



## STUDY OF THE PHYSICAL DEVELOPMENT, PHYSICAL AND TECHNICAL-TACTICAL PREPAREDNESS OF WOMEN BASKETBALL PLAYERS

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### ABSTRACT

The sporting achievement in basketball is greatly influenced by both morphofunctional indicators and the level of development of special physical qualities in combination with technical and tactical training. The aim of the study is to improve the training process in adolescent basketball players, through analysis and evaluation of physical development, physical and technical; and tactical training. The method used is testing. A test battery include 15 indicators was used. The methods of theoretical research, anthropometry and sports-pedagogical testing are applied in the article. The results of the study are processed mathematically and statistically through variation analysis, body mass index, correlation and comparative analysis. In analysis of the results in 6 of the indicators, the adolescent basketball players from the surveyed team have reached grades above the average level. In conclusion there is a need to improve the ability to lead the ball at high speed, shooting in motion over time and the use of various means to develop the abdominal muscles.

**Key words:** basketball, preparedness, motor qualities, technical skills

### INTRODUCTION

Human's physical development is a subject explored by many experts from a rich variety of areas. Physical development has been defined both as a dynamic biological process, and as a momentary status in the individual development of the human being (1, 2).

Physical development is a complex combination of the following factors: the levels of the anthropometric data and the extent of development of the motor capabilities of a sports player / an athlete.

Knowing the structural patterns and interconnections of the motor capabilities, enables setting the management of the physical education with those who practice it on scientific foundations (3).

The assessment of physical development is based on complex studying and consideration of all indicators that characterize it (4, 5).

Technical preparedness is necessary for modern basketball, and it also sets the trends in its progress. The growing number of new technical approaches, which are characteristic of the modern intensification of the basketball game, require a change in the technical training of basketball players. In its essence, technical training is a process of creating new knowledge, skills and habits which find their presentation, and a new attitude towards the technique of performing these movements.

Tactical preparation is the major part of sports training. It is in close relation and interdependence with the other aspects of the training. Sometimes, the tactical training is positively impacted, sometimes – negatively, and

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at the same time it has its influence itself over the other training process aspects.

Modern tactics include universal activation of all offensive and defensive actions of the team, increasing the individual tactical mastery, increase of the game skill-set brilliance of each one of the players, and their abilities for orientation in complex game situations (1).

Studies on the physical and technical-tactical preparation and training of women basketball players with different qualifications, have been carried out (8, 9).

## METHODOLOGY

The purpose of the study is development and mastering of the education-training process among adolescent women basketball players, through analysis and assessment of the physical development and their technical-tactical preparedness. The study was conducted in March 2021.

16 women basketball players aged 15-16 were studied, all from Basketball Club "NSA" Sofia.

In order to obtain the set objectives, we have listed to carry out the following tasks:

1. Study of the specialized literature on the problem of physical development, physical and technical-tactical training.
2. Gathering information about the condition of the physical development, physical and technical-tactical preparedness of the women basketball players at the BC "NSA" Sofia.
3. Discovering the average values and the dispersion in the studied parameters / indicators, in total for the whole team.
4. Finding the correlation dependencies between the studied indicators.
5. Assessment of the condition of the indications of physical development, the physical and the technical-tactical preparedness.

In order to achieve the set goals and to execute the listed tasks in the study, we have applied the

following methods of research and study: theoretical research and analysis of the specialized literature, anthropometrics, sports-pedagogical testing.

Test battery was used, which includes 15 indicators, of which the indicators №№ 1 - 4 are parameters for physical development, the range №№ 5 - 8 are indicators for physical preparedness, and the №№ 9 - 15 are indicators for technical-tactical preparedness.

For the purposes of the study, we have applied the following mathematical-statistical methodologies: variation analysis, body-mass index (BMI), correlation analysis and comparative analysis.

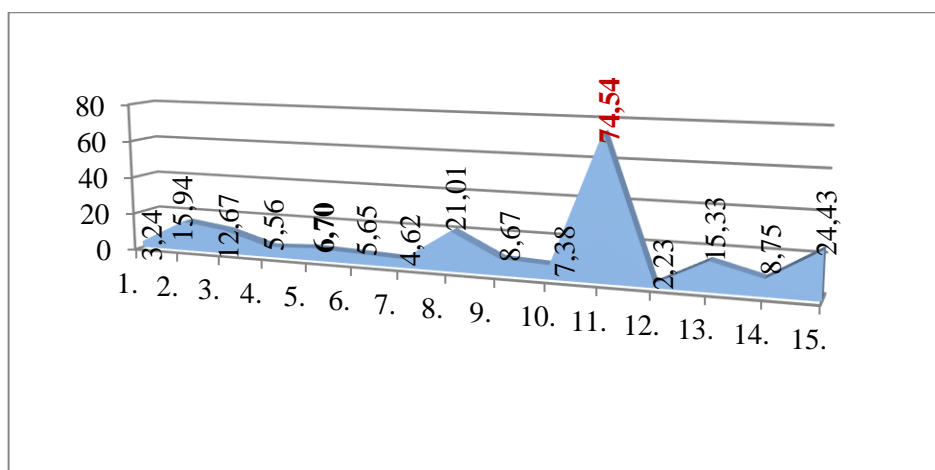
## ANALYSIS OF THE RESULTS

**Table 1** presents the data for the adolescent women basketball players, the values for the indicators selected for the purposes of the study. We can notice that the average value of Indicator №1 Height is quite low – 168,25cm. Important information about the physical development is carried by the so-called Body mass index (BMI). It is calculated based on the weight and height of the basketball players, and its value 22,10 shows us that they are in the norm, i.e. they have normal body weight.

**Figure 1** shows the dispersion among the indicators for physical development, physical and technical-tactical preparedness. Analyzing the dispersion, we can conclude that the studied group are very similar in 5 of the studied parameters. Indicator №2 (Weight),  $V=15,94\%$ ; №3 (BMI),  $V=12,67\%$ ; indicator №8 (Sit-ups),  $V=21,01\%$ ; indicator №13 (Shoot in motion - coefficient),  $V=15,33\%$ , and indicator №15 (Free throws % successful),  $V=24,43\%$ . The sample are strongly non-homogenous at indicator №11 (Index of lead), with  $V=74,54\%$ .

**Table 1.** List of the studied indicators

№	Indicator	X	S	V	min	max	As	Ex
1.	Height	168,25	5,45	3,24	160	178	0,42	-0,70
2.	Weight	62,81	10,01	15,94	48	80	0,33	-0,81
3.	Body-mass Index (BMI)	22,10	2,80	12,67	18,75	28,68	1,20	1,47
4.	Stretch	169,12	9,41	5,56	153	183	-0,11	-1,30
5.	Running 20 m	3,73	0,25	6,70	3,25	4,12	-0,02	-0,44
6.	Running between stands	23,70	1,34	5,65	21,48	25,87	-0,19	-0,97
7.	Running "Shuttle"	46,48	2,15	4,62	42,37	49,36	-0,52	-0,40
8.	Sit-ups	17,94	3,77	21,01	15	31	3,06	10,80
9.	Defense slide	10,15	0,88	8,67	8,66	11,70	0,10	-0,56
10.	Dribble between stands	24,78	1,83	7,38	21,96	27,48	-0,29	-1,06
11.	Index of lead	1,10	0,82	74,54	0,31	3,60	2,14	5,44
12.	Lay up fortune t	36,71	0,82	2,23	29,43	39,98	-1,55	4,13
13.	Lay up – coeff.	7,11	1,09	15,33	6,01	9,86	0,90	0,97
14.	Shoot with passer % successful	56,45	4,94	8,75	46,66	63,33	-0,44	-0,66
15.	Free throws % successful	62,50	15,27	24,43	40	90	0,48	-0,87

**Figure 1.** Dispersion of the indicators for physical development, physical and technical-tactical preparedness

**Table 2** show the correlation matrix of physical development for the studied sample.

The analysis of **Figure 2** shows that the strongest correlation is between the BMI and the weight. The proof for this is the correlation coefficient,  $r=0,927$ . This is the reason to name this correlation very strong. There is also big correlation bond between indicators №1 (Height) and №4 (Stretch),  $r=0,857$ , also between

indicators №2 (Weight) and №4 (Stretch),  $r=0,862$ .

Significant correlation is noticed for indicator №1 (Height) and indicator №2 (Weight)  $r=0,689$ , also between indicator №3 (BMI) and indicator №4 (Stretch),  $r=0,671$ . Moderate correlation is noticed between №1 (Height) and №3 (BMI),  $r=0,370$ .

**Table 2.** Correlation matrix of the physical development

№	Indicator	1	2	3	4
1.	Height	1			
2.	Weight	0,689	1		
3.	Body-mass Index (BMI)	0,370	0,927	1	
4.	Stretch	0,857	0,862	0,671	1

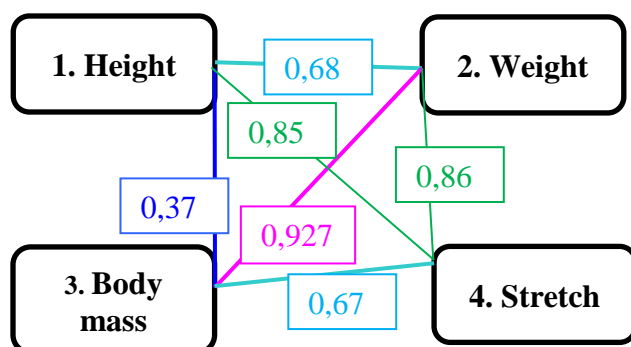


Figure 2. Correlation structure model of the physical development

Table 3 represents the correlation matrix of the physical preparedness among the studied sample of adolescent female basketball players.

Table 3. Correlation matrix of the physical preparedness

№	Indicator	5	6	7	8
5.	Running 20 m	1			
6.	Running between stands	0,848	1		
7.	Running “Shuttle”	0,913	0,770	1	
8.	Sit-ups	-0,605	-0,544	-0,615	1

In the study of the correlation-structure model of the physical preparedness of the basketball players, there were tests executed for 4 indicators, listed in the study under numbers 5 to 8. Analyzing Figure 3, we observe that there are 6 correlation dependencies between the studied indicators. Very high correlation index is noticed

between indicators №5 (Running 20 m) and №7 (Running “Shuttle”),  $r=0,913$ . High correlation dependency is observed between indicators №5 (Running 20 m) and №6 (Running between stands),  $r=0,848$ , also between №6 (Running between stands) and indicator №7 (the “Shuttle” Running),  $r=0,770$ .

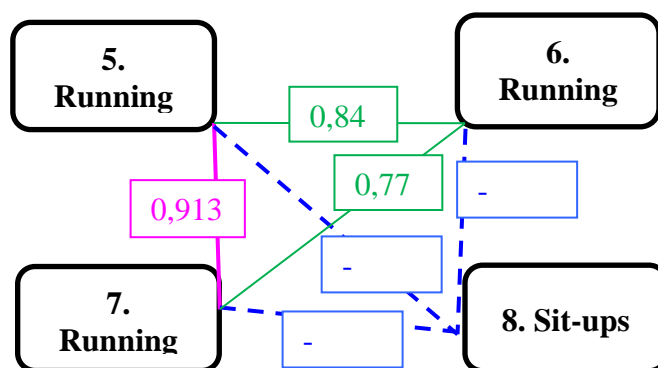


Figure 3. Correlation structure model of the physical preparedness

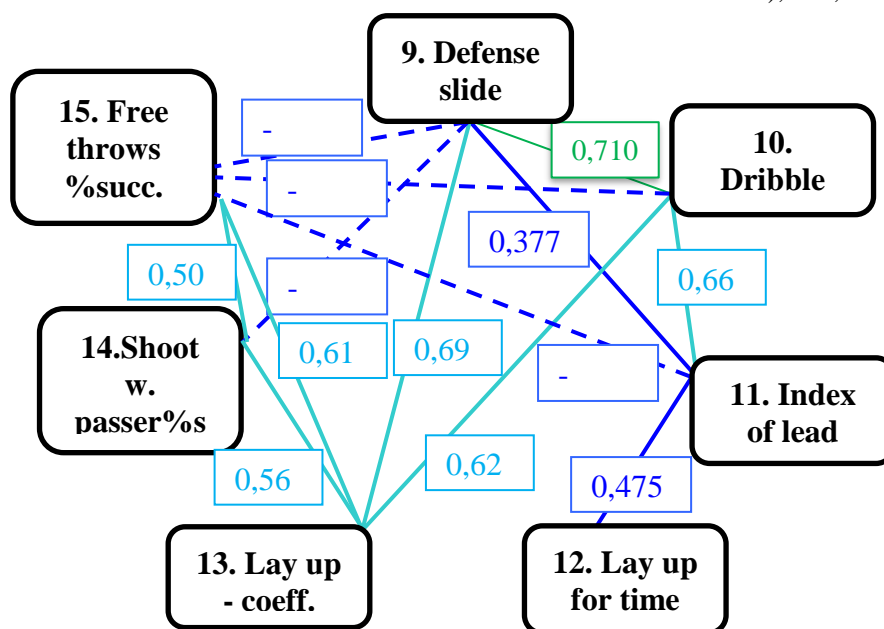
Table 4 lists the values of the correlation matrix of the technical-tactical preparedness among the 15-16 y.o. basketball players – women.

**Table 4.** Correlation matrix of the technical-tactical preparedness

№	Indicator	9	10	11	12	13	14	15
9.	Defense slide	1						
10.	Dribble between stands	0,710	1					
11.	Index of lead	0,377	0,665	1				
12.	Lay up for time t	0,169	0,277	0,475	1			
13.	Lay up – coeff.	0,690	0,620	0,205	-0,205	1		
14.	Shoot with passer % successful	-0,553	-0,253	0,106	0,253	0,569	1	
15.	Free throws % successful	-0,422	-0,639	-0,365	0,054	0,613	0,508	1

The analysis of the correlation-structural model of the technical-tactical preparedness of the basketballers as shown on **Figure 4** Shows that the number of the interdependent correlations, which correspond to the accepted limit of informative interdependence ( $r \geq 0,30$ ), is 13. High correlation index is demonstrated between indicators №9 (Defense slide) and №10 (Dribble between stands),  $r=0,710$ . Significant correlation dependence between №9 (Defense slide) and

№13 (Lay up coefficient),  $r=0,690$ , and between indicators №10 (Dribble between stands) and №11 (Index of lead),  $r=0,665$ , also between №10 (Dribble between stands) and indicator №13 (Lay up coefficient),  $r=0,620$ , between №13 (Lay up coefficient) and №14 (Shooting with passer % successful),  $r=0,569$ , as well as between №13 (Lay up coefficient) and №15 (Free throws % successful),  $r=0,613$ , indicator №14 (Shooting with passer % successful) and №15 (Free throws % successful),  $r=0,508$ .

**Figure 4.** Correlation structure model of the technical-tactical preparedness

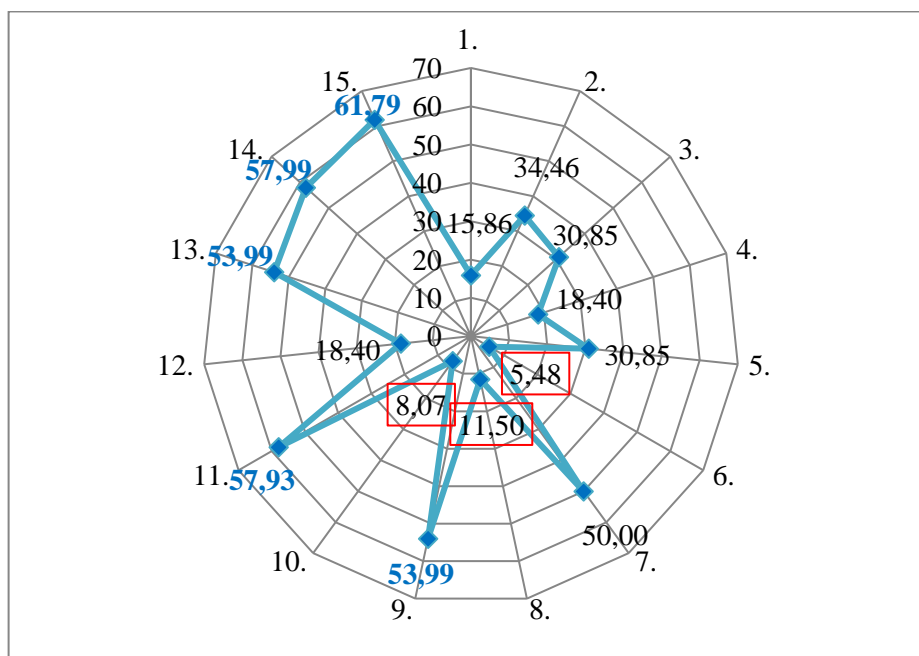
The study compares and evaluates the studied features, carrying information about the physical development, physical and technical-tactical readiness of the basketball players from the team of BC “NSA”. It is carried out on the basis of an existing normative table for control and optimization of the sports training and the

competitive efficiency of the national teams – women cadets.

**Figure 5** shows the assessment scores of the indicators as P%. They are made using the 50-point assessment system. Five of the studied indicators of scores T are higher than 25 points. ( $P=50\%$ ). They vary between 53,99% and

61,79%. The highest is the score of indicator №15 (Free throws % successful) – 61,79%. The analysis shows that for 9 of the studied indicators T<sub>s</sub> scores are below the average level (lower than 25 points), that is the basketball players are currently falling behind in relation to those

indicators. The lowest scores marked by the basketball players are for indicators №6 (Running between stands, T<sub>6</sub>=5,48), for №8 (Sit-ups, T<sub>8</sub>=11,50) and at № 10 (Dribble between stands, T<sub>10</sub>=8,07).



**Figure 5.** Assessment of the physical development, the physical and the technical-tactical preparedness of the NSA basketball team – women 15-16 y.o.

## CONCLUSION

Correlation models of the indicators for physical development, physical and technical-tactical readiness of the studied basketball players are presented. A strong inhomogeneity was found in the indicator - ball running index. According to 6 of the indicators, the teenage basketball players from the surveyed team have reached grades above the average level, but according to 9 indicators they are below the average level. According to the analyzes and evaluation of the indicators selected for the needs of the present study, the following recommendations can be made in order to optimize the training process. It is necessary to make adjustments in the future training program and to emphasize and include in it priority training means for improving the speed of the ball, performing shooting in high-speed movement and development of the abdominal muscles.

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