseases of the vascular system about the condition of these children;
- method of assessing the development of children's physical qualities (by performing special diagnostic physical tests);

- methods of assessing the health of children (based on the results of dynamic medical observation);
- methods of statistical processing of the data obtained during the study with the determination of the level of their reliability.

The use of just such a selection of research methods allowed the most efficient use of resources and time to obtain the desired results.

Results

The process of physical education of young children is paid much attention in many countries around the world. The result depends on the correctness of the organization of the process of physical education of children, including those who have vascular diseases. The main task of the system of physical education of children is the desire to achieve their harmonious physical development without deterioration of their overall health.

The main goal of our research was to find out whether it is possible in the conditions of life in modern society to achieve harmonious physical development of children of primary school age suffering from diseases of the circulatory system, through the use of special programs of therapeutic and preventive physical culture (Fullan, 2017). Therefore, in the course of this study, we sought to obtain accurate information about the health status of young children suffering from diseases of the vascular system, the development in the dynamics of their physical qualities and the effect of a certain algorithm on children's physical activity on this process (Aelterman, 2007).

We planned to conduct the study in such a way that it allowed us to study the indicators of physical development and the state of development of the basic physical qualities of 124 children living in Kiev and Kiev region and suffering from diseases of the vascular system (in particular, dystonias, aneurysms, some types of vasculitis, etc.). To obtain comparable data, we also created a control group, also consisting of 124 children without circulatory system diseases. These were children of the same age with similar anthropometric indices. As a result of this preparatory work, we received two comparable groups of children, whose indicators approximately coincided according to anthropometric and physiological studies (Opfer, 2011).

After implementing a comprehensive assessment of the physical development indicators and indices of the basic physical qualities of each of the students in the main and control groups, during the two-year observation period, we used special complexes of physical exercises (for children with diseases of the vascular system) that were sent to achieve harmonious physical development of these children, despite the fact that they have pathological changes in the state of the vascular system (Hargreaves, 2010).

At the same time, during the first stage of work, we used standard methods for determining the indicators of physical development in all children of the main and control groups. It turned out

that in children of the main group (that is, those who have diseases of the organs of the vascular system), the indicators of physical development were significantly lower than in healthy children from the control group.

Determining the indicators of the physical development of children, as well as the indices of their basic physical qualities, was carried out using special tests developed for children of primary school age. Moreover, all indicators were expressed in arbitrary units (from 0 to 100 units).

The use of such a system for recording indicators was most convenient for this study, since it made it possible to compare the results of using complexes of special physical exercises designed for children with vascular diseases with those of practically healthy children of the same age.

After the end of the two-year period of application of special exercises for children of the main group, we repeated the measurement of these indicators in children belonging to both groups.

It turned out that in children of the control group these indicators increased in accordance with the age dynamics of the human organism, and the indicators of children with vascular system diseases increased to an even greater degree, as a result of which the difference between the indicators of children in the main and control groups significantly diminished.

**Table 1 Indicators of physical development of children at the beginning of the study
(in arbitrary units)**

Consecutive number	Physical Development Index	Groups of children	
		Core group	Control group
1	body mass	45,9 ± 2,6	55,8 ± 3,4
2	body length in prone position	47,5 ± 2,7	57,5 ± 3,5
3	chest circumference	47,6 ± 2,8	61,5 ± 3,9
4	tissue turgor	44,3 ± 2,5	54,5 ± 3,3
5	muscle tone	41,4 ± 2,3	62,6 ± 4,1

Each of the indicators was presented in this table in arbitrary units relative to the age norm, taking into account the possible minimum and maximum indicators. Thus, the average normal value of each of these indicators corresponds to approximately 50 points. The table shows that almost all indicators in children with diseases of the organs of the vascular system are lower than in healthy children from the control group.

This is explained by the fact that children with vascular diseases deliberately reduced the intensity of physical activity due to the fear of possible complications. As a result, children with vascular diseases were lagging behind in physical development from healthy children.

After the two-year observation period was completed, during which we used special physical exercises for children with vascular diseases, we repeated the study of the physical development indicators of children in the main and control groups (Cheerham, 2011).

In the same time, typical indicators of the physical development of children characteristic of their age were taken as the basis. Thus, the average value of each indicator again corresponded to 50 points, despite the fact that its actual value was, naturally, greater.

Table 2 Indicators of physical development of children at the end of the study
(in arbitrary units)

Consecutive number	Physical Development Index	Groups of children	
		Core group	Control group
1	body mass	50,8 ± 2,9	54,6 ± 3,2
2	body length in prone position	51,6 ± 3,0	55,3 ± 3,3
3	chest circumference	52,6 ± 3,1	57,9 ± 3,7
4	tissue turgor	49,2 ± 2,8	53,6 ± 3,2
5	muscle tone	51,2 ± 2,9	56,4 ± 3,6

As can be seen from the data presented in both tables, the difference in indicators of the physical development of healthy children and children with diseases of the vascular system has been significantly reduced.

Based on these results, it can be concluded that special exercises developed for children with diseases of the vascular system contribute to the achievement of their harmonious physical development, despite the presence of cardiovascular pathology (Weston, 2017).

Discussion

Considering the fact that in Ukraine and in many other countries of the world the number of young children suffering from diseases of the organs of the vascular system continues to increase, the relevance of scientific research in this area is extremely high.

There is no doubt that children suffering from chronic diseases of the vascular system organs, limiting the level of their physical activity due to fear of complications, will not reach harmonious physical development as adults.

They will not be sufficiently developed in physical terms and will not be able to effectively carry out labor activities. In addition, the vast majority of such people will be forced to systematically be treated and apply appropriate rehabilitation programs.

Given this situation, it is extremely important to apply scientifically grounded and proven complexes of special physical exercises for children with pathological changes in the vascular system. These complexes should be adapted to the real possibilities of children suffering from diseases of the vascular system, and most importantly, they should be aimed at achieving a harmonious physical development of these children, despite the fact that they have pathological changes in the vascular system of their body. Of course, the use of such exercises should be carried out absolutely correctly, using scientifically based methods and under constant medical supervision.

In the future, it is advisable to create special centers of self-education in universities of physical education and medical universities, in which children with vascular pathology under the constant supervision of medical specialists and physical culture instructors will use special complexes of physical exercises aimed at achieving their harmonious physical development (Dannenberg, 2013).

The most important role in organizing the process of correcting the state of the physical development of children with diseases of the organs of the vascular system is played by medical specialists, rehabilitologists and specially trained physical education teachers who specialize in working with this category of children.

Of course, all work with such children should be carried out against the background of continuous medical monitoring of the condition of children and subject to the implementation of extraordinary medical examinations.

The most important areas of further scientific research aimed at solving the problem of maintaining the health of children with pathological deviations in the state of health, should be considered the rationale and development of special physical training programs aimed at achieving the harmonious physical development of children suffering from other types of pathological changes in their body diseases of the respiratory system, gastrointestinal tract, musculoskeletal system, etc.)

The results of this study are primarily important for those areas of human activity that are aimed at the protection of health, physical education and ensuring the comprehensive development of representatives of different categories of the population of modern society.

Conclusion

The main feature of this study was that it was devoted to the study of the physical development of children suffering from diseases of the vascular system. Such a contingent was chosen for study not by chance.

The fact is that, according to many experts, the human body during this period of life is the most sensitive to the effects of therapeutic and diagnostic activities. In addition, it is at this age that the basis for harmonious physical development of a person is laid.

Therefore, based on the data obtained as a result of this scientific research, we can draw the following conclusions:

1. The impact of a combination of adverse factors associated with the habitat and nature of the daily lifestyle of a modern person leads to a gradual increase in the number of children suffering from various diseases (including diseases of the vascular system), which is a serious demographic, medical and social problem. Therefore, it is important to develop and use scientifically based exercise systems designed for children with disabilities in their health status, aimed at achieving a harmonious physical development of these children.
2. Insufficient level of motor activity of children with pathological changes in the organs of the vascular system naturally leads to deterioration of their general condition, progression of diseases and lagging in physical development from healthy peers. At the same time, the use of special physical exercises for this contingent of children can allow not only to improve their health and physiological state, but also to improve the indicators of their level of physical development, as well as to promote the transition of their illness into a state of prolonged remission.
3. The best way to solve this problem is to organize and conduct systematic work with children with diseases of the vascular system. This work should be carried out by experienced physical culture instructors subject to constant medical supervision and using complexes of special physical exercises that help these children achieve harmonious physical development, despite the fact that they have pathological changes in the vascular system. It is most expedient to carry out such work on the basis of special physical rehabilitation centers established at medical universities and universities of physical education and sport.

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