

NININS 2020**International Scientific Forum «National Interest, National Identity and National Security»****PHYSICAL ACTIVITY OF CHILDREN AS A CONDITION FOR
THE HUMAN CAPITAL DEVELOPMENT**

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Abstract

The issues of children's health and systematic physical education and sports are an important point of strategic planning for the period up to 2035 at the regional and federal levels. The importance of organizing sports classes in ensuring the healthy and harmonious development of children during school education has been recognized by doctors and teachers. At present, the problem of health is exacerbated by the decline in physical activity and optimization as a result of the introduction of digital technologies and the development of robotics. At the same time, the human brain is processing more and more information, increasing mental loads, reducing vision, disrupting blood circulation, which leads to a future decline in efficiency. Despite the fact that the modern concept of human capital is transformed in favor of the intellectual, as many studies show, it is practically impossible to preserve the mental health of a person without physical health. In our view, the greatest potential for physical health can be realized in rural areas, but the problem of physical education of schoolchildren is national. The article presents a theoretical justification for the development of methods of physical rehabilitation of first-graders with diseases of the cardiovascular system. The structure, and content of the technique are revealed and the impact of individualized motor activity on the child's body is shown.

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1. Introduction

Despite world trends in the proportion of urban population in the structure of the population, the number of rural areas remains quite large, and their development is given sufficient attention. The main factor of modern socio-economic and innovative development of the territory is human capital (Khosroeva et al., 2019; Selitrenikova, 2005). The first mention of the need to take human factor into account in the creation of national wealth was noted as early as 1676 in the work of the English economist William Petty in "Political Arithmetic" (Petty et al., 1993). In the early 20 century, Harry Becker (1964) viewed human capital as separate from the physical kind of capital, with similar properties:

- it represents the good of lasting use;
- requires repair and maintenance costs;
- may become obsolete even before its physical wear and tear occurs.

Theodore Schulz, another well-known American scientist, made a significant contribution to the formation of the theory of human capital at the initial stage of its development. His work largely defined the understanding of the role of human capital as the main productive factor of industrial and post-industrial economies (Shultz, 1968).

In Russia, at present, from an economic point of view, human capital means the stock of knowledge, health, skills, experience that an individual uses to generate income, and the basis for the formation of human capital is the innate abilities and gifts that develop through investment (Gromova, 2019). In the context of the pandemic and the development of chronic diseases, health in the present time comes to the fore, especially in rural areas. This is due to the fact that the maintenance of the population of rural territory is settled by reproduction; the processes of relocation from cities to rural areas are not foreseen. Therefore, in order to develop a healthy generation and preserve the population of rural areas, it is important to physically improve the younger generation.

In the modern period, prevention of diseases of the cardiovascular system and the rehabilitation of people remains one of the urgent problems of health care and education, since the prevalence of these diseases among the adult population of the Russian Federation has become quite widespread.

Currently, congenital heart disease is one of the main risk factors for the development of complications among children and young people. Achievements of modern experimental cardiology and rehabilitation systems allow speaking about the complexity of the pathogenesis of cardiovascular diseases, which determines the need to use not only drug therapy, but also various therapeutic physical factors.

The vast arsenal of methods for the physical treatment of various diseases of the cardiovascular system is constantly expanding, which gives scientists the task of investigating the comparative effectiveness of both previously developed and new technologies for treating this group of diseases.

At the age of seven, children usually begin to attend school and, accordingly, spend a long time in a static position at the desk. This significantly increases the load not only on the musculoskeletal system, but also the cardiorespiratory and nervous systems of the child's body. At the same time, it is proved that nothing affects the child's health more negatively than hypodynamia. Dosed exercise increases immunity, strengthens posture, improves blood circulation and activates mental activity (Selitrenikova, 2005).

Exercises help the first-graders to form a correct posture, increase their body endurance, and also help to improve the coordination of movements.

2. Problem Statement

In our work, we divided the exercises for first-graders into 2 types: fortifying and corrective. A seven-year-old child with pathology of the cardiovascular system can not reproduce uniform exercise for a long time.

Therefore, we recommend alternating the types of permitted motor actions in the process of occupation, changing gymnastic equipment and using different starting positions. We can use the complexes with a gymnastic stick, a ball or near the gymnastic wall.

3. Research Questions

Starting positions in the exercises are applied "standing", "sitting on the floor" or "sitting on a chair", "lying on the mat". In the process of training, we recommend using various game and competitive elements, for example, "who is the fastest and the highest will get an apple?" Or "who will hold the ball on the head longer?"

It is worth noting that before the start of classes it is imperative to assess the capabilities of the child's body and to obtain permission from doctors to influence the specific motor load on it.

In this case, any set of physical exercises should consist of the following parts: a warm-up, the main and the final part. At the same time, the duration of extracurricular physical education classes with first-graders who have violations of the cardiovascular system should not exceed 30 minutes (Dubrovsky, 1998; Luca, 2003).

The objectives of the complex of physical exercises for heart diseases are as follows (Blumenthal et al., 2004; Meracle, 2016; Radzewitz et al., 2002):

- Possible compensation for existing circulatory failure;
- Improving the adaptive abilities of the heart and the peripheral blood circulation apparatus to the changing needs of the child's body;
- Strengthening the nonspecific resistance of the child's body to adverse environmental factors;
- General expansion of the functional capabilities of the child's body;
- Creating an enabling environment for improving the physical and mental performance of the child.

Scientists recommend the use of general developmental and applied exercises for solving these problems. We believe that, in addition to these exercises, special attention should be paid to respiratory. In addition the selection and individualization of physical activity and its gradual increase is important, taking into account the duration of classes and the state of the student's body. It is advisable to choose such exercises, in the performance of which all or most of the muscle groups of the child take part in physical work according to the principle of the scattered load (alternately on different muscle groups).

Our experiment was based on a survey of 60 first-graders in rural areas of the Voronezh region, who have diseases of the cardiovascular system (30 people are an experimental group and 30 are controls).

In the process of training, we followed the following rules (Allnsworth & Kobbe, 2007)

- 1) gradual increase in the duration and intensity of employment;
- 2) child's painless exercise of the proposed exercise;
- 3) conducting classes two hours after the last meal;
- 4) maintaining a temperature of comfort in the room for occupancy equal to 22 °C;
- 5) mandatory use in the process of breathing exercises (at least 20 % of the total duration).

The contraindications to conducting classes with a particular child included: the presence of high temperature, arrhythmias, and poor health.

For first-graders who have diseases of the cardiovascular system, for the study of small muscle groups, the recommended number of repetitions of one exercise is 10–12 times, and for large ones – 3–5. Specially directed exercises should be designed to activate extracardiac circulatory factors. These include: dynamic and static breathing exercises performed from various starting positions. It is also necessary to apply the so-called diaphragmatic breathing of moderate depth. It consists in the following: at the expense of “once” the child makes a breath, at the expense of “yes – three – four” – exhalation. We recommend using dosed walking at the beginning (starting from the third minute for 2 minutes) and in the middle of the main part of the lesson (from 12 to 14 minutes). Then within 10 minutes we recommend to include outdoor games with moderate physical activity in the after-hour physical education class of a first-grader. In general, the duration of one lesson was 30 minutes, and they were held 3 times a week on those days when the child did not have physical education classes in the schedule.

Recommending the use of outdoor games, we note that they had a general physiological orientation: improving the functions of the respiratory, cardiovascular, nervous systems and the musculoskeletal system of the child. In games, walking at a different pace, a wide and smooth range of movement and training of the student's vestibular apparatus were used. According Chasey (1970), with regular exercises with dosed physical exercises in a schoolchild with a cardiovascular disease, compensation is provided for the existing disorder and a holistic adaptation of the child's body to the effects of physical activity.

Our classes included three stages:

- the first stage – the retractor – lasted 3 months (from September to November): included general developmental, specially directed exercises and outdoor games of insignificant intensity;
- the second stage – developmental – had a duration of 3 months (from December to February): included general developmental, specially directed exercises and outdoor games of low and moderate intensity;
- the third stage – stabilizing – had a duration of 3 months (from March to May): it included general developmental, specially directed exercises and active games of moderate and tonic intensity.

Exercises and mobile games of the first stage of impact on the body of a first-grader who has a cardiovascular system disease were referred to as so-called recovery loads, that is, they had an intensity of

about 25–30 % of the maximum possible for a healthy child of similar age and required the schoolchild to recover from no more than 6 hours.

Exercises and mobile games of the second and third stages were in the area of the so-called maintenance load, which affected the body of a first grader with a cardiovascular disease approximately 50–60 % of the maximum possible for a healthy child of seven or eight years of age and demanded recovery from his body for no more than 12 hours.

We specify the structure of the method of correctional and health-improving activities with children of 7–8 years old who have diseases of the cardiovascular system, depending on the distribution in stages.

4. Purpose of the Study

The article presents a theoretical justification for the development of methods of physical rehabilitation of first-graders with diseases of the cardiovascular system. The structure, and content of the technique are revealed and the impact of individualized motor activity on the child's body is shown.

5. Research Methods

According to problem statement, we propose 2 types of exercises for first-graders: fortifying and corrective. The article presents a theoretical justification for the development of methods of physical rehabilitation of first-graders with diseases of the cardiovascular system. The structure, and content of the technique are revealed and the impact of individualized motor activity on the child's body is shown.

6. Findings

At the first stage of training, the technique developed by us included the following exercises and outdoor games.

1–2 minute classes – I.p. – legs shoulder-width apart, arms extended along the body. Raise your arms through the sides up – inhale, then lowering – exhale.

3–4 minutes:

- 1 exercise – walking around the room on toes, arms above head (1 min.). Follow the posture, breathing is arbitrary.
- 2 exercise – walking in the hall, not leaning forward, while raising the knees high (30 s).
- 3 exercise – walking in the hall with deep forward attacks (30 s). Lunges to perform deeper, without jumping, keep your back level.

5–11 minutes:

- 1 exercise – I.p. – legs together, hands on a belt. Bend your knee, clap your hands under it. Then, the same is for the second leg. After 5 repetitions for each leg, complicate the exercise: lift the leg straightened at the knee forward (5 repetitions for each leg).
- 2 exercise – I. p. – feet shoulder width, hands clenched fists to shoulders. Hands are down from the starting position down, then again to the shoulders (10 repetitions).

- 3 exercise – I.p. – feet shoulder width, hands on a belt. Take the leg to the side, return to the starting position (5 repetitions for each leg).
- 4 exercise – I.p. – legs shoulder-width apart, arms extended along the body. Carry out the torso to the sides with the arms sliding along the body while inhaling to inhale, while straightening – exhaling (5 repetitions to each side).

12–13 minutes:

- 1 exercise – walking around the room on toes, arms above head (1 min). Follow the posture, breathing is arbitrary.
- 2 exercise – walking around the room on the heels, hands on the belt (30 s). Follow the posture, breathing is arbitrary.
- 3 exercise – walking in the hall, not leaning forward, while raising the knees high (30 s).

14–15 minutes:

- 1 exercise – I.p. – standing near the wall at a distance of one and a half steps facing the wall. Bend forward to the waist, touching the wall with your fingers, carry out the exhalation. While inhaling, straighten up, take your hands back (5 repetitions).
- 2 exercise – I.p. – legs shoulder-width apart, arms extended along the body. Raise your arms through the sides up – inhale, then lowering – exhale.

16–26 minutes – outdoor games (different depending on the stage of training).

27–28 minutes:

- 1 exercise "Let's blow on a fluff" – I. p. – legs shoulder-width apart, arms extended along the body. To carry out a long exhale through the half-open mouth, then exhale (the lips are located "tube"). Exhale to perform as long as possible (1 min.).
- 2 exercise – I.p. – sitting on the floor, hands in the support from behind. Bend the legs at the knees – exhale, then straighten the legs and return to I. p. – inhale (1 min.). Hold your socks; do not bend your elbows.

29–30 minutes – Construction and summarizing the lesson

6.1. The 1st stage:

Monday – 1 – “Kolobok” (a load of low intensity). First graders sit on the chairs, holding in the hands of sticks about 20 cm long, to which bright balls are tied by ropes. The schoolboy is at a distance of about 10 m from the ball-ball. The student, winding the rope on a stick, as soon as possible should roll the "bun" to itself. The game lasts 5 minutes.

2 – “Find and keep silent” (load of low intensity). The children turn away from the leader and close their eyes. The facilitator places the item in a visible place. Pupils must walk around the room looking for an item. The one who noticed the hidden object first should not show others that he knows the place where he is. The child sits on the seat, followed by the second one who has found the item, etc. Those students who have not yet noticed the object are helped in this way: children who have already found the hidden object look at it. The subject must be found in the direction of sight. The game lasts 5 minutes.

Wednesday – 1 – “Ear – Nose” (a load of low intensity). The participating schoolchildren are sitting or standing. They need to clap their hands in front of them and then grasp their right ear with their

right hand and their nose with their left hand. After that, clapping your hands, do the opposite. Therefore, you need to repeat several times. Then the exercises can be complicated: by slamming, to hold the left ear with the right hand, and the nose with the left hand and vice versa. The game lasts 5 minutes.

2 – "Fist – palm" (a load of low intensity). First graders sit or stand with their hands in front of them. Players need to squeeze the left hand into a fist with their fingers up. In this case, the elongated fingers of the right hand should rest on the fist of the left. After that, it is necessary to squeeze the right hand, and the fingers of the left hand to stretch and rest against the right fist. The movements of the hands of the child must be fast and accurate. The duration of the game is 5 minutes.

Friday – 1 – "Ring on a stick" (load of low intensity). Schoolchildren sit or stand. Previously a cardboard with a diameter of approximately 15 cm and a width of 3–4 cm must be cut out of cardboard or plywood. A rope is tied to the ring in advance, the other end of which is attached to a stick about 30 cm long. Students should catch the ring on the stick. In addition, each player can make five attempts and must count how many times he managed to catch the ring. The game lasts 5 minutes.

2 – "Snake" (load of low intensity). Players need to bypass the "snake" preset by the teacher in a row of pins, the distance between which is approximately 40 cm. The student who wins not knocked down any pins wins.

After a workout, the game can be complicated: a student must pass between the pins with his eyes closed or crawl on all fours. The game lasts 5 minutes.

6.2. The 2nd stage:

Monday – "Land, air, water, fire" (load of low and moderate intensity). Players sit on the floor or stand in a circle. When the teacher says "earth", all students put their hands down, if he says "water", the players perform hand movements, like during a swim, the children need to raise their arms up on the command "air", and rotate the word "fire" hands in the wrist and elbow joints. One who is mistaken, is out of the game. The game lasts 10 minutes.

Wednesday – "Masters and machines" (moderate intensity load). Of the participants in the game, the teacher assigns one to the "master", and the rest become "machines." During the "work machines" one or two break. The "master" needs to guess which "cars" have broken down. Before starting "working the machines," the teacher removes the "masters" to the other end of the hall in order to negotiate with the other players what movements they will perform, depicting the correct work of the "machines" and also what actions two students will consider "car breakage". Then the teacher invites the "master". At the command of the teacher, all the "machines" work correctly (students perform conditional movements). At the command of "the car went bad" the students, with whom they had agreed in advance, change their habitual movements. The "master" needs to guess exactly which "cars" have broken down, and find out what their problems are. The game lasts 10 minutes.

Friday – "Sedentary Football" (moderate intensity load). School children sit on the floor, bending their knees and leading them to the stomach. One line of players is facing the other. The movement of the feet of students needs to throw the ball in the direction of sitting in front of a partner. In turn, he stops the ball with his feet or with his hands, after which he rolls it back to his partner. After the game, children need to lie on their backs and rest. The game lasts 10 minutes.

6.3. The 3rd stage:

Monday – 1 – "Carousel" (load of moderate intensity). Players stand in a circle and hold hands. The students are slowly moving in a circle, saying: "Merry-go-rounds, merry-go-rounds ... We got into the car and drove off." At the same time, they squeeze the brushes into a fist ("steering wheel" in their hands) and, with the sound "rrr ...", begin to slowly run in a circle, turning the "steering wheel" either to the right or to the left. After running for about 1 minute, first-graders join hands and walk in a circle, uttering the same words, and then "get on the train." The practitioners put their hands on their shoulders and, making circular rotations in the shoulder joints, move in a circle, saying "chukh-chukh-chukh ...". The game lasts 5 minutes.

2 – "Balloon" (load of moderate intensity). Children sit or stand and inflate balloons (if necessary, the teacher can help them). Having inflated, they throw balls up and catch them, and then throw each other. The game lasts 5 minutes.

Wednesday – 1 – "Train with watermelons" (load of toning intensity). The practitioners sit in a circle and pass each other the ball in a circle, then throw the ball to the teacher, which means "we put the watermelons on the train". After that, students need to make movements with their arms bent at the elbows in the direction back and forth, as when running, saying "chukh, chukh, chukh ..." After 3 minutes, the train stops – first-graders say "shhhh ..." and the "unloading" of watermelons begins (the same movements as during the "loading"). The game lasts 5 minutes.

2 – "Catch a mosquito" (load of tonic intensity). School children stand in a circle at a distance of approximately 2 m from the center. The teacher is in the middle of the circle, holding a stick about 1 m long with a "mosquito" tied on a rope. He turns the rope with a "mosquito" a little above the heads of the players. When the "mosquito" flies over his head, students jump up, trying to reach it with their hands. The game lasts 5 minutes.

Friday – 1 – "Tram" (load of toning intensity). Players stand next to each other, holding the rope with one hand, on the end of which a bell is tied. The schoolboy, who is the last one, gives the bell – the "tram" starts off. At the command of the teacher, the "tram" either speeds up or slows down. At the signal (bell), it stops. Those of the guys who did not have time to stop in time go to the end of the line. The duration of the game is 5 minutes.

2 – "Do not yawn" (load of toning intensity). A large circle is drawn in the middle of the site; small circles (approximately 40 cm in diameter) are drawn around it in different places, the number of which is one less than the number of players. Players walk inside a large circle and say these words: "You, friend, do not yawn. Take a lap faster." Then they rush to take a small circle. A late player is considered a loser, but at the same time he does not drop out of the game, but participates again. The game lasts 5 minutes.

Dosed physical activity is an obligatory component of both primary and secondary prevention of the occurrence of complications of diseases of the cardiovascular system of schoolchildren. Under the influence of individualized physical exercises, the child's body's resistance to physical activity increases, the functional state and contractile function of the myocardium improve, the so-called coronary reserve and cardiac performance increase, the collateral and peripheral blood circulation improves, etc. (Solodkov & Sologub, 2001).

It is proved that physical exercise increases the intensity of the flow of all physiological processes in the body. Such an exercise improves the quality of life of a child with a disease of the cardiovascular system and is important in limiting physical activity.

7. Conclusion

Health is the main factor in the formation of human capital. Despite the fact that many genius people have some deviations from the norm of health by one criterion or another, the health of the population of the country is a national asset and a national wealth. The decline in health indicators leads to an increase in budgetary expenditures on health and social services for the population. In this regard, physical health is an important step in the prevention of many diseases.

To sum up, the correct physical education of schoolchildren allows not only reducing the current and promising incidence, but also improving the quality of human capital. School age is the period of the most progressive learning, formation of intelligence and immunity. Therefore, at this stage of human development it is most expedient and effective to instil correct skills in physical education and sports.

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