



STATUS OF PHYSICAL CAPACITY OF LOWER SECONDARY EDUCATION STUDENTS

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ABSTRACT

The status of the physical capacity of students is a very accurate and objective indicator, through which the efficiency of the educational process in physical education and sports can be assessed.

The aim of this research is to determine the current state of the physical capacity among the students from V to VII grade from Secondary School “D. Debelyanov”, Burgas. The study was conducted with 156 students, who were divided into two groups – boys and girls. Indicators of the physical capacity of students are their physical achievements. In order to define those, tests have been applied, taken from the new system for assessing the physical capacity of students. A test battery was used, which includes the following indicators – running (sprint) 30m from a high (standing) start, long jump from a standing point, throwing a thick 3 kg ball with two hands over head, running 200 m, T-test (agility). The results of the study are processed mathematically and statistically by applying comparative analysis, Student's *t*-test, variation analysis. The average grades of the surveyed students from 5th to 7th grade, according to the studied indicators, fall into the range of the “Good” score (in 20-level scoring), for both sexes. Only on the indicator №3 (Throwing a thick ball 3 kg) among the girls of 5th class, the grade is “Average”. In this age group, it is recommended to use tools and techniques in order to develop the strength of the upper limbs and of the abdominal muscles.

Key words: motor skills, physical education, sports

INTRODUCTION

One of the current problems of physical education is ways to improve the motor skills of students.

Physical capacity is a complex indicator of the general functioning state of a person and his / her motor abilities, closely related to the level of development and demonstration of the basic motor qualities. Physical capacity depends on the physical development, gender, age and hereditary conditions of a person.

Motor qualities, skills and habits determine the level of physical capacity.

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Physical capacity is a condition which combines the influence of physical and motor development with the motor activity of humans, and it is most often determined by measuring the five basic motor qualities of a person by means of a set of motor-quality tests. Considered as such a combination of factors, physical capacity can be concluded as a leading factor for the functional state of the individual, which is essential for his/her quality of life (1).

Physical capacity reflects integrally and multi-dimensionally the health condition, viability and physical capability of the individual. It is characterized by the state of the various motor qualities, which can be reported by different motor and agility tests (2). The problem of physical capacity is the subject of scientific research in the works of the following authors (3-6).

Physical qualities describe the different aspects of human motor abilities. The motor activity is characterized by increased intensity and variety. It reveals the following motor qualities: speed, strength, endurance, agility and flexibility.

Regarding the motor functions of a person, the highest rate in the development of strength capabilities is observed in two periods: in the 8-11 y.o. age range and the period 14-15 years of age. The qualities of the neuromuscular apparatus are improved by reduced time for performing simple and complex motor reactions (7).

METHODS

The purpose of this current study regards the detection of the momentary snapshot of the physical capacity of students from V to VII grade from the Secondary School “D. Debelyanov”, Burgas. To achieve the set goal, we determined the following tasks:

1. Theoretical review of literature sources on the problem;
2. Finding out the average levels of the physical capacity of the students;
3. Comparison of students' achievements;
4. Assessment of the physical capacity of the students.

For the achievement of the set goal and performing the tasks of the research, we applied sports-pedagogical testing. The test battery for establishing the physical capacity of students includes the following indicators:

- Running 30 m from a high (standing) start;
- Long jump from a standing point;
- Throwing of a thick 3kg ball with both hands over head;
- Running 200 m;
- T-test.

The four tests – running 30 m from a high start, long jump, throwing the 3kg ball with two hands over the head, and running 200 m are standard tests that are applied in physical education and sports classes. The only new test is the agility test – T-test. The student stands behind the hoop at the start-finish line, in a starting position of basic standing posture. At the “Start” signal, he/she bends down, takes the ball placed in the hoop and moves to the other hoops in the direction indicated in **Figure 1**, numbered (1) to (6).

From each following hoop, the student takes the ball in it and leaves the ball he/she carries.

The measurement stops at the second when the ball touches the hoop field at the start-finish spot.

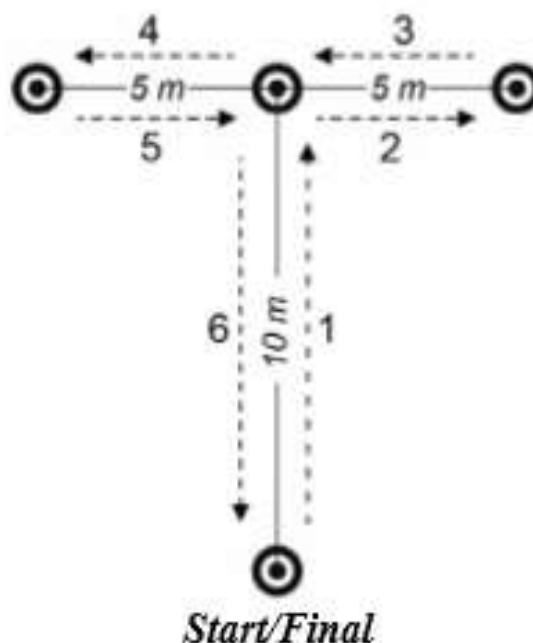


Figure 1. Diagram for performing a T-test for agility

The results data of the research are processed mathematically and statistically, by applying comparative analysis, variation analysis, as well as the *t-test* criterion by Student.

RESULTS

Table 1 presents the results giving information about the physical capacity of students in 5th grade, divided into 2 groups – boys and girls. The results obtained from the study of 6th - grade students (boys and girls) are shown in **Table 2**. **Table 3** shows the studied indicators characterizing the physical capacity of 7th - grade students (boys and girls).

In order to perform the comparative analysis, we used Student's *t-test* method for independent samples. The choice of this method is correct, since the calculated coefficients for asymmetry and excess do not exceed the critical values of the significance level $\alpha = 0.05$.

The analysis shows that according to indicator №1 (Running 30m), the best time among boys was achieved by the students from VII grade – 5.38 seconds. Among the girls, the best time is achieved by students from VI grade – 5.87 s.

Table 1. Physical capacity of 5th grade students

№	Indicators	boys		girls		d	t	P %
		X ₁	S ₁	X ₂	S ₂			
1	Sprint 30 m	6,29	0,71	6,26	0,53	0,02	0,14	76,68
2	Jump length	137,93	19,36	138,17	17,39	-0,24	-0,50	58,84
3	3 kg ball throwing	322,14	68,62	274,65	49,85	47,48	2,99	98,04
4	Running 200 m	51,27	7,54	52,29	6,79	-1,02	-0,54	32,53
5	Agility	16,98	1,56	17,70	1,59	-0,72	-1,72	17,50

Table 2. Physical capacity of 6th grade students

№	Indicators	boys		girls		d	t	P %
		X ₁	S ₁	X ₂	S ₂			
1	Sprint 30 m	5,74	0,69	5,87	0,61	-0,13	-0,69	14,69
2	Jump length	166,48	21,58	155,81	15,78	10,66	1,95	84,83
3	3 kg ball throwing	430,96	96,52	325,54	79,34	105,42	4,16	57,10
4	Running 200 m	45,65	8,33	47,99	5,79	-2,34	-1,13	75,83
5	Agility	16,39	2,09	16,57	1,88	-0,18	-0,32	44,22

Table 3. Physical capacity of 7th grade students

№	Indicators	boys		girls		d	t	P %
		X ₁	S ₁	X _{cp2}	S ₂			
1	Sprint 30 m	5,38	0,55	6,07	0,72	-0,69	-3,74	85,34
2	Jump length	169,13	20,51	152,76	16,53	16,36	2,82	18,93
3	3 kg ball throwing	488,64	104,09	410,70	88,09	77,94	2,61	36,35
4	Running 200 m	41,97	5,45	48,00	5,11	-6,03	-3,74	17,23
5	Agility	16,14	2,03	16,54	1,53	-0,40	-0,71	38,46

According to indicator №2 (Long jump from a standing point), the best result is for the boys from VII grade – 169.13 cm, and for girls we should note that the students from VI grade have the best achievement – 155.81 cm.

At indicator №3 (Throwing a 3 kg ball) the highest average result of the boys is for the students from VII grade – 488.64 cm; for girls the best average is again the result of the seventh graders – 410.70 cm.

4th Indicator (Running 200m): the best average time given by the boys is by the students from VII grade, while for the girls the sixth-graders gave the best average time – 47.99, and it should be noted that the difference between them and seventh-graders girls is 0.01 s.

According to indicator №5 (T-test), among boys the differences are very small. The fastest test was performed by VII class – 16.14 s, VI class – 16.39 s, and V class – 16.98 s. For girls the best result is for 7th grade – 16.54 s, followed by 6th grade – 16.57 s and 5th grade – 17.70 s.

Figure 2 shows the dynamics of speed evolvment among students. The boys from the 5th grade achieved a result of 6.29 s, and the girls 6.26. Despite the minimum difference of 0.03 s, girls outperform their peer boys fifth-graders. In sixth-grade students, the difference between boys and girls is 0.13 s in favor of the boys. They achieved an average result of 5.74 s, while the girls – 5.87 s. The seventh-grade boys have a result of 5.38 s, and the girls students have a result of 6.07 s.

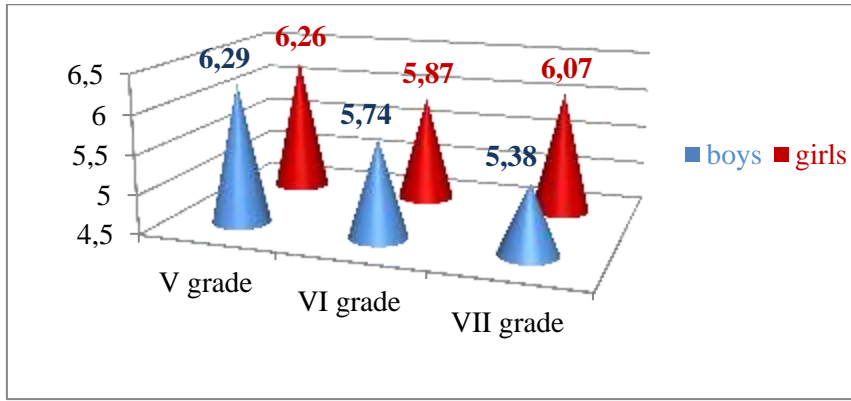


Figure 2. Speed dynamics among 5th – 7th grade students (values in seconds)

Figure 3 gives information about the dynamics in strength development among the tested students (3kg thick ball throwing over-head with two hands). The average result for boys from 5th grade is 322.14 cm, and for girls –

274.65 cm. 6th grader boys have achieved results in average of 430.96 cm, while their girls classmates did 325.54 cm. The best results are from the seventh-graders – 488.64 cm for boys, and girls – 410.70 cm.

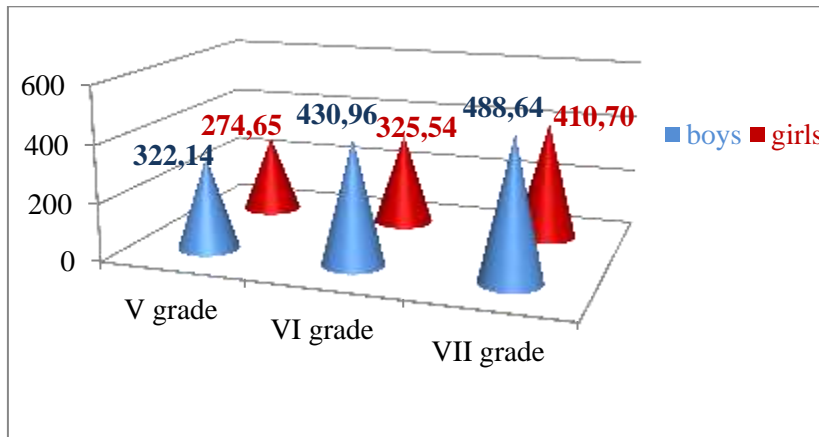


Figure 3. Strength dynamics among 5th – 7th grade students (values in centimeters)

Figure 4 presents the variability measures of the indicators for physical capacity among students – boys 5th-7th grades.

V=11.28% and in indicator №5 (T-test), V=9.19%. It is approximately homogeneous at indicator №2 (Long jump from a standing point), V=14.04%, at indicator №3 (Throwing a 3 kg ball) with V=21.30%, and at indicator №4 (Running 200 m), V=14.97%.

From the analysis of the results we can find out that the studied sample group of 5th graders is homogeneous in indicator №1 (Running 30m),

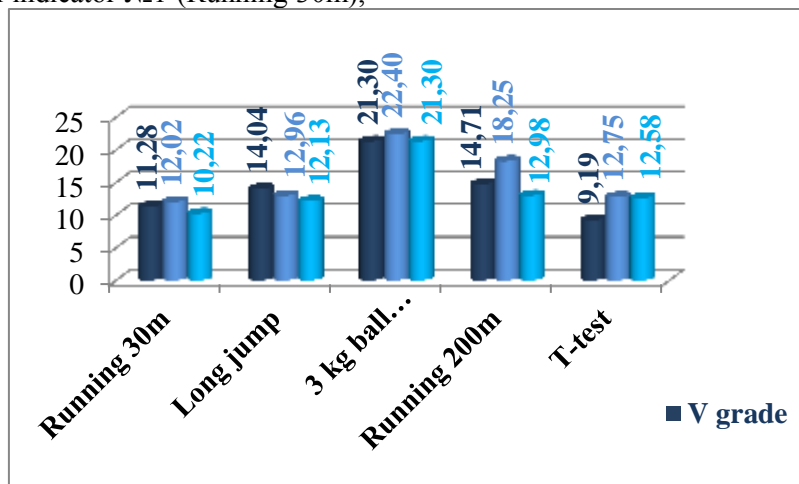


Figure 4. Variability of indicators for physical capacity among students – boys

Among the students of 6th grade the whole group is approximately homogeneous, with the largest coefficient of variation noticed in indicator № 3 (Throwing a ball of 3 kg), V=22.40%.

The variation analysis of the seventh-grade students shows that the group is approximately similar, however a large variation coefficient can be observed at indicator №3 (Throwing a 3 kg ball), V=21.30%.

Figure 5 presents the values of dispersion or variation of scores in the indicators of physical capacity of students – girls (V-VII class).

The group of fifth-graders is homogeneous in terms of indicator №1 (Running 30m), V=8.47% and in terms of indicator №5 (T-test), V=8.98%. It is approximately homogeneous according to indicator №2 (Long jump), V=12.58%, according to indicator №3 (3 kg ball throwing), V=18.15% and at indicator №4 (Running 200 m), V=12,98%.

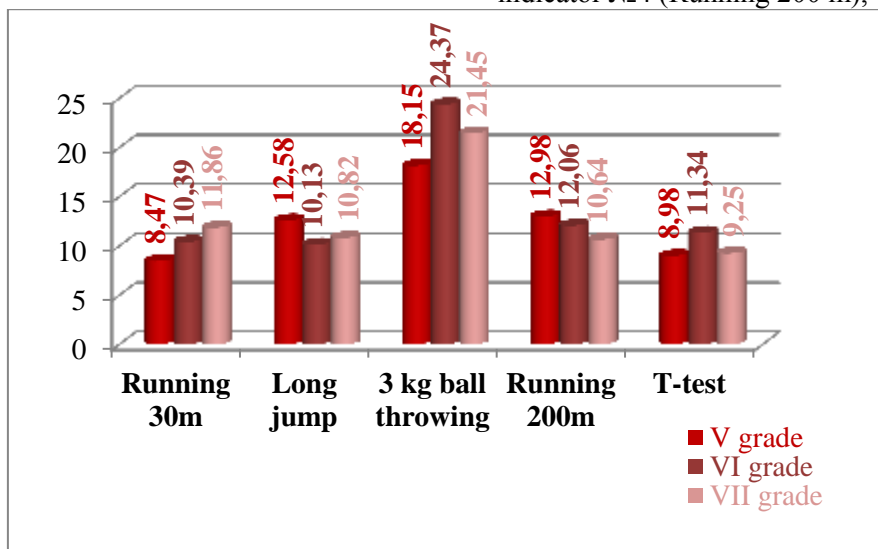


Figure 5. Variability of indicators for physical capacity among students – girls

The studied respondent group of sixth-grade girls is homogeneous in indicator №1 (Running 30m), V=10.39%, at indicator №2 (Long jump), V=10.13%, and indicator №5 (T-test) with V=11.34%. It is approximately homogeneous in terms of indicators №3 (Throwing a ball 3 kg), V=24.37% and indicator №4 (Running 200 m), V=12.06%.

For girls in VII grade, the highest coefficient of variation is №3 (Throwing a ball 3 kg), V=21.45%. The group has similar scores at indicators №1 (Running 30m), V=11.86%, at indicator №2 (Long jump), V=10.82%, indicator №4 (Running 200m), V=10.64 %,

and indicator №5 (T-test), with variation coefficient of V=9.25%.

Figure 6 shows the results from assessing the physical capacity of students (boys) V-VII class on a 20-point scale. It gives an easy and quick view of the current status of each studied characteristic (indicator). The final assessment of physical capacity is calculated as the arithmetic average of the scores from individual tests, but only if there are results from all five tests. As we can see from the figure, the overall assessment of the students from grades V-VII (boys) is “Good” – approximately 11 out of 20.

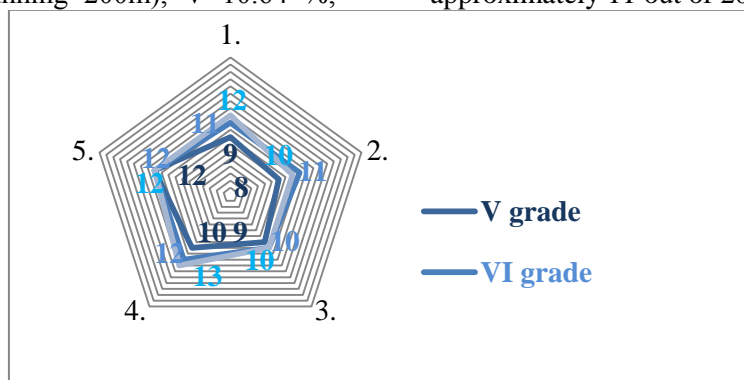


Figure 6. Assessment scores of boys V-VII grades

The chart shown in **Figure 7** can reveal to the analysis, that all research participants by the girls' group have achieved overall scores corresponding to the assessment "Good" (approximately 11 as a whole; 10 average for 5th -grade, and above 11 for 6th and 7th -grade

girls). Here we must point out that the girls from the 6th and 7th grades, at the indicator №5 (T-test) have scored 14 points, which is a "Good" but only 1 point was missing for the assessment to be "Very Good".

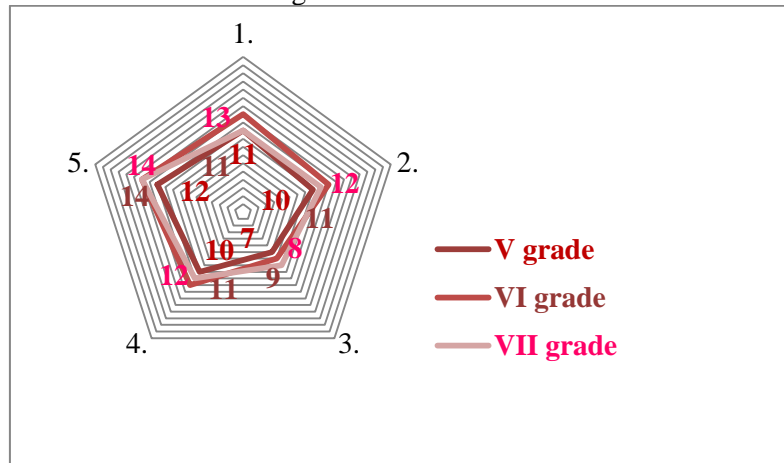


Figure 7. Assessment scores of girls V-VII grades

CONCLUSION

Based on the analysis of the results of the study, we can summarize that the overall state of physical capacity among students at lower-secondary school education (junior high school level), is at a good level at indicators related to speed, strength, endurance and agility.

In order to have improved assessment scores, we should increase the number, duration and intensity of the training means and activities used in the physical education and sports classes.

Fifth-grade girls students should stress on work for upper limb strength and abdominal muscles – indicator №3 (Throwing a thick 3 kg ball), increasing the volume and duration of exercises.

For all students, the work for the upper muscles will help reduce the variation coefficient in indicator 3 (Throwing a thick 3 kg ball), in order to bring the group closer to homogeneity.

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