The Relationship Between Motor Skills and Leading the Ball in Handball in Students

Danijel Dujakovic

Department of Physical Education, Public Institution Desanka Maksimovic Laktasi, Laktasi, Bosnia and Herzegovina

Email address:
daniduj@gmail.com

Abstract: The aim of the research is to determine the relationship between the achieved results in motor skills (as a predictor system) and the achieved result in students in leading the ball in slalom (criterion variable). The research was conducted on a sample of 45 students from the Primary School "Desanka Maksimivic" Laktasi, aged 11 and 12. Testing was realized in the duration of 8 lessons at the beginning of the school year. Predictor variables were presented through a set of 7 motor tests: throwing a medical ball of 3kg (bacmed), running from a high start at 30m (trc30m), endurance in the arme (enda), sit-ups (situp), long jump from standing (jump), 20 yards (20y) and flamingo test (flam). The sample of the criterion variable consisted of the test of leading the ball in slalom (vslalom). In order to formulate valid conclusions of the research, the following parameters were calculated: basic descriptive parameters, correlation and regression analysis. Based on the analysis and processing of the results, it was determined that the applied predictor system has a statistically significant correlation with the criterion variable. The statistically significant correlation is at the level of 0.05. Individual statistically significant influence was achieved by the variable: throwing a medical ball ($p<0.05$), while in other tests there was no statistically significant influence. It can be concluded that continuos improvement and knowledge of basic motor skills and traits in students on which success in teaching depends, is important for the proper direction and selection of potential talents, as well as for programming and implementation of the teaching process.

Keywords: Correlation, Motor Skills, Handball, Ball, Students

1. Introduction

Handball performance is affected not only by anthropometric characteristics, but also by technical skills, tactical understanding and physical abilities that develop with the age of students or players [8, 13], so it is necessary to constantly improve the motor and situational motor skills of students, so that the teaching process can be improved. Level of basic motor abilities must be considered as a value that can be a guarantee of unhindered development and improvement of specific - situational motor abilities [16]. Numerous authors have confirmed that there are five situational-motor abilities [4, 11] namely: precision, ball handling, speed of movement of players with the ball, speed of movement of players without the ball and power of throwing the ball.

Leading the ball is one of the basic elements that a student needs to master, and that is why it is necessary to master the basic elements of technique in order to be able to organize a better handball game in class. The speed of movement of students with the ball represents the ability to finely manipulate students with the ball in motion [16]. Many authors have done numerous researches on this topic, so Markovic and Pivac [10] established a high correlation between some basic motor skills and a set of variables for assessing specific situational-motor abilities of handball players, where the success in ball movement and speed explain 55% of total variability, while Zakula and Jovanovic [20] established a statistical association of some motor skills with ball slalom results. Vuleta [17] analyzes the correlation of variables for the assessment of different types of strength with situational efficiency in handball. It has been determined that the most significant influence is exerted by the tests of explosive power, and to some extent the tests for estimating the speed of power, ie the speed of movement with and without the ball.

The importance of this research is to obtain data on motor skills that affect the result of the criterion variable ball guidance, then there will be guidance to the teacher or coach on how to program and direct the class in the right direction, and these results will help choose talented students.

2. Research Methodology

The subject of research is focused on the analysis of the results of some motor skills and the achieved result in leading the ball in slalom. The aim of the research is to determine the relationship between the achieved results in motor skills (as a predictor system) and the achieved result in leading the ball in slalom (criterion variable). Based on the set subject and the goal of the research, the following tasks were set:

1. determine the level of motor skills of students,
2. to determine the level of situational-motor abilities of students in leading the ball,
3. determine the relations of motor abilities with the result in leading the ball in slalom.

For the purpose of this research, the following hypothesis was set:

H1-Statistically significant correlation of the set of predictor variables with the criterion variable is expected.

The research was conducted at the beginning of the first half of 2020/21, lasting 8 hours, where the students realized the teaching content of handball according to the curriculum. For the purpose of this research, a sample of 45 students from the elementary school "Desanka Maksimovic", Laktasi, who regularly attend physical education classes, aged 11 and 12, was used. The following tests were used for the research:

Instruments for assessing situational-motor abilities consisted of 1 variable [2, 6, 9]: leading the ball in slalom (vslalom)

Test description: The test is performed by drawing a 10 m long line on the parquet. At every two meters from the side of the line, five stands 1.5 meters high are placed. The starting line is 1 m long. At the signal of the starter, the student starts leading the ball, going around the "zigzag" stands. He goes around the end and returns to the starting line. The student has two attempts and the best attempt is recorded in the list. The student can use both hands, and the measurement of his work and writing is done by one person-scorer at the same time. Instruments for assessing motor skills consisted of 7 variables: throwing a medical ball of 3kg (bacmed), running from a high start at 30m (trc30m), endurance in the arme (enda), sit-ups (situp), long jump from standing (jump), 20 yards (20y) and flamingo test (flam). In order to formulate valid conclusions, the following were calculated: 1. basic descriptive parameters, 2. correlation and regression analysis. Statistical data processing was done using the application statistical program SSPS version 26 for Windows.

3. Results and Discussion

The analysis of motor characteristics was performed on the basis of descriptive parameters (Table 1) on the minimum and maximum values of the observed characteristics, as well as on the basis of the central tendency of the data-arithmetic mean (Mean) and standard deviation (St.Dev). By analyzing the results shown in Table 1, it can be noticed that the students had the largest variable width in the results on the bacmed and jump test, while the lowest in the trc30m test. In the dispersion parameters, based on the standard deviation of the subjects, it was observed that the subjects achieved the most homogeneous results in the trc30m test, then 20y, and the greatest scatter of the results was achieved in the bacmed test.

Table 1. Descriptive Statistics.

Descriptive Statistics										
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
vslalom	45	17.10	7.90	25.00	12.3578	3.38079	1.846	.354	4.313	.695
trc30m	45	1.53	5.47	7.00	6.0707	.38245	.818	.354	.118	.695
y20	45	1.80	5.10	6.90	5.9940	.36380	.247	.354	.220	.695
bacmed	45	355.00	255.00	610.00	387.3333	74.99273	.687	.354	.301	.695
jump	45	75.00	110.00	185.00	148.3556	17.64184	-.056	.354	-.184	.695
enda	45	60.00	1.00	61.00	13.5156	13.39659	1.829	.354	3.729	.695
situp	45	16.00	9.00	25.00	18.3556	3.16340	-.739	.354	.867	.695
flam	45	20.50	.00	20.50	5.1333	5.22016	1.693	.354	2.044	.695
Valid N (listwise)	45									

Table 2. Correlation analysis of criterion variables and motor abilities.

Correlations		vslalom	trc30m	20y	bacmed	skud	izgib	ptrup	flam
vslalom	Pearson Correlation	1	.319*	.242	-.514**	-.402**	-.341*	-.476**	-.048
	Sig. (2-tailed)		.033	.110	.000	.006	.022	.001	.755
	Sum of Squares and Cross-products	502.910	18.139	13.073	-5729.767	-1055.924	-678.780	-223.924	-37.140
	Covariance	11.430	.412	.297	-130.222	-23.998	-15.427	-5.089	-.844
	N	45	45	45	45	45	45	45	45

Note: * statistical significance level 0.05; ** statistical significance at the level of 0.01.

In Table 2, a correlation analysis was applied to calculate the values of the Pearson correlation coefficient. The criterion variable leading the ball in slalom (vslalom) has a statistically significant correlation with the variable running from a high start at 30 m (0.319), endurance in the arme (-0.341), throwing the medical ball (-0.541), sit-ups (-0.476), long jump (0.402), while in the other two tests there is no statistically significant correlation.

Regression analysis of the criterion variable leading the ball in slalom (vslalom) which estimates the coordination and speed of leading the ball in handball in students are shown in Table 3. The obtained results show that the predictor system of variables shows a statistically significant correlation in the prediction of the criterion variable running the ball in slalom (vslalom). These differences are significant at the level 0.05.

Predictive system of selected motor abilities the coefficient of multiple correlation is (0.643) and the coefficient of determination is (0.431) at the level of significance (F = 3.725; sig = 0.004), which means that it is possible to predict 41% or explain the predictor system of motor skills, and the other 59% of variability refers to other dimensions of students anthropological status (conative, cognitive, morphological, etc.) that are not the subject of this research. Brankovic, Martinovic and Ilic [1] in their study of students also confirmed a statistically significant relationship of motor variables with the criterion variable running the ball in slalom. Vuleta [18] determined by regression analysis that a significant correlation was found between the variables of the predictor set and the criterion variable, which was defined as the ability of players to handle the ball.

Table 3. *Results of regression analysis of the criterion variable (vslalom) in students.*

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.643[a]	.413	.302	2.82362	.413	3.725	7	37	.004

a. Predictors: (Constant), flam, situp, bacmed, y20, enda, trc30m, jump.

Table 4 shows the individual statistically significant influence of a set of predictor variables on the criterion variable slalom ball leading (vslalom). One motor test had a statistically significant effect: throwing the medical ball at the level (sig = 0.010), while in other tests there was no statistically significant effect. The causes of the individual influence of the motor variable throwing medicine on the criterion variable can be sought in the technique of performing the elements of guiding the ball in slalom and in the test throwing medicine ball itself, which defines the explosive power of the upper extremities. In order to master the technique of guiding the ball as well as possible, it is necessary to optimally develop the muscles of the arms and shoulders, ie to be able to perform explosively fast movements while guiding the ball. It has been proven that the faster a muscle stretches, the better (greater) the concentric force after

stretching, the result is an explosive movement when it acts on an external object or body (eg ball, jumps, etc.) [14] and this test defines the explosive power of the upper extremities. These authors obtained similar research results [3, 7, 12, 15, 19]. The lack of connections from other treated predictor spaces can be explained by the level of adoption of the technical element of the criteria and the sensitivity of the test [5]. Based on these allegations, it can be concluded that the motor test of throwing a medicine ball has a large share in the derivation of the criterion variable, and that ability should be constantly developed in health and physical education classes. Also, with the increase of students' basic motor skills, situational motor skills will improve, in this case the technical element of slalom ball guidance, which would contribute to students mastering technical elements in handball, which was the problem of this work on improving teaching technology.

Table 4. *Results of individual influence of predictor variables on criterion variables (vslalom).*

Coefficients[a]									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	27.372	17.712		1.545	.131			
	trc30m	.740	1.624	.084	.455	.651	.319	.075	.057
	20y	-.912	1.602	-.098	-.569	.573	.242	-.093	-.072
	bacmed	-.018	.006	-.389	-2.715	.010	-.514	-.408	-.342
	jump	-.008	.048	-.042	-.169	.867	-.402	-.028	-.021
	enda	-.045	.044	-.180	-1.029	.310	-.341	-.167	-.130
	situp	-.299	.153	-.279	-1.945	.059	-.476	-.305	-.245
	flam	.009	.088	.014	.099	.922	-.048	.016	.012

Dependent Variable: vslalom.

4. Conclusion

A study conducted on a sample of 45 students in order to

examine the relationship between the results achieved in motor skills (as a predictor system) and the results achieved in students in leading the ball in slalom (criterion variable), came to the following conclusions: The H1 hypothesis that

expected statistically significant relationships between predictor variables on the criterion variant, which was tested by regression analysis, is fully accepted. The results showed that there are statistically significant relationships between a set of predictor variables with the criterion variabl (vslalom) at the significance level less than (sig = 0.05), while a idividul statistically significant effect on the criterion variable (vslalom) was achieved by motor test: throwing the medical ball (bacmed = 0.010). It can be concluded that the improvement and knowledge of basic motor skills and traits in students on which success in teaching depends, is important for the proper direction and selection of potential talents, as well as for programming and implementation of the teaching process.

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