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COMPARATIVE ANALYSIS OF THE PHYSICAL AND TECHNICAL READINESS OF STUDENTS PRACTICING BASKETBALL

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ABSTRACT
The comprehensive development of motor abilities is a characteristic feature typical for the game of basketball. The level of technical skills plays an important role in planning and conducting the teaching and training process during basketball activities in physical education classes. The aim of this study is to improve basketball training for students through analysis and comparison of their physical and technical readiness. To achieve this aim, we set the following tasks: to review specialized literature, to collect information on the level of physical and technical readiness of students from 9th Primary School "Veselin Hanchev" and Secondary School "Maxim Gorky" in Stara Zagora; to identify the average levels and the variation of the studied indicators; and to compare the students' performance. The main methods used in the study are theoretical research and analysis of specialized literature, and sports-pedagogical testing. The test battery includes fourteen indicators, nine of which provide information about physical readiness and five about technical readiness. The results from the testing were processed using mathematical and statistical methods: variation analysis and comparative analysis. Based on the results and the conducted analysis, we can summarize that the students from 9th Primary School "Veselin Hanchev" in Stara Zagora are physically better prepared than their peers, showing better results in nine of the examined indicators. In terms of technical readiness, the students showed similar results.

Keywords: sports activity, physical qualities, technique, comparison

INTRODUCTION

In sports, motor activity is characterized by both intensity and unpredictability in the manifestation of motor abilities. Their development and improvement are achieved through general and specialized physical training (1).

Physical training represents the complex manifestation of an athlete's motor abilities (2). Along with the other components of sports preparation, it constitutes a necessary and obligatory element of sports activity (3, 4).

The study of motor activity in basketball reveals that motor abilities are consistently expressed in a complex and simultaneous manner. They are manifested through diverse sequences of movement in time, space, and effort (5).

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The complex display of motor abilities—speed, strength, endurance, flexibility, and agility—is characteristic of basketball. Moreover, the manifestation of these motor abilities plays a central role in the training process (6). Physical and technical preparation in basketball has been examined in a broad context (7-9).

Modern basketball imposes even greater demands on players in mastering and applying technical skills at high speed and in an extremely complex, unpredictable, and constantly changing competitive environment (6).

MATERIALS AND METHODS

The aim of the present study is to optimize basketball training sessions for students through analysis and comparison of their physical and technical readiness.

To achieve this aim, the following objectives were set:
1. To review specialized literature on the topic of physical and technical readiness;

2. To collect information on the level of physical and technical readiness of students from 9th Primary School "Veselin Hanchev" and Secondary School "Maxim Gorky", Stara Zagora;
3. To determine the average values and the variation of the studied indicators for all students;
4. To compare the students' performance.
The present study was conducted in October 2024.

The study involved 44 seventh-grade students from 9th Primary School "Veselin Hanchev" and Secondary School "Maxim Gorky", Stara Zagora.

The research was carried out with the informed consent of the students and their parents, who completed a declaration for participation in the conducted testing.

To accomplish the set aim and objectives, the following research methods were applied: theoretical review and analysis of specialized literature, and sports-pedagogical testing. The test battery included fourteen indicators, of which nine provided information about physical readiness and five about technical readiness.

For the purposes of the study, the following mathematical and statistical methods were used: variation analysis and comparative analysis.

RESULTS

Table 1 presents the mean values and variability of the indicators that provide information about the physical readiness of students from 9th Primary School "Veselin Hanchev".

Table 1. *Mean values and variability of the physical readiness of seventh-grade students from 9th Primary School "Veselin Hanchev"*

№	Indicators	X	S	V	min	max	As	Ex
1.	20 m sprint	2,85	0,21	7,37	2,34	3,41	0,31	1,84
2.	20 m dribbling	3,04	0,25	8,22	2,65	3,57	0,54	-0,46
3.	Court-width running	27,20	1,95	7,17	24,78	31,95	1,34	1,30
4.	Court-width running with ball	28,66	2,02	7,05	26,38	35,34	2,08	5,17
5.	Vertical jump	43,54	7,35	16,88	16	56	-2,18	8,41
6.	Push-ups	26,46	8,27	31,25	11	41	-0,15	-0,62
7.	Sit-ups	21,29	4,50	21,14	10	30	-0,49	0,82
8.	Forward medicine ball throw	6,30	0,94	14,92	4,80	8,00	0,12	-0,99
9.	Backward medicine ball throw	6,62	1,60	24,17	2,20	10,20	-0,42	2,55

Table 2 presents the mean values and variability of the indicators of physical readiness for the students from Secondary School "Maxim Gorky".

Table 2. *Mean values and variability of the physical readiness of seventh-grade students from Secondary School "Maxim Gorky"*

№	Indicators	X	S	V	min	max	As	Ex
1.	20 m sprint	3,93	0,58	14,76	3,10	4,87	0,43	-1,16
2.	20 m dribbling	4,53	0,77	17,00	3,59	5,91	0,51	-1,22
3.	Court-width running	31,57	3,21	10,17	23,12	36,21	-0,80	0,85
4.	Court-width running with ball	37,77	1,93	5,11	35,10	41,44	0,22	-0,89
5.	Vertical jump	42,50	11,43	26,89	25	61	0,19	-1,22
6.	Push-ups	26,25	8,19	31,20	11	38	-0,15	-1,00
7.	Sit-ups	19,40	4,85	25,00	11	26	-0,11	-1,15
8.	Forward medicine ball throw	6,24	0,83	13,30	4,90	7,90	-0,01	-0,85
9.	Backward medicine ball throw	6,69	0,97	14,50	5,00	8,45	-0,02	-0,72

Figure 1 provides a visual representation of the variability values of the physical readiness indicators among the students.

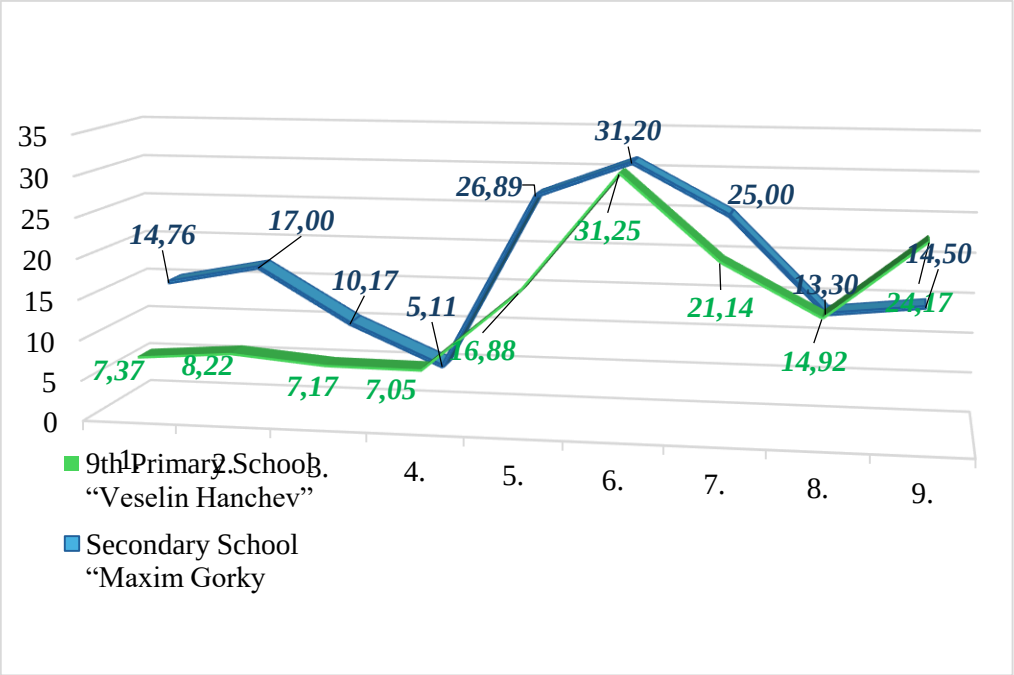

Figure 1. Variability of the physical readiness indicators among the students

From the analysis, it is established that the seventh-grade students from 9th Primary School "Veselin Hanchev" exhibit an approximately homogeneous sample in 4 of the indicators. For Indicator No. 6 – *Push-ups*, the sample is highly heterogeneous, with a coefficient of variation V = 31.25%.

Among the students from Secondary School "Maxim Gorky," the sample is approximately homogeneous in 6 of the indicators. The highest coefficient of variation is observed for Indicator No. 6 – *Push-ups*.

The results presented in **(Table 3)** illustrate the level of technical readiness of the students from 9th Primary School "Veselin Hanchev".

Table 3. *Mean values and variability of the technical readiness of seventh-grade students from 9th Primary School "Veselin Hanchev"*

№	Indicators	X	S	V	min	max	As	Ex
10.	T-defensive movement	9,73	0,62	6,37	9,08	11,51	1,68	2,25
11.	Shooting on the move 6 - time	47,77	3,93	8,24	41,90	60,00	1,33	3,11
12.	Shooting on the move 6 succ. shots	4,29	1,30	30,30	1	6	-0,85	0,25
13.	Jump shot 8 – time	43,28	3,19	7,37	38,52	49,85	0,51	-0,39
14.	Jump shot 8 – successful shots	2,08	1,02	49,04	1	4	0,63	-0,58

The results from the applied variation analysis of the raw data from the technical readiness testing of the students from Secondary School "Maxim Gorky" are presented in **(Table 4).**

Table 4. *Mean values and variability of the technical readiness of seventh-grade students from Secondary School "Maxim Gorky"*

№	Indicators	X	S	V	min	max	As	Ex
10.	T-defensive movement	9,63	1,31	13,60	5,38	11,72	-1,55	5,28
11.	Shooting on the move 6 - time	50,95	3,57	7,01	45,96	58,38	0,59	-0,44
12.	Shooting on the move 6 succ shots	2,50	1,05	42,00	1	4	0	-1,10
13.	Jump shot 8 – time	43,33	3,90	9,00	37,78	49,51	0,11	-1,59
14.	Jump shot 8 – successful shots	3,65	1,50	41,09	1	6	-0,06	-1,17

Figure 2 illustrates the variation analysis of the indicators for technical readiness among the students. For the students from Secondary School "Maxim Gorky", the sample is highly heterogeneous in Indicator No. 12 – Shooting on the move 6 – successful shots, with V = 42.00%, and in Indicator No. 14 – Jump shot 8 – successful shots, with V = 41.09%.

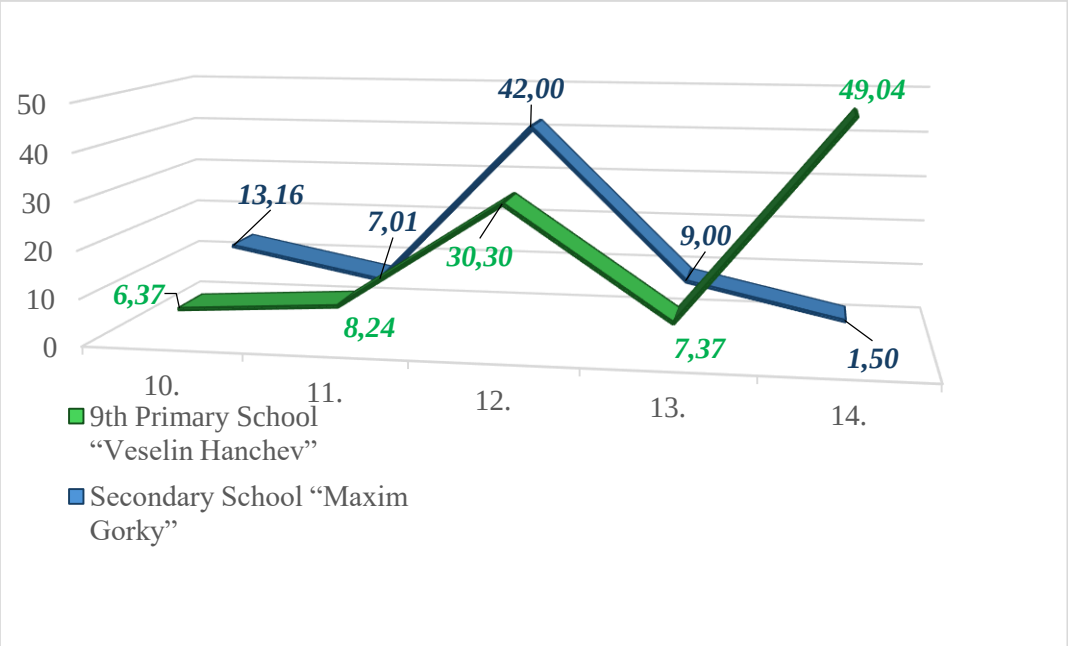

Figure 2. Variability of the technical readiness indicators among the students

Figure 3 presents a comparative analysis of the physical readiness of seventh-grade students. The students from 9th Primary School "Veselin Hanchev" outperform their peers from Secondary School "Maxim Gorky" in 8 of the indicators.

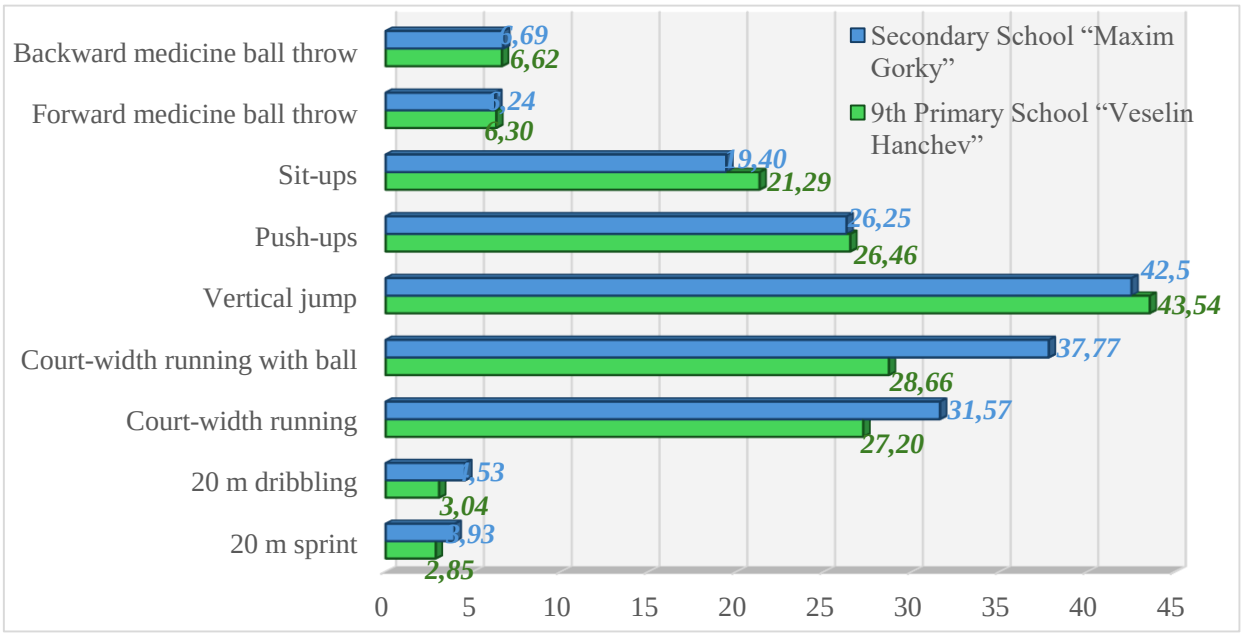

Figure 3. Comparative analysis of the physical readiness of the students

The most significant advantages are observed in: Indicator No. 4 – Court-width running with ball, and Indicator No. 3 – Court-width running. In Indicator No. 8 (Forward medicine ball throw), the difference is minimal—only 0.06 m in favor of the students from 9th Primary School "Veselin Hanchev". In contrast, in Indicator No. 9 (Backward medicine ball throw), the advantage lies with the students from Secondary School "Maxim Gorky", with a lead of 0.07 m. **Figure 4** provides information on the technical readiness of the students. The results achieved by both groups are relatively close.

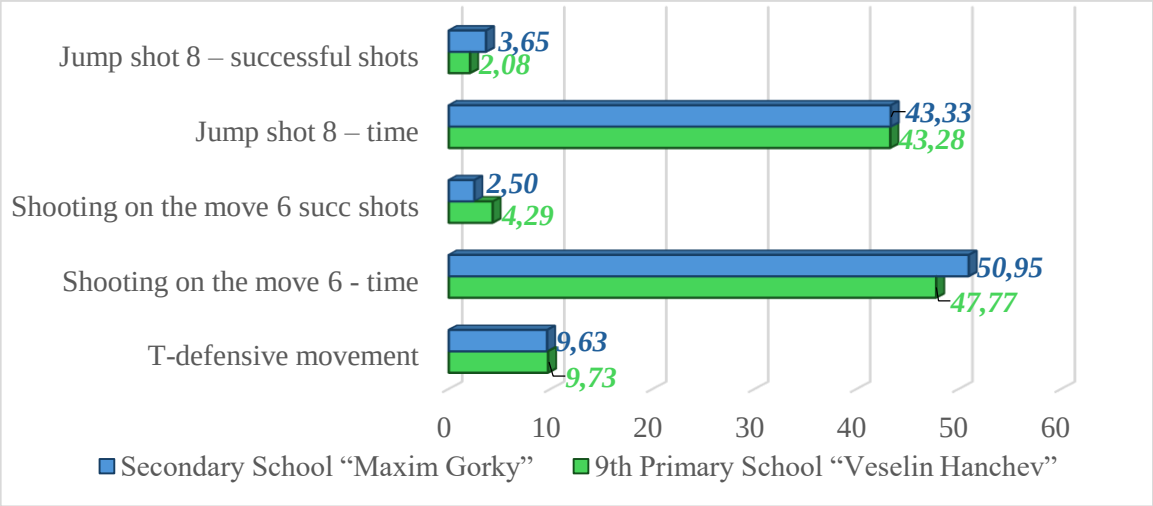

Figure 4. Comparative analysis of the technical readiness of the students

The seventh-grade students from Secondary School "Maxim Gorky" completed the T-defensive movement in 9.63 seconds, while those from 9th Primary School "Veselin Hanchev" completed it in 9.73 seconds.

In Indicator No. 14 – Jump shot 8 – successful shots, students from Secondary School "Maxim Gorky" scored an average of 3.65 successful attempts, compared to 2.08 by those from 9th Primary School "Veselin Hanchev".

It is noteworthy that in Indicator No. 13 – Jump shot 8 – time, the difference is minimal—0.05 seconds in favor of the students from 9th Primary School "Veselin Hanchev". Indicator No. 4 – *Court-width running with ball*, and Indicator No. 3 – *Court-width running*.

In Indicator No. 8 (*Forward medicine ball throw*), the difference is minimal—only 0.06 m in favor of the students from 9th Primary School "Veselin Hanchev". In contrast, in Indicator No. 9 (*Backward medicine ball throw*), the advantage lies with the students from Secondary School "Maxim Gorky", with a lead of 0.07 m.

CONCLUSIONS

Based on the obtained results and the conducted analyses, we can summarize the following:
The students from 9th Primary School "Veselin Hanchev", Stara Zagora, are physically better prepared than their peers. They demonstrated superior results in nine of the evaluated indicators.

Students from Secondary School "Maxim Gorky" should incorporate additional exercises into their physical education basketball classes aimed at improving their running capabilities—specifically speed and speed endurance.

Furthermore, these students should increase the number of training tools and activities focused on developing abdominal strength and upper body power.

Regarding technical readiness, the students from both schools showed comparable results. To improve their jump shot performance, it is advisable to increase the number and frequency of jump shot training exercises.

To enhance the number of successful moving shots (Indicator 12), it is recommended that students from Secondary School "Maxim Gorky" integrate a wider variety of drills for shooting on the move at high speed into their training routines. Additionally, they should focus on maintaining concentration during the final phase of the shooting action.

REFERENCES

1. Tsankov, Ts., Multi-year Training of Basketball Players – Women, Nais An EOOD, Sofia, 2020.
2. Aladzhov, K., Physical preparation of the athlete. Astra, Sofia, 1992.
3. Karabiberov, Y., Bonov, P., Athletic training in basketball, NSA - IPB, Sofia, 2000.
4. Tsankov, T., Speed-strength training of adolescent basketball players, NSA PRESS, Sofia, 2005.
5. Tzankova-Kaloyanova, M., Aspects of the technical-tactical training of adolescent basketball players, NSA PRESS, Sofia, 2023.
6. Tzankova-Kaloyanova, M., Sports preparedness among female basketball athletes aged up to 12 years. *International Scientific Congress "Applied Sports Sciences"*, vol. 1, pp. 206-2011, doi: 10.37393/ICASS2022/36, 2022.

7. Tzankova-Kaloyanova, M., Correlation structure of physical development, special physical and specific technical-tactical preparedness in 16-year-old female basketball players. *Sport and Science*, Nsa press, Sofia, Issue 1, pp. 167-173, 2018.
8. Arsova, R., Strength training of young volleyball players., Publishing complex - UNWE, Sofia, 2019.
9. Arsova, R., Analysis of the indications of the special force with young volleyball players. *Trakia Journal of Sciences*, Vol. 18, Suppl. 1, pp 736 -740, 2020.