

# Influence of motor modes on indicators of physical fitness of junior schoolchildren

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## Abstract

**Objective of the study** was to evaluate the effectiveness of motor modes of younger schoolchildren and their influence on the optimization of motor activity and the level of physical fitness of children aged 9-10 years.

**Methods and structure of the study.** The experiment involved students of secondary schools in Belgorod (n=60, 32 girls, 28 boys aged 9-10 years). Scientific work was carried out from September 2021 to May 2022. The students of the experimental group attend a full-time school with a variable system of physical education, and the students of the control group attend a school with a traditional model of organizing the educational process.

**Results and conclusions.** As a result of the analysis of the correlation dependence of the studied indicators, it was revealed that the weakest correlation is observed between the indicators of the volume of motor activity and the results of running 1000 meters in all the studied children aged 9-10 years. The revealed data, according to the authors, are due to the age-related features of the development of endurance, as well as the insufficient attention of teachers to the development of this physical quality in classroom and extracurricular physical education classes with primary school students.

**Keywords:** motor activity, physical fitness, correlation, primary school students.

**Introduction.** The problem of a decrease in physical activity in primary school age is more relevant than ever at the present time, since there are objective socio-pedagogical factors that negatively affect its performance: frequent transitions to distance learning during and after the pandemic and, as a result, limitation of organized physical activity; deformation of independent forms of motor activity; destruction of the playing space; reorientation of children's interests and preferences from motor-playing activities to games in gadgets and a computer; lack of gaming experience among young teachers and parents, and as a result - insufficient transmission of gaming culture in educational organizations and families; the orientation of the modern education system towards the ideas of early development, without taking into account the natural conformity of these ideas [2, 7].

Scientists have proven that in children, most of the health limitations arise directly from the lack of

motor activity in the mode of daily life. A large number of authors single out movement as a natural need for children at primary school age. As noted by M.A. Pravdov, (2003), I.M. Bakanov (2007), N.A. Silaeva (2009), L.N. Voloshina et al, (2018, 2021), L.A. Kadutskaya, et al, (2021), hypokinesia in childhood prevents the normal and timely development of the functional capabilities of a growing organism. Inhibition in the development of organs and functions of the body leads to the appearance of various deviations in the state of health.

It should be noted that 80% of first graders have a sharp (more than 70%) decrease in motor activity compared to the preschool period of childhood. These losses negatively affect the indicators of health, physical fitness and physical development of children [3, 8].

**Objective of the study** was to evaluate the effectiveness of motor modes of younger schoolchildren and their influence on the optimization of motor ac-

tivity and the level of physical fitness of children aged 9-10 years.

**Methods and structure of the study.** Students of comprehensive schools in Belgorod (n=60, 32 girls, 28 boys aged 9-10 years) took part in the pedagogical study. The experimental work was carried out during the academic year from September 2021 to May 2022. The students of the experimental group (EG n=30, 16 girls, 14 boys) attended a full-time school with a variable system of physical education. The students of the control group (CG n=30, 15 girls, 15 boys) attended a school with a traditional model of educational process organization.

The traditional model of organizing the educational process is training, which is carried out in the mode from 8<sup>00</sup> to 13h<sup>00</sup> hours, including extracurricular activities. Students can receive the possibility of additional education of a physical culture and sports orientation both on the basis of an educational organization and in organizations of additional education for children.

In the experimental full-day school with a variable system of physical education, the organization of the educational process is carried out in the mode from 8<sup>00</sup> to 18<sup>00</sup> hours and assumes the presence of two blocks: an educational block from 8<sup>00</sup> to 14<sup>00</sup> (class activities and extracurricular activities) and a developing block from 14<sup>00</sup> to 18<sup>00</sup> (self-study), additional education, leisure activities, outdoor activities). The schedule at a full-time school is implemented non-linearly, that is, the lessons alternate during the school day with the following sports and recreational activities: gymnastics before classes, physical education minutes during lessons, a walk in the open air with the use of physical exercises during an extended break, a dynamic hour with predominant using mobile games. In the afternoon, students are given the

opportunity to choose classes within the framework of extracurricular activities and additional education of a physical culture and sports orientation, which in turn also helps to increase the motor activity of younger students.

In order to study the relationship between indicators of motor activity and physical fitness of children aged 9-10 years, a correlation analysis was carried out. The data obtained give an idea of the average daily volume of physical activity of children studying in experimental and traditional schools (Tables 1-2).

**Results of the study and their discussion.** It was found that in 90% of primary school students the average daily volume of physical activity is below the age norm (14-20 thousand steps per day according to A.G. Sukharev, 1991) (Tables 1, 2). At the same time, there were no significant differences in the indicators of the volume of physical activity of boys and girls both in the CG and in the EG.

The analysis of the indicators of the average daily pedometer indicates that in children 9-10 years old (boys and girls) studying in a full-time school, the volume of motor activity is significantly higher than in girls and boys from a traditional school (p<0.05).

Comparison of indicators of physical readiness from the CG and the EG revealed that in four indicators the boys from the EG are significantly better than the boys from the CG (30 m run, shuttle run 3x10, tilt from a sitting position, pull-ups). Comparative analysis of indicators of physical readiness in the CG and the EG allowed revealing significant differences in four indicators among girls. Girls from the EG have an advantage in tests that require the manifestation of speed-strength qualities (30 m run, 3x10 m shuttle run, standing long jump), flexibility and endurance.

**Table 1.** Correlation between the average daily volume of physical activity and indicators of physical fitness of boys aged 9-10

Indicators of physical fitness	Groups		P between EG and CG	Correlation with pedometer	
	CG n=15	EG n=14		CG	EG
	M ± m	M ± m		n=15	n=14
30 m run, s	6,56±0,61	5,34±0,14	#	0,78***	0,66**
Shuttle run 3x10 m, s	9,83±0,29	8,37±0,29	#	0,62**	0,78***
1000 m run, s	374,43±19,20	366,14±9,48		0,65**	0,42*
Tilt from a sitting position, cm	0,6±2,95	4,29±0,99	#	0,4*	0,97***
Standing long jump, cm	145,57±7,1	159,71±7,87		0,41*	0,38*
Pull-ups, number of times	0,71±0,47	8,86±2,19	#	0,73***	0,8***
Pedometer (steps/day)	9373,43±421,35	12115,29±1329,45	#		

# - p ≤ 0.05 according to t - Student's test

\* - weak correlation

\*\* - average correlation

\*\*\* - strong correlation



**Table 2.** Correlation between the average daily volume of motor activity and indicators of physical fitness of girls aged 9-10

Indicators of physical fitness	Groups		P between EG and CG	Correlation with pedometer	
	CG n=15	ЭГ n=16		CG n=15	EG n=16
	M ± m	M ± m			
30 m run, s	6,05±0,22	5,46±0,18	#	0,79***	0,27*
Shuttle run 3x10 m, s	9,36±0,21	8,16±0,12	#	0,72***	0,37*
1000 m run, s	371,4±19,06	364,5±18,03		0,26*	0,6**
Tilt from a sitting position, cm	7,63±1,02	9,63±2,45		0,57**	0,71***
Standing long jump, cm	145,38±5,98	158,63±5,92	#	0,53**	0,39*
Pull-ups, number of times	19,0±2,85	6,88±1,34	#	0,25*	0,78***
Pedometer (steps/day)	10374,75±365,02	13663±774,62	#		

# -  $p \leq 0.05$  according to t - Student's test

\* - weak correlation

\*\* - average correlation

\*\*\* - strong correlation

According to the results of the analysis of the correlation dependence of indicators of physical fitness and the volume of physical activity, it was revealed that the highest correlation coefficient of the volume of physical activity is observed with the results in the 30-meter run (for girls and boys from the CG), shuttle run 3x10 (for boys from the EG and girls CG), tilting from a sitting position and pulling up (in girls and boys from the EG). Correlation of average strength is observed between the indicators of pedometer and results in 30 m run (for boys from EG), shuttle run 3x10 (for boys from CG), 1000 m run (for girls from EG and boys from CG), tilt from a sitting position (for girls from CG) and in the standing long jump (for girls from the CG). The remaining indicators have a weak relationship with the volume of physical activity.

*Discussion.* Motor activity of schoolchildren is subject to a significant influence of external and internal factors, which in turn create conditions and opportunities for the realization of the necessary daily potential of motor locomotion [4]. Factors that directly affect motor activity are divided into biological, social, climatic and hygienic.

The results obtained by us are consistent with the data presented by scientists from different countries, investigating the relationship of motor activity, physical fitness and health. So, for example, T.F. Abramova, T.M. Nikitina, A.V. Polfutikova, D.N. Pukhov (2021) analyzed changes in the morphofunctional development and physical fitness of 6-10 year old boys depending on age and physical activity. In these studies, the conditionality of indicators of morphofunctional development and physical fitness in boys aged 6-10 years by physical activity was proved [1].

In the studies of modern scientists, it is also noted that the optimal motor mode has a positive effect on the indicators of physical fitness of younger school-

children and contributes to advanced physical development [3, 5, 8].

Ewa Polak & Bernadetta Wojtuń-Sikora (2021) prove in their work that girls of primary school age, who regularly dance, develop motor skills faster and demonstrate a higher level of physical fitness [6].

**Conclusions.** As a result of the analysis of the correlation dependence of the studied indicators, it was revealed that the weakest correlation is observed between the indicators of the volume of motor activity and the results of running 1000 meters in all the studied children aged 9-10 years. The revealed data, in our opinion, are due to the age-related features of the development of endurance, as well as the insufficient attention of teachers to the development of this physical quality in classroom and extracurricular physical education classes with primary school students.

We believe that the problem of optimization of motor modes and their influence on the level of physical fitness at this age level requires additional in-depth study.

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