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THE INFLUENCE AND RELATIONSHIP OF ANTHROPOMETRIC FEATURES AND MOTOR ABILITIES OF SPRINT RUNNING IN 60-100 METERS OF 16 YEARS OLD STUDENTS

Preliminary communication

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Abstract

This paper explore the impact of some anthropometric characteristics and motor abilities of sprint running in 60-100 meters. The aim is to establish the connection between the anthropometric characteristics and motor abilities as a predictor system of sprint running on 60-100 meters as a criterion system. The research was done by 130 male students +-6 month, at high school ''Sami Frasheri" - Kumanovo. In research have been used total 22 variables in which 12 for anthropometric characteristics, 8 for motors abilities all of these as a prognostic variables and 2 variables of percentage for sprint running at 60 and 100 meters as a criterion variables. Based on the obtained results and the conducted analysis can be concluded that: anthropometric characteristics and motors abilities as a predictor system used for this variables may have an impact on statistical characteristics in variables of sprint running at 60 and 100 meters. Anthropometric characteristics and motors abilities as a prognostics (as predictor system) have an impact on statistical variables TP60m and TP100m with value Q=0.00. Also worth mentioning is that the prognostics system which affects the variables has MCM, with value -.264 and level 0.22 where it has a negative sign which means that the impact of variable on that MCM is negative at variable TP60m, also a great influence on the predictors has variables TP100m, have also AONL with the coefficient .396 and value 027, variable MCM with the value -401 and level value 0.001. From these results we can conclude that students of this age who posses the motor abilities as explosive force by the following experiments and a pure muscular mass of the higher limbs have to achieve the best results on sprint running at 60 and 100 meters.

Keywords: *prognostic and criterion variables, regression analysis, muscular explosive force, higher limbs muscular mass, 60 - 100 meters sprint running*

INTRODUCTION

Sprint running are known before the new era, where at that time the best description of running gave one of the world's most prominent poets Homer in his legendary epic "Iliad and Odyssey" where he mention the fast runners. The explanation there was why jogging and the sprint runs were one of the first Olympic disciplines from year 776 before the new era by running by a stud (192.27m). This discipline also was one of the most attractive in athletic running (Radic, 2006) from all running disciplines which are: shorter runs, medium and long runs, sprint runner are among the first where to start with general training with children of age 10-12, specialized exercises of age 14-16 (Bompa, 2000). To improve the results in running on short and medium routes, use different variables interval momentum method, breaks and numerous repetitions which depends on the specific training tasks (Stefanovic, 2015). We have been focused on sprint runner athletes and students on age of 14. Some authors estimate that the functional and motor abilities are one of the most valuable skills which are considered as a success of the sprint runners (Homenkov 1977; Brown, Ferrigno& Santana 2000; Milanovic 2007). For example Stefanović, R., & Stefanović, Ž. (2015) suggest that technical skills in running, especially long skills and quick finish to a great extent depend on the notorious capabilities.

METHODS

The subjects were male students aged 16 ±6 month, the research is based on 130 examiners in high school "Sami Frasheri"- Kumanovo. This research is not selective in connection with the anthropometric characteristics and motor abilities, respectively of the sprint runner. The results obtained from this research were obtained only by examiners who had regularly attended the physical education classes and participated in all test.

Twenty two variables were used in the test of which 12 percentage for the anthropometric characteristics: (AVT – body height), (ASVT - sitting height of the body), (ADN – leg length), (ADR- arm length), (ADK–diameter of the knees), (ATTM- body weight), (ASOGK – the volume of thorax-circumference), (AONL – the volume of the arm), (AOPL- the volume of the forearm), (AKNNL- the skin folds of the arm), (AKNG – the skin folds of the back), (AKNS- the skin folds of the abdomen) , 8 for motor abilities: (MOT-turn at the podium), (MTN – foot taping), (MTR – hand taping), (MDPS – the deep forward bend on the bench), (MŠ-splitting up the legs), (MTM- triple jump), (MPM – five jump), (MSM – long jump), all parameters such as prognostic system and 2 percentage variables for sprint running in 60 (TR60м) and 100 meters (TR100м) as a criterion variables.

Table 1. Descriptive statistics of the indicators of anthropometric characteristics and motor abilities of students aged 16. (N=130)

Variables	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
AVT	162.00	194.00	174.4692	6.17345	.494	.218
ASVT	119.00	141.00	130.0615	4.29847	.036	.166
ADN	92.00	120.00	105.2923	5.10464	.222	.295
ADR	34.00	44.00	39.1462	2.13175	-.150	-.094
ADK	25.00	39.00	31.6615	1.85754	.610	3.058
ATTM	46.00	125.00	69.4423	13.22665	1.291	2.555
ASOGK	74.00	126.00	89.7269	7.94396	1.206	2.849
AONL	22.20	38.00	27.8531	3.28282	.699	.295
AOPL	21.80	33.00	25.6685	2.22296	.761	.740
AKNNL	26.00	184.00	75.0462	33.31081	.935	.473
AKNG	34.00	193.00	73.7538	31.05860	1.648	2.677
AKNS	34.00	195.00	85.1615	43.73436	1.239	.585
MOT	3.40	10.40	5.7838	1.49924	1.066	1.058
MTN	15.00	31.00	24.8692	2.69478	-.308	.689
MTR	22.00	41.00	33.4000	4.13268	-.382	-.295
MDPS	7.00	39.00	23.8385	7.42487	-.250	-.416
MŠ	131.00	197.00	165.5000	12.82696	-.085	.021
MTM	420.00	702.00	555.4077	54.73002	.364	.101
MPM	657.00	1220.00	975.6000	86.72898	-.029	.782
MCM	140.00	266.00	182.7385	21.72362	.639	.867
TR60m	7.00	13.00	9.2069	1.15525	.745	.683
TR100m	13.10	19.70	15.4654	1.62016	.636	-.429

Table 2. Regressive relationship between the anthropometric characteristics and motor abilities with the criterion variable MTR 60m

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.648[a]	.420	.314	.95683	.420	3.952	20	109	.000

Table 3 . Regressive analysis of variable TP60 m

Variables	Nonstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	17.929	4.446		4.032	.000
ABT	-.020	.035	-.105	-.558	.578
ACBT	.039	.024	.143	1.585	.116
АДН	.009	.038	.040	.236	.814
АДР	-.051	.064	-.094	-.792	.430
АДК	.081	.069	.131	1.172	.244
АТТМ	.013	.022	.154	.603	.548
АСОГК	-.021	.032	-.147	-.678	.499
АОНЛ	.055	.061	.157	.911	.364
АОПЛ	-.123	.096	-.236	-1.282	.202
АКННЛ	-.003	.004	-.077	-.661	.510
АКНГ	.000	.005	-.007	-.049	.961
АКНС	.006	.004	.218	1.465	.146
МОТ	-.033	.072	-.043	-.459	.647
МТН	-.079	.040	-.184	-1.963	.052
МТР	-.016	.024	-.056	-.636	.526
МДПС	-.008	.013	-.051	-.625	.533
МШ	-.005	.008	-.055	-.618	.538
МТМ	-.001	.003	-.061	-.494	.622
МПМ	-.003	.002	-.196	-1.568	.120
МСМ	-.014	.006	-.264	-2.332	.022

Table 4. Regressive relationship between the anthropometric characteristics and motor abilities with criterion variable MTP 100m (dependent model).

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.622[a]	.387	.275	1.37954	.387	3.446	20	109	.000

In order to determine the impact between the anthropometric characteristics and motor abilities as predictors system for variables in sprint runs 60 and 100 meters as a system requirements, it has been accepted the regression analysis and methods of analysis and impact which concludes by a multivariate group analyses. For the processing of results was used the packet SPSS 22.0.

RESULTS AND DISCUSSION

Toward the evidence of the connections and influence of anthropometric characteristics and motor abilities in the success of sprint runs of 60 and 100 meters, it is taken into account the regression analysis and methods of analysis and impact and connection which is in the multivariate group. The regression analysis in anthropological research is considered as a case where the impact must certify the connection and the size of two or more variables known as prognostics variables (independent variable) on variable criteria (dependent variable) (Malacko & Popovic, 1997).

From the Table 2. shown that the number of short correlation between variables of predictors system at the variable of sprint running in 60 meters (TR60m) valued R=(.648), which explains the common variability between 42% (R^2=.420), while others 58% belong to another anthropometric characteristics which they are not explored in this research (anthropometric variability conative, cognitive, functional, sociological, motivational, etc). From this table can also be seen that the value between the criterion variable and compared with prediction variable with value of Q(F) = test .00, which means it is statistically significant toward the predictive variables on the criterion variable.

The highest impact of 60 meters criterion variable (MSM) (Table 3.) of all predictors system, over the running criterion there is a negative coefficient -.264 and value Q(F) test = .022, which means that as smaller is the space the poorer will be the result in the running of 60 meters and the opposite. Variable values of predictors system have no statistical impact on the criterion variable.

In the Table 4. it is seen that the multicorrelation between running at the 100 meters (TR100m) and others as independent variables (predictors system) have statistically identical value R=.622 or explains the common variability of the criterion variability (prognostic and criterion) 38.7% (R^2=.387), the remaining percentage 61.3% of the common variability of the criterion variability with the predictors and belongs to anthropological characteristics which are not subject of research in this sphere (another anthropometric variables, conative, cognitive, functions, sociological, motivations, etc). In this table also we can see the value level which is Q(F)= test=.000 which means that predictors have the same value with the criterion variable but the same may be interpreted solely.

In the Table 5. it is seen that the predictor's variables impact on criterion variable of running at 100 meters where the results are made depending on the value of beta coefficient where greater impact has statistical variable in land jump (MSM), as well as a negative value of beta coefficient -.401 in the value .001, from this we may conclude that the weaker be the result instead (MSM), the weaker will be the result of running to 100 meters and the opposite. Also it has the statistical value of anthropometric variability (AONL), with value of beta coefficient .396, and level value of .027 where this value is positive and variable impact (AONL) on the variability of running in 100 meters (TR100m) is positive.

CONCLUSION

From the obtained results can be concluded that the anthropometric characteristics and motor abilities, as predictors variable in this research, have a statistical impact on criterion variables of sprint running at 60 and 100 meters. From this we can conclude that the students who possess motor skills as explosive force to the lower extremities and muscular strength also to the high extremities will achieve better results to the sprint runs of 60 and 100 meters. From this we can advise all teachers and trainers to deal with athletic or more precisely with sprint runs, presented as the most attractive disciplines of running, to practice these explosive motor forces or in their curricula also to exercises this tests for hypertrophy of the upper part of extremities. With this we advise everyone works in all sports with the possibility of two - three times a year to make exercises in anthropological and to find spaces to exercises in order to follow the psycho-sociological situation of students and sportsman, and to achieve better results in the framework of the school, why not also in professional sports.

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