

ANALYSIS OF THE INFLUENCE OF BASIC-MOTORIC ABILITIES ON BUOYANCY IN SWIMMING

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Abstract:

The purpose of this research is to confirm multiple coherence and influence of basic-motoric dimensions on the buoyancy in swimming with the students. The sample of respondents on this research is composed of male students from Faculty of Physical Education and Sport from the University in Tuzla, who successfully realized the program of the subject Swimming with total number of 58 entities. A scope of basic-motoric abilities is represented with variables which reflect latent dimensions: coordination, flexibility, repetitive strength and explosive strength.

The scope of situational elements of swimming is covered with variables; place buoyancy.

In order to obtain relevant indicator of connection as well as the influence of researched areas, there were applied adequate analysis and statistic procedures for processing data on univariate and multivariate level. It is determined a significant statistic connection, as a criteria variable with regression analysis, between basic-motoric abilities as a predictor system, and place buoyancy.

Coefficient of multiple correlation is relatively high 63%, with totally explained variability of about 41% on statistically significant level. So we can conclude that researched variables of basic-motoric abilities in this paper are participating in prediction of buoyancy in place with 41% involvement, while the remaining part of the variable 59% belongs to the other anthropological dimensions and other factors which hadn't been treated by this research.

Partial influence of individual variables of basic-motoric abilities on buoyancy in place is selected on two variables with statistical significance. The highest predicative value was manifested by agility on the ground variable as well as backwards polygon variable, both from subspace of coordination.

Keywords: swimming, motoric abilities, students, buoyancy in swimming

INTRODUCTION

The ability of maintenance of a person on the surface, in water, is based on the principles of specific body weight, buoyancy and balance in water.

Swimmers body, staying still or moving in water, is behaving differently because there is a tremendous difference between action of the forces on the ground and in water. There is 4-6% body weight in static position above the water, depending of specific weight of human organism and water (specific weight of plain water is 1gr/cm, sea water 1,15-1,25gr/cm-increased concentration of salt and minerals, and specific weight of a human is in average 0,93-1,06gr/cm)

Specific body weight and its value depends on specific weight of bone, muscle and subcutaneous fat tissue. Specific body weight is changing and it is not constant value. During the inspiration this value is about 0,93-0,98gr/cm and in a situation of strong exhalation the value is logically increasing and amounts 1,03-1,08gr/cm (Turković, S. 2001)

Gravitational force and thrust act on the body staying still in water and these two forces are interrelated as

forces of action and reaction. Gravitation force is more or less constant value, while force of thrust is based on Archimedean principle. Pulling force (muscle force) and water resistance force are acting on the body when the body is moving through water. Water resistance force depends on the shape of the body, velocity of the body through fluid, angle of attack of longitudinal axis of swimmer, density of the liquid and smoothness of the body. Resistances can be frontal, lateral and aspirational. The pulling force is opposite by its actions to the resistance force and it depends on physiological section of muscles, speed and biochemical processes happening in the muscle, the amount of active motor units and central nerve system and its mobilization.

WORKING METHODS

The purpose of this research was to reveal if there is, and in to what extent (if the answer was affirmative) influence of basic-motoric abilities on detection of buoyancy in place with student population which has successfully completed swimming lessons.

SAMPLE OF RESPONDENTS

Sample of respondents in this research is consisted of students from Faculty of physical education and sport of University in Tuzla, male gender, who successfully realized program from the subject Swimming with total number of 58 entities.

THE SAMPLE OF VARIABLES

Variables of basic-motoric abilities.

Motoric abilities are prerequisite for quality of performing swimming techniques. There has been a selection of basic-motoric variables from four latent dimensions of motoric space, suitable for research in swimming.

Latent dimensions applied in this research are: coordination, explained with three variables (agility on the ground, backwards polygon and backwards long jump), flexibility explained with three variables (tumble with a bat, split from lying position and reach on the bench), repetitive strength explained with two variables (lifting of the torso laying on the back and lifting of the torso lying on the stomach), and explosive strength explained with two variables (standing long jump and standing high jump). For determining dimensions related to situational motor skills in swimming it is used next criteria variable: Buoyancy in place (SMPLOV).

Variables samples

Variables of basic-motoric abilities.

1. Agility on the ground (MKOKNT),
2. Backwards polygon (MKOPOL),
3. Backwards long jump (MKOSDN),
4. Tumble with a bat (MFLISK),
5. Split from lying position (MFLPRL),
6. Reach on the bench (MFLPRK),
7. Lifting of the torso laying on the back (MRSPTL)
8. Lifting of the torso laying on the stomach (MRSPTT),
9. Standing long jump (MESNDM),
10. Standing high jump (MESNVM).

Variable of situational elements in swimming.

Criteria variable: Buoyancy in place (SMPLOV).

METHDOS OF DATA ANALYSIS

Regarding the posted problem, goals and tasks in this research and determination of verification hypothetical assumptions there have been applied

suitable analysis of univariate and multivariate level.

It is necessary to subdue the observed results of this research to the following statistic operations and procedures, using software packages SPSS and STATISTICA.

Using descriptive statistics there have been calculated basic central and dispersion parameters, as follows:

Arithmetical mean, standard deviation, variance, Min-minimal value, Max-maximal value and Range.

Testing the normality of distribution is made based on given measures: asymmetry coefficient (Skewness), coefficient of elongation (Kurtosis).

By regression analysis it is determined the impact of basic-motoric dimensions on the manifestation of situational elements of swimming presented by buoyancy in swimming.

RESULTS AND DISCUSSION

Regression analysis of basic motoric abilities and place buoyancy.

With the regression analysis of these sets (Chart 1), it is determined statistically significant correlation between basic-motoric abilities as a predictor system and place buoyancy as a criteria variable.

The coefficient of multiple correlation is relatively high 63% ($R=.634$) with totally explained variability of about 41% ($R\text{ Square}=.401$) on statistically strictest level $\text{Sig}=.00$.

So we can conclude that researched variables of basic-motoric abilities in this paper are participating in prediction place buoyancy with 41% involvement, while the remaining part of the variable 59% belongs to the other anthropological dimensions and other factors which hadn't been treated by this research.

Partial influence of individual variables of basic-motoric abilities on place buoyancy is selected on two variables with statistical significance.

The highest predicative value was manifested by agility on the ground variable (MKOKNT) as well as backwards polygon variable (MKOPOL), both from subspace of coordination.

Tests responsible for mechanisms of structuring of movement, or dimension of coordination which is the least explored because of its complexity, have on isolated predicative dominant function. Therefore, we have to approach extremely careful to the obtained results because they are difficult to interpret meaningfully.

With these obtained facts on this sample of respondents it is possible to implement the prediction of influence of certain variables of basic-motoric abilities on the criteria variable buoyancy in swimming and therefore we partially accept special hypothesis: it expected statistically significant influence of basic-motoric abilities on buoyancy in swimming.

CONCLUSION REMARKS

With the regression analysis between basic-motoric abilities as a predicator system and place buoyancy as a criteria variable it is determined statistically significant correlation.

The coefficient of multiple correlation is relatively high 63% with totally explained variability of about 41% on statistically significant level.

So we can conclude that researched variables of basic-motoric abilities in this paper are participating in prediction of place buoyancy with 41% involvement, while the remaining part of the variable 59% belongs

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Chart 1. Regression analysis of basic-motoric abilities and place buoyancy

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	MESNVM, MFLISK, MKOKNT, MRSPTT, MRSPTL, MFLPRK, MKOSDN, MESNDM, MKOPOL ^a , MFLPRL		Enter

a. All requested variables entered.

b. Dependent Variable: SMPLOV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,634 ^a	,401	,274	,801

a. Predictors: (Constant), MESNVM, MFLISK, MKOKNT, MRSPTT, MRSPTL, MFLPRK, MKOSDN, MESNDM, MKOPOL, MFLPRL

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20,232	10	2,023	3,151	,004 ^a
	Residual	30,181	47	,642		
	Total	50,414	57			

a. Predictors: (Constant), MESNVM, MFLISK, MKOKNT, MRSPTT, MRSPTL, MFLPRK, MKOSDN, MESNDM, MKOPOL, MFLPRL

b. Dependent Variable: SMPLOV

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7,386	2,923		2,526	,015
	MKOKNT	,401	,117	,589	3,424	,001
	MKOPOL	-,336	,128	-,462	-2,634	,011
	MKOSDN	,000	,001	-,029	-,196	,845
	MFLISK	,000	,001	,055	,365	,717
	MFLPRL	-,031	,017	-,316	-1,788	,080
	MFLPRK	,002	,002	,114	,719	,475
	MRSPTL	-,002	,017	-,014	-,110	,913
	MRSPTT	-,007	,007	-,126	-,969	,338
	MESNDM	-,002	,001	-,289	-1,748	,087
	MESNVM	,002	,003	,112	,660	,513

a. Dependent Variable: SMPLOV

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