A STUDY OF THE MOTOR FITNESS OF STUDENTS AGED 12-13

Petia Dikova

National Sports Academy „Vassil Levski”, Sofia, Bulgaria

ABSTRACT

The problem of motor fitness of school students continues to be of major importance up to date. The attempts of educational institutions to prepare and implement in practice tests for the assessment of the basic motor skills – speed, strength and endurance are commendable, but in our opinion, this is a process that must be carried out over time. The main role and merit should be given to teachers of physical education and sport, who apply innovative approaches in the learning process.

The purpose of this study is to improve the mobility of 12-13-year-old pupils. The teaching units of the school program in physical education and sport included an additional set of complex exercise aiming at improvement of students' physical activity for a period of 7 months.

The results obtained from the pedagogical experiment lead us to conclude that our exercises and their distribution in the physical education and sport classes show high efficiency in the complex development of motor skills with 12-13-year-old students in our research, improving their motor fitness.

Key words: *physical fitness, students, motor skills*

INTRODUCTION

Physical education is a multifaceted pedagogical process that helps for specific tasks to be solved, primarily related to the improvement of students' health, motor skills and habits. The changes that have taken place in recent years put the work of physical education and sport teachers to a serious test. The lack of sufficient and well-equipped facilities in schools, the busy school programs, the reduction of classes in physical education and sport, the closing of a large number of sports schools and sports sections in schools have led to limitation of opportunities for aimed physical activity of students. All this has a negative effect on students' lifestyle and is directly related to the expanding hypodynamia.

Hypodynamia is the main reason for a number of socially significant illnesses in childhood and adolescence - spinal distortions, high blood pressure, diabetes, etc., which have a negative impact on their lives as a whole.

Adding the bad habits acquired in childhood and adolescence, which are difficult to get out of later, inevitably leads to serious health problems in adulthood.

That is why one of the main tasks of the physical education and sport activities is to preserve and strengthen students' health, which, in turn, is a reflection of their mental health and motor fitness.

METHODOLOGY

To prove our assumption that increasing the intensity in the physical education and sport lesson through additional exercises with various effects will lead to an improvement in the general physical qualities of the students in the experimental group, which in turn will have a positive effect on their motor fitness, we conducted a 7-month pedagogical experiment.

49 students from 19th Secondary school “Elin Pelin” in Sofia city participated in the study. They were divided into two groups - experimental (25 students) and control (24 students). To accomplish this, we used the general physical training program we developed for our previous study, which included sets of motor activities with different orientation, which we included in the lesson of physical education and sport for seven months (Milanova, 2013).

The Sports-pedagogical testing was performed using the following benchmarks (Table 1).

Table 1. *Indicators studied*

NAME OF THE TEST	MEASURING UNITS	MEASUREMENT ACCURACY
30 m running – standing start position – 30 m	Seconds	up to 0.01 sec
Standing long jump with two legs – SLJ	Centimeters	up to 0.01 sec
Throwing a heavy ball – 3 kg with two hands over his/her head – THB	Centimeters	up to 1 cm
Agility test – AT	Seconds	up to 0.01 sec
200 m running – standing start position (Shuttle Run) – 200 m	Seconds	up to 1 cm

The aim of this study is to improve the motor fitness of 12-13-year old students.

To accomplish this, we set the following *tasks* to solve:

1. To put into practice the developed sets of exercises with common impact.
2. To monitor and analyze the dynamics of the results of the control exercises during the experiment.
3. To determine the influence of the conducted experiment on the motor fitness of the studied 12-13-year old students.

Research Methods:

1. Pedagogical experiment.
2. Sport-pedagogical testing.
3. Mathematical-statistical methods.

RESULTS ANALYSIS

After the carried out seven-month sport-pedagogical experiment, we submitted the data from the control measurements to mathematical to mathematical – statistical processing.

Table. 2 and Table. 3 present the results of the variational analysis of the experimental group (EG) and control group (CG).

Table 2. *Initial data from the variational analysis of EG*

	n	X min	Xmax	R	$\bar{X}$	S	V	As	Ex
30 m	25	4,78	6,76	1,98	5,5084	0,49	8,81	0,826	0,534
SLJ	25	100	220	120	165	28,58	17,32	-0,199	-0,196
THB	25	240	650	410	427	112,65	26,38	-0,037	-0,458
AT	25	38,04	56,9	18,86	43,9536	3,52	8,01	1,994*	7,093 *
200 m	25	12,81	22,86	10,05	15,8152	2,27	14,33	1,437*	2,584 *

Table 3. *Initial data from the variational analysis of CG*

	n	X min	Xmax	R	$\bar{X}$	S	V	As	Ex
30 m	24	5,06	7,84	2,78	5,8070833	0,74	12,69	1,703 *	3,034 *
SLJ	24	138	219	81	168,66667	23,33	13,83	0,507	-0,505
THB	24	260	640	380	413,33333	99,99	24,19	0,289	-0,291
AT	24	37,86	58,2	20,34	45,875	5,41	11,79	0,677	0,23
200 m	24	12,71	18,52	5,81	15,460417	1,55	10,01	0,362	-0,359

At the beginning of the experiment, there were no significant differences between the two studied groups. The initial data show that for the EG only for two of the indicators the result is strongly homogeneous (30 m and 200 m running), while for all other indicators, including those of CG it is average homogeneous. The distribution for the first three indicators at the EG is symmetrical, with normal Ex, while for the 200 m running and the agility test the differences are significant with values above the

critical ones for $n = 25$ ($As = 0.927$ and $Ex = 1.803$). In the CG, differences are observed only with the 30 m running test.

At the end of the experiment, all values of As and Ex were below the critical value, which indicates a symmetrical distribution with normal excess, and the coefficient of variation shows a downward trend (Table 4 and Table 5).

This gives us ground to accept that the experiment

we conducted had a positive impact on the dynamics of the motor qualities of the EG students.

Table 4. Variational data analysis for EG at the end of the experiment

	n	X min	Xmax	R	$\bar{X}$	S	V	As	Ex
30 m	25	4,2	6,05	1,85	5,0688	0,44	8,61	0,571	0,084
SLJ	25	155	250	95	196,4	22,15	11,28	0,582	0,306
THB	25	380	690	310	496	83,37	16,81	0,68	-0,042
AT	25	38,86	46,72	7,86	42,6176	1,60	3,75	-0,12	1,323
200 m	25	12,64	15,75	3,11	14,6996	0,85	5,77	-0,899	0,114

Table 5. Variational data analysis for the CG at the end of the experiment

	n	X min	Xmax	R	$\bar{X}$	S	V	As	Ex
30 m	24	4,87	7,64	2,77	5,59375	0,72	12,91	1,617 *	2,634 *
SLJ	24	142	225	83	175,83333	22,53	12,82	0,432	-0,399
THB	24	265	655	390	419,58333	99,43	23,70	0,371	-0,098
AT	24	37,64	58,04	20,4	45,727083	5,43	11,87	0,689	0,257
200 m	24	12,68	18,46	5,78	15,345	1,55	10,10	0,389	-0,336

The comparative analysis shows an improvement in the results for all control exercises. A significant increase in the level of the basic motor skills has been achieved at the time of the aimed overall impact on the physical qualities of the EG students.

At the end of the experiment, there was a signifi-

cant improvement in the development of strength, speed, endurance and agility of the students in the EG. The students from the CG also showed an increase in the development of the basic physical qualities but compared with that of the EG, it was insignificant (Fig. 1).

Figure 1. Increase in the results of the control exercises at the end of the experiment

It is well known that the the most sensitive periods for the development of speed-power qualities and speed are at the age of 10-15, ie. the period of puberty. The rate of increase in speed and speed-power capabilities during the experiment confirm the studies that the age of 12 or 13 is very favorable for the basic motor qualities to be formed.

These results indicate the correctness of our choice to include additional sets of physical exercises with general physical impact in the PE lesson. They support the mobilization and adaptation processes not

only in the physical but also in the psychological and physiological development of 12-13-year old students. They also help to expand the range of motor skills and technical skills, which has a significant impact on the performance and the result from the control exercises requiring a certain degree of technical skills.

COMPARATIVE ANALYSIS OF RESULTS BY GENDER

The analysis of the results by gender revealed that there were significant differences in motor fitness

between boys and girls of the EG at this age, despite some isolated cases (Figure 2). At the end of the 7-month period, values with especially high increase were measured in:

- ✓ 30 m running (girls – 0.49 sec; boys – 0.39 sec);
- ✓ 200m running (2.05 sec girls and 0.68 sec boys);
- ✓ Standing long jump – the improvement of the explosive power in legs with girls was 34.59

cm and with boys 28.46 cm.

- ✓ Throwing a heavy ball – that gives information about the strength and explosive power in hands, shows an upward trend with girls, with an increase of 95 cm, while with boys the increase is 45 cm.
- ✓ The same tendency is observed in the agility test. The girls manage to achieve a result which is 2 seconds better than the one at the beginning of the study, while the improvement with the boys is of 0.28 sec.

Figure 2. Increase in the result of the control exercises for the EG separately for boys and girls

Most probably the acceleration processes that are more pronounced at this age in girls are relevant to their better performance. The condition of the cardiovascular, respiratory, muscular, autonomic and central nervous systems at the time of puberty is also relevant. This is the period during which the dynamics in the mobility and lability of the nervous processes is the greatest for both genders, and they, in turn, are responsible for the speed of muscle contractions. These conditions are inextricably linked to the adaptation processes associated with

the recovery processes, the knowledge of which is a prerequisite for effective impact on children's and adolescents' organism with physical exercises.

For students in the CG, the differences between boys and girls are so insignificant that we can accept them as non-existent (Figure 3).

The great differences between the EG and the CG for all control exercises are generally attributed to the additional impact applied on the EG students in their PE classes.

Figure 3. Increase in the result of the control exercises for the CG separately for boys and girls

CONCLUSION

The results of the experiment confirm the usefulness of additional exercises as a number and intensity in the PE lesson. The increase in the speed and speed-power capabilities of the EG students over the course of the experiment is very significant and gives us a reason to believe that there are still undiscovered opportunities regarding the improvement of effectiveness in the PE lesson.

The set of motor exercises thus applied may be updated and adapted to different school grades in our future larger-scale studies.

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Corresponding author:

Petia Dikova

Department Heavy athletics,
boxing, fencing and sport for all

National Sports Academy "Vassil Levski"

Studentski grad, 21, Acad. Stefan Mladenov str.

Sofia 1700, Bulgaria

E-mail: petiamilanova@gmail.com