

## **ANTHROPOMETRIC RELATIONS BY MEASURES AND RESULTS IN SOME MOTOR TESTS SUCCESS IN RUNNING THE 400M IN 16-YEAR OLD STUDENTS**

*(Research note)*

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### **Abstract**

*The aim of this paper was to prove the linkage between the motor skills and anthropometric characteristics as a predictor system with effectiveness and results in running discipline at 400 meters as situational-motor variables of criteria system. The research is made by testing 130 sample of 16 years old male, high school students  $\pm 6$  months, of the gymnasium "Sami Frasheri"- Kumanovo. There have been used 26 variables in this research. 12 of them are used to evaluate motor skills, 13 for evaluating anthropometric characteristics and 1 of them to evaluate situational-motor skills. By proving the individual influence of motor skills and anthropometric characteristics in successful sprint running at 400 meters, the results bring a conclusion that: motor variables and those anthropometric used as predictor variables in this paper, have significant statistical impact in criteria variables on 400m running (MTP400m). More affinity showed the variable longwise jumping from the point (MCJM) which expresses explosive force and correlates more with 400 meters running and motor variables tapping on feet (MTH) which expresses speed of movement of the lower extremities. Therefore, we can suggest professors and trainers, who are engaged with sprint running, to use more exercises, which develop the explosive force and the speed of movement, notably polymeric exercises. Regarding the anthropometric variable, bigger correlation has been shown by the variable dermal tiple of the arm (AMTP) which correlate positively with running in 400 meter, from which we can conclude that the fullest in the upper limbs are students, the more slowly realize running in the 400 meters and conversely.*

**Keywords:** *physical exercise, motor manifest dimensions, anthropometric characteristics, success in running, independent motor variables independent anthropometric variables, explosive muscle power; multi variant regression analysis*

### **INTRODUCTION**

Athletics is one of basic sports and an essential branch of Physical Education, as well as running, notably as racing discipline, which dates back from old games, respectively the first Olympic games of 776 B.C., where running in one period (129 meters), was the only run racing discipline. It is known as the Queen of sports because there are several branches and motile disciplines within it. Running, notably in short paths, is part of some studies and investigations because they have a specific variety, notably running in 400 meters as typical sprint running, which is the studying object in this research. The specific thing here is that runners do not run in straight track, because there is a turn immediately at the beginning of the track, so the sprinter should have

additional technical skills for a good start and be explosive at the turn and take the turn with maximum speed.

As it could be seen from the structural analyze, sprint running is divided into four phases, such as: start, starting acceleration, distance running and the finish. All phases are in connection with each other for more effective results. To reach better results in sprint running, the runner needs to have an explosive force and an excellent psychomotor coordination.

For this to be realized, it is needed the use of studying methodology for enforcement of the structure of anthropologic dimensions, their directions and development characteristics as well as the approach of the use of methods and tools for body exercises for optimal development of children and teenagers. Except this, it

is important to determine the value of motor tests and anthropometric measures to follow the situation and changes of latent dimensions which will be realized with tools of body exercises in Physical Education.

According with this, the information for the relation of anthropometric characteristics and motor skills with successful sprint running, is very important for the theory and the practice of Physical Education. This problem will be realized in this paperwork, with high school students of the gymnasium "Sami Frasheri" from Kumanovo city.

**METHODS**

The object of this research are sport skills of students which are creating within the regular classes during the exercises in Physical Education, in form of an athletics discipline model of running on 400 meters. Besides, the subject of the research is anthropometric (morphological) characteristics and motor skills of students at the age of 16.

The main problem of the research is to investigate the value level and characteristics of the relation of sports success of high school students at running in 400 meters with anthropometric characteristics and anthropometric skills within the regular physical education training.

According with the subject and the research problem, the general aim of the investigation is to confirm the relation between the anthropometric characteristics and motor skills (as a predictor system) with an efficient result in athletic running discipline in 400 meters at high school students (criteria system). Within this general aim, the specific aim is to confirm the level of cooperation of anthropometric and motor span with the result of running in 400 meters.

The sample of the research is taken from high school students of gymnasium "Sami Frasheri" from Kumanovo. There are 130 testers, male students.

There have been 26 variables in this research: 12 variables to evaluate motor skills, 13 variables to evaluate anthropometric characteristics and 1 variable to evaluate situational-motor skills.

**RESULTS**

To demonstrate the relation between motor variables and the anthropometric variables (as a predictor

system), we have used regressive analysis as a method for analyzing the effect and the direction which belongs to multi option analysis.

In the following charts we have shown results from the regressive analysis of the variable criteria running in 400 meters (MTP400M).

*Table 1. Regression of variable MTP400M*

Model summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
,665(a)	,442	,308	10,37

In Table 1., we can see that multiple correlation between the criteria variable - running in 400 meters (MVR400M) and all other free variables (predictors) have been of statistic importance R= (0,665), which respectively explains the common variability for about 44,2% (R<sup>2</sup>=0,442), when the other percentage 55,8% of the description of common variable of the criteria variable (MTP200M) belong to other anthropometric characteristics which are not been researched yet (as other anthropometric, motor, cognitive, and functional variables). From this, we can comment on the results about the effect of predictor index on criteria index running in 400 meters (MTP400M).

In Table 2., we have described the variance analyze of multiple regression. It is seen in the chart that the value of variability between the groups (regression) is smaller than the value of the variability within the group (residual). The value of F test is 3,294, while the level of confidence p=0,000 shows that the variability value between the group and within it at the variance of multiple regression has a difference with a statistic meaning.

In Table 3., we can see that the impact of predictor variables on criteria variables running in 400 meters (MTP400M) is calculated according to the beta standardized coefficient value. Of greater statistic importance is the variable long jumping from the point (MCDM) with a negative value of beta standardized coefficient -0,377 and level of confidence 0,002, follows the variable tapping on feet (MTH) with a value of -0,284, and level of confidence 0,006. These values have a negative impact on this capability; this data indicates that as short as the

*Табела 2. Values of the parameters of the analysis of variance – MTP400M ANOVA(b)*

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	8851,151	25	354,046		
Residual	11179,253	104	107,493	3,294	,000
Total	20030,404	129			

Table 3. Regression analyze of variable MTP400m - Coefficients (a)

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std.error	Beta		
(Constant)	168,939	51,649		3,271	,001
АВИС	-,085	,383	-,042	-,221	,825
АСВИС	,096	,284	,033	,338	,736
АДН	-,391	,415	-,160	-,941	,349
АшР	-,024	,716	-,004	-,033	,973
АшК	-,470	,449	-,112	-1,048	,297
Ашп	1,148	,788	,171	1,458	,148
АТЕЖ	,133	,245	,141	,542	,589
АОГК	-,385	,352	-,245	-1,092	,277
АОР	1,164	,687	,307	1,695	,093
Аоп	-1,544	1,093	-,275	-1,412	,161
АКДР	1,056	,454	<b>,282</b>	2,325	<b>,022</b>
АКДГ	,763	,592	,190	1,289	,200
АКДС	-,161	,441	-,056	-,364	,716
МРп	-1,272	,795	-,153	-1,600	,113
МТН	-1,314	,471	<b>-,284</b>	-2,791	<b>,006</b>
МТР	,188	,285	,062	,659	,511
МДф	,195	,148	,116	1,314	,192
МС	,105	,091	,108	1,155	,251
МпБ	-,127	,111	-,096	-1,138	,258
МТМ	-,008	,029	-,037	-,290	,772
МпМ	,024	,018	,166	1,297	,198
МСДМ	-,216	,067	<b>-,377</b>	-3,240	<b>,002</b>
МИЗ	-,053	,052	-,098	-1,026	,307
МГМ	-,370	,464	-,077	-,797	,427
ММп	,097	,203	,043	,477	,634

length of the jump, so small is the positive impact on the anaerobic ability MTP400m and vice versa. Also significant impact on the criteria variable have the predictor variables - dermal tittle of the arm (AMTP) with a positive value of beta standardized coefficient 0.282, and level of confidence of 0.022. The value of this parameter speaks for a positive impact to dermal tittle of the arm, from which we can conclude that as much the greater in the upper limbs are students, as well as in the lower limbs, the more slowly is realized the running on the 400 meters and conversely.

## CONCLUSION

The motor and the anthropometric variables used as predictor variables in this paperwork, have a significant impact on criteria variable running in 400 meters (MTP400m). The variable jumping in length from the point (MCDM) and variable taping on feet (MTH) has shown bigger interest from motor variables, which expresses explosive force and speed of movement and correlates more with running on 400 meters. Therefore, we can suggest the professors and trainers, who are engaged with sprint running, to use more exercises, which are developing the explosive force and the speed of

movement, also known as polymeric exercises. Except the anthropometric variable, greater correlation shows the variable dermal tittle of the arm (AMTP) which correlates positively with running on 400 meter, from which we can conclude that the greater in the upper limbs are the students, as well as in the lower limbs, the more slowly is realized the running on the 400 meters and conversely. What means that in sprint running it is needed a clear muscular mass of upper and lower extremities as it is known that if the muscle is more hypertrophied, it shows bigger force, in our case an explosive force, for better results in all the professional aspects.

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