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Systematic approach based on the use of compensatory exercises with an impact on the indicators of motor qualities

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Abstract

Aim: To substantiate that the use of compensatory exercises with a selective effect on the declining indicators of motor qualities of inactive muscle groups can increase the level and ensure a positive trend in the indicators of physical fitness of schoolchildren of grades 3-4.
Methods: To achieve this, the following research methods were used:
1) study of special literature, individual diaries of physical education teachers.
2) questionnaire,
3) anthropometric measurements,
4) the method of control exercises,
5) ascertaining experiment.
6) pedagogical experiment,
7) mathematical statistics.
Results: To improve the quality of physical education lessons, it is recommended and implemented: 1. Types and system of compensatory exercises for the preservation and development of physical qualities, non-specific physical activity: a) strength endurance of the muscles of the arms, speed - strength endurance of the abdominal muscles and flexibility in lessons in which the material of athletics, sports and outdoor games is mastered; b) speed-strength qualities and explosive strength of leg muscles, speed and general endurance in mastering the practical material of gymnastics and outdoor games.
Conclusion: The inclusion of compensatory exercises in the structure of lessons, taking into account their educational orientation, then, firstly, it will require a reduction of other types of means, changes in the structure of educational activities; secondly, justification for the choice of types of compensatory exercises in the modified structure of the physical education lesson.
Keywords: physical culture, compensatory exercises, motor apparatus of schoolchildren, physical qualities, level of physical fitness

Introduction

The dynamics of individual physical qualities during the academic year has periods of increasing some and decreasing other qualities. At the same time, there is no progressive trend in the development of basic physical qualities. At the beginning of the new academic year, the level of physical fitness according to monitoring indicators differs little from the initial level of the past academic year. One of the reasons for the negative state of the process of physical training is the low effectiveness of the methods of physical education lessons and insufficient motivation of students. School practice shows that the organization of the educational process in quarters and half-years does not ensure the progressive development of motor qualities throughout the year (1). There is data showing that when passing the section of athletics, sports games, the indicators of speed, endurance increase, but the indicators of coordination abilities, proper strength and speed-strength qualities, flexibility decrease sharply. Gymnastics lessons contribute to improving the indicators of coordination of movements, strength and speed-strength qualities, flexibility. But at the same time, the indicators of speed and endurance are significantly reduced.

The subject-organized content of physical education lessons is in deep contradiction with the diverse and diverse means of physical education, in particular, with the requests for versatile improvement of physical qualities, harmonious physical development of the musculoskeletal system (MSS): arms, torso, legs. Individual functional structures of the organism and the MSS, on the one hand, largely determine the success of the educational activities of schoolchildren and the professional activities of an adult, and on the other hand, they limit activity and effective vital activity (2).

In this regard, it is necessary to search for new adequate means and forms of influence of a health-improving and developing orientation on a person, which 6 should be considered as a social order of society. Younger schoolchildren pay special attention to themselves in this aspect.

Methods

The methodological basis of the pedagogical experiment was the following provisions:

1. Various means of the program sections by quarters selectively affect the motor apparatus of schoolchildren and therefore develop individual physical qualities, individual muscle

groups to an unequal extent;

2. The effectiveness of compensation is related to the specificity of training effects in relation to the leading physical quality and in relation to the composition of active and inactive muscle groups, the volume of active muscle mass;

3. The construction of physical education lessons based on the variation of mandatory exercises in sections of the program with additional exercises gives a positive result in increasing the level of physical fitness of students (3);

4. The process of development of physical perfection and physical potential is carried out on the basis of sufficient functional and physical fitness, versatile development of physical qualities (4);

5. A systematic approach in the organization of the process of physical education provides for the definition of compensatory exercises, the place of their inclusion in the structure of physical activity aimed at improving functional and physical conditions.

At the first stage, the specific features of the impact of the basic means on the development of the physical qualities of the "main" and "non-main" working muscles were identified by the sections of the program.

At the second stage, compensatory exercises were determined taking into account the purposeful developmental effect: to maintain the achieved level of development of the main working muscles; to equalize the physical qualities of those muscle groups that were not actively involved in the development of educational material.

Physical exercises - compensators were built into the exercise system of the lesson program and determined a different structure of physical activity of schoolchildren.

Thus, the effectiveness of the physical training process should have been ensured on the basis of a combination and integration of basic (mandatory) and compensatory (additional) means aimed at leveling the declining level of physical condition of some muscle groups: arms and shoulder girdle, trunk and legs, and further improving the physical condition of other muscle groups (5). Thus, it was supposed to achieve versatility in the development of basic physical qualities and muscle groups in schoolchildren, and to ensure a progressive trend of their development throughout the quarter of the academic year.

Results and discussion

In the control group, the expansion of motor potential, the improvement of skills in basic motor actions, the development of basic physical qualities were carried out by means of gymnastics and games. The content of the lessons in the control group corresponded to the planning but the state program (6). The content of the lessons of the experimental group of schoolchildren included compensatory means aimed at leveling and possibly increasing the nonspecific training effect, in particular, the strength qualities of the leg muscles and increasing overall endurance (see table 1)

The analysis of the results of the pedagogical experiment allows us to note the following.

1. Comparison of the average values of physical fitness indicators of schoolchildren of both groups at the end of the first quarter did not reveal significant differences ($p > 0.05$) in the levels of development of speed-strength qualities of leg muscles, speed-strength endurance of abdominal muscles, strength endurance of arm muscles and shoulder girdle in boys, as well as in girls; explosive muscle strength legs, quickness of concentration.

Statistically significant differences exist between the average values of endurance and flexibility ($p<0.05$). The level of development of these qualities in girls was higher than in boys. In one minute, the girls performed an average of 12 more jumps through the rope, the amplitude of the slope was 5 cm higher than the result of the boys.

2. In the control group, the following changes occurred in absolute values and in terms of the increase in % of physical fitness indicators.

The indicators have significantly increased:

- the level of flexibility development: the forward tilt increased by 32.8% ($\alpha \leq 0.05$); at the beginning of the experiment, the slope amplitude was 2.2 + 0.56cm; at the end of the experiment, 2.9 + 0.33cm;

- strength endurance of the muscles of the arms and shoulder girdle in girls by 11.2% ($a < 0.05$); the number of pull-ups increased from 7.6 + 1.40 to 8.7 + 1.66 times. There was a tendency to increase the indicators: the level of development of speed and strength qualities of the leg muscles by 1.07% ($\alpha \geq 0.05$);

Table 1. The structure and content of the means of physical activity of 4th grade students in the second quarter of the academic year

№ Weeks	Basic tools of the program sections	Control group (n=22)	Experimental group (n=22)	Compensatory means (exercise compensators)
		Specific developmental training effect	Not a specific training effect	
10-16	General developmental exercises	Development: a) coordination of movements with hands, torso; b) the speed and strength qualities of the muscles of the trunk; c) strength endurance of arm muscles; d) the speed of movement by the links of the body; e) flexibility.	Development of: a) general endurance endurance b) the speed and strength qualities of the leg muscles.	1. Throwing a stuffed ball with feet weighing 1 kg up, forward, backward, left, right. 2. Multi-jumps of the hand on the belt, behind the head (4, 6, 8m). 3. Squats (10, 15. 20 times) hands behind the head, a stuffed ball, dumbbells (from 1 Kg) behind the head (fast, with a sharp pace). 4. Jumping rope on the place and with progress (30, 45, 60 s). 5. Running and jumping relay races with heavy weights (stuffed balls, dumbbells up to 3 kg). 6. The combination of running with jumping on a soft foundation (15 s). 7. Jumping on a soft foundation (20 s and 30 s) 8. 6-minute run. 9. A series of these exercises (3 or more exercises). 10. Stretching exercises to reduce the tone of working muscles.
10-12	Acrobatic exercises			
10-13	Rope climbing			
13	Balance exercises			
13-15	Exercises on columns and gymnastic rings			
13-16	Jumping exercises: non-supporting and supporting			
15-16	Climbing: gymnastic obstacle course			
10-16	Games: relay race with gymnastic objects			
15-16	Control of motor readiness			

The table is compiled by the author on the basis of the conducted research

- the average values of the jump length from the spot were 145.54 + 2.51cm at the beginning and 147.09 + 2.51cm. at the end of the second quarter ($\alpha > 0.05$); the level of speed and strength endurance of the abdominal muscles by 10% ($\alpha > 0.05$); the level of endurance development by 3.5% ($\alpha > 0.05$); the level of development of explosive strength of the leg muscles: height increased by 1.0% ($\alpha > 0.01$); speed of concentration of attention by 4.7% ($\alpha > 0.05$); the level of development of strength endurance of arm muscles in boys by 3.5% ($a > 0.05$).

In the experimental group, there was a significant increase in the level of motor qualities characteristic of physical activity, conditioned readiness of the leading (active) muscles of the arms, trunk and legs.

The level of development has significantly increased: speed and strength qualities of leg muscles - long jumps from a place increase by 2.2% ($\alpha < 0.05$); speed and strength endurance of abdominal muscles by 6.5% ($\alpha < 0.05$); strength endurance of arm muscles by 75.0% in boys and 18.7% in girls ($\alpha < 0.05$); flexibility by 14.0% ($\alpha < 0.05$); speed of concentration by 3.7% ($\alpha < 0.05$).

At the same time, the level of development of non-specific physical qualities, for example, general endurance increased by 6.6%, explosive strength of leg muscles by 6.8% ($\alpha < 0.05$). Obviously, the developing effect for active muscle groups: arms and shoulder girdle, trunk and legs in the experimental group of schoolchildren was determined by the systematic use of specific (basic) and non-specific (compensatory) means in the structure of physical activity in the classroom. An unpredictable result in the control group was an insignificant increase in the speed and strength endurance of the abdominal muscles (9). Performing exercises in the vises and stops, especially rope climbing, were supposed to promote the development of this active muscle group.

Conclusion

Consequently, motor activity in the lessons of

the second quarter, which is based on a combination of gymnastics with outdoor games strictly according to the program, does not ensure the progressive development of general endurance, speed-strength endurance of the trunk muscles, speed-strength qualities of the leg muscles, speed of concentration of attention. The results of the pedagogical experiment confirm the expediency of using and high efficiency of individual series of physical exercises with a compensating orientation in the structure of the main part of the lesson. Performing compensatory exercises in the form of circular training allows you to harmoniously develop large muscle groups and ensure a progressive trend in the development of physical qualities in younger schoolchildren during the school year. For the development of non-specific qualities when mastering practical gymnastics material, it is recommended to use exercises from diverse sections of the program as compensators, in particular, athletics: running, jumping; as well as exercises with weights, performing jumping exercises on soft and hard supports, relay tasks. If only basic means of gymnastics are used in physical education lessons, then it is necessary to strictly control and manage the parameters of physical activity in order to achieve a specific developmental effect.

In the content of the lesson, it is advisable to include special compensatory exercises in the scope of the basic tools used. The lack of theoretical rigidity (validity) of compensating for declining functions and qualities leads to a wide spread of systemic ideas and ideas, which allows us to focus on systemic principles in diverse and specific situations, between which there may be very little in common, in the process of physical training of schoolchildren during their schooling (7).

Compensation should be understood as the process of compensation, balancing; a set of operations to compensate for losses associated with mistakes in the organization and ineffective methods of conducting a lesson, the development of physical qualities, violation of the principle of complex solutions to physical education problems (8).

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