

## The impact of basic - motor potential to situational efficiency in female volleyball

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### Abstract:

The main objective of this research is to determine whether there is a statistically significant multiple correlation between the basic-motor potential and situational-motor abilities, in order to explore the impact of predictor system on a criterion via connected conditions. Modern Volleyball is a sport with high expectations in the manifestation of motion activities, and even the players with high level of motor and functional abilities can't express the proper technical and tactical characteristics over the entire duration of the match. This research was conducted on a sample of 75 respondents, who competed in the First Volleyball League of Montenegro, chosen from first five teams, namely: "Buducnost" - Podgorica, "Moraca" Podgorica, "Rudar" – Pljevlja, "Galeb" - Bar, and "Luka Bar" - Bar. For the assessment of basic motor abilities subspaces were selected which are considered primary in the implementation of complex motion structures which are abundant in volleyball game, and tests were presented to determine: coordination, speed, explosive strength, repetitive strength and flexibility of volleyball players with a total of fifteen (15) variables, while situational motor skills were presented with two hypothetical factors: 1. the accuracy of hitting the ball in a circle on the wall with your fingers and elevation precision of the ball rebounding from the basic standpoint with fingers. Results obtained by testing within the studied area were analyzed by statistical package statistics and SPSS, and subjected to the following statistical operations and procedures. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system and basic motor abilities effects on the criterion system with introducing situational-motor abilities of volleyball players. Data obtained in this study are pointing out the fact that there is a statistically significant effect of the basic-motor potential to situational-motor abilities of volleyball players.

**Key words:** basic motor skills, specific motor, volleyball, influence.

### Introduction

Volleyball is a collective sport not only the game that sets out a number of requirements that, among others, belong to the area of intellectual abilities, so it could be defined as Extracurricular sports complex (Jankovic et al., 1995). Modern volleyball shows more and more significant association with science, which opens up new ways and new views on the training of volleyball players (Ivanovic, Dopsaj, Nesic and Stankovic, 2010). Modern Volleyball is a sport with high expectations in the manifestation of motion activities, and even the players with high level of motor and functional abilities can't express the proper technical and tactical characteristics over the entire duration of the match (Boras et al., 2011). Pursuit height can be when jumping from place to place with both hands up (while blocking) to jump out with one hand up (when playing the ball above the net, pushing the ball into a block or rolled over the block, network), height within reach with one hand from the timing (Eom, HJ, Schutz, RW. 1992). In the training process when it comes to team sports, especially when it comes to volleyball, a special attention is paid to the development of power of other motor skills that directly affect the efficiency of the game (Raiola, 2012a). Motor development and improvement of motor skills are important components that can be programmed to operate physical work or training (Bompa, 2005). In contrast to the science of exercise, which is also applied and which is the subject of research that will be aimed primarily at maintaining and improving health status, sports science is more focused on developing those skills that directly affect the quality of the sports performances, which are basic and situational motor skills (Stone et al., 2004; Bishop, 2006). Based on the duration of the points with average of about 1.2 seconds, the players in the area of attacks perform 3 rebounds in the trash and 4 rebounds in the block, lifters perform 11-21 rebounds, middle blockers 2-15 rebounds spike and 3-19 rebounds in the block receivers and proofreaders 1-15 rebounds spike and 1-13 rebounds in the block (Sheppard et al., 2007). Based on the opinions of the author ( Nićin, 2000; Bokan, 2009) in terms of general and specific motor abilities, it can be said that volleyball players in the training process and rally possess and manifest both general and specific motor skills. Volleyball games are characterized by increasing speed and reaction speed to the ball, which requires more strenuous intensive training of individual body segments, as well as increasing explosive strength of the extremities (Cretu & Vladu, 2010). Finally, in a generic summary the winning teams make fewer errors and are more effective and the losing teams make a

superior number of continuity types of attacks (Monteiro Mesquita & Marcelino, 2009). Exploring the motor abilities of volleyball players means finding out facts related to basic and specific motor skills and its implementation in close volleyball practice, which aims to increase efficiency during sports rally (Bokan, 2009). The influence of basic motor skills form the basis for further development of specific motor skills that are directly responsible for achieving quality results in sport (Brcic, Viskić Štalec and Jaklinović Fressl, 1997). The way in which teammates cooperate to conclude the attack may be considered as a specific relationship (Clemente, Martins & Mendes, 2015). For that reason, the teammates' interactions with ball can be considered a network.

**Material & method**

This research was conducted on a sample of 75 respondents, who competed in the First Volleyball League of Montenegro, and were chosen from first five teams, namely: "Buducnost" - Podgorica, "Moraca" Podgorica - "Rudar" - Pljevlja "Seagull" - Bar, and "Luka Bar" - Bar. For the assessment of basic motor abilities subspaces were selected which are considered primary in the implementation of complex motion structures which are abundant in volleyball game, and tests were presented to determine: coordination, speed, explosive strength, repetitive strength and flexibility volleyball players with a total of fifteen (15) variables, while situational motor skills were presented with two hypothetical factors: 1. the accuracy of ball hitting the circle on the wall with your fingers and elevation precision of a ball rebounding from the basic standpoint with fingers. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system and basic motor abilities effects on the criterion system with introducing situational-motor abilities of volleyball players. The main objective of this study was to determine the influence of the basic-motor skills treated as a potential predictor (independent) variables of the system while the situational-motor abilities of volleyball players were treated as the criterion (dependent) variables.

**Results**

Regression analysis, basic motor skills and hypothetical factors of the precision of rejecting the ball with your fingers (PPR) determine the size of the general impact of the predictor variables represented by space and the basic - motor abilities on two variables from space situational - motor abilities, which are defined as: the refusal ball circle on the wall with your fingers (SOPKNZ) and elevation accuracy of ball from the basic standpoint with fingers (SOPEOS) as criterion variables. Besides this method we determine the influence of each predictor variable on the date criteria. Regression analysis of these meetings (Table 1) had a statistically significant correlation between the basic - motor abilities as predictor system, and bouncing the ball in the circle on the wall with your fingers, as the criterion variable. Multiple correlation coefficient is relatively high 68% (P = .675), with a total see Turn variability of about 46% (R Square = .456) in a statistically strictest level of Sig. = .00. We conclude that the studied variables of basic - motor capabilities in this paper are involved in the prediction of hitting the ball of a circle on the wall with your fingers with 46% share, while the remainder of the variance of 54% belongs to all the other anthropological dimensions and other factors, which were not treated in this study. Partial influence of individual variables, the basic - motor abilities on the ball rebounding of a circle on the wall with your fingers was selected with five variables with statistical significance. The highest predictive value exhibited all treated variables flexibility, such as: bend on the bench (MFLPRK), bend astride (MFLPRR) and side rope (MFLBOS) as variables of explosive strength of lower limbs horizontal components: long jump immediately (MFESDM) and triple jump from places (MFETRO). On an isolated predictive function tests have the dominant role responsible for the mechanisms for controlling the tone and quality of connective tissue as well as mechanisms for regulation of excitation intensity.

Table 1. Regression analysis of basic motor abilities and bouncing the ball in the circle on the wall with your fingers

Model	Variables entered	Variables Removed	Method
1	MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR	.	Enter

a. all requested variables entered  
b. dependent variable: SOPKNZ

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,631a	0,398	0,245	4,934

a. Predictors: (Constant), MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR

**ANOVA(b)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	951,042	15	63,402	2,604	,005
	Residual	1436,503	59	24,347		
	Total	2387,546	74			

- a. Predictors: (Constant), MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR  
 b. Dependent Variable: SOPEOS

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error			
1	(Constant)	9.503	24.878		0.381	0.703
	MBFTAN	0.361	0.326	0.152	1.106	0.273
	MBFTAZ	0.323	0.213	0.188	1.519	0.134
	MFE20V	-5.254	3.964	-0.195	-1.325	0.190
	MFLPRR	-0.179	0.081	-0.384	-2.193	0.032
	MFLPRK	0.048	0.133	0.060	0.359	0.720
	MFLBOS	0.100	0.041	0.317	2.428	0.018
	MFESDM	-0.043	0.043	-0.166	-0.992	0.324
	MFESVM	-0.235	0.158	-0.239	-1.488	0.141
	MFETRO	-1.428	1.617	-0.143	-0.883	0.380
	MFEBML	1.679	0.517	0.391	3.243	0.001
	MRSPT30S	0.565	0.238	0.335	2.367	0.021
	MRESKL	0.355	0.149	0.343	2.386	0.020
	MKLSRL	0.328	0.414	0.118	0.793	0.430
	MAGKUS	0.787	0.660	0.144	1.193	0.237
MKTOUZ	-1.844	1.148	-0.207	-1.605	0.113	

a. Dependent Variable: SOPEOS

Since the entire system is investigated basic motor abilities have a statistically significant correlation (sig. = .00). With criteria variable of elevation accuracy of ball from the basic standpoint with fingers (SOPEOS) we can approach to the analysis of general and individual impact of predictor measures on the criterion variable (Table 2). Multiple correlation coefficient was 0.631 (R), while the size of the general impact of mediocre was 0398 (R Square). Based on the size of the given parameters, we see that the entire system of the studied variables of basic - motor abilities has a 40% impact on the elevation accuracy of ball from the basic attitude with fingers while the remaining 60% belongs to the influence of other endogenous and exogenous factors that were not studied in this paper. The individual impact of predictor variables on the criterion variable realized, as in the previous analysis, the variables flexibility: bend on the bench (MFLPRK) and side rope (MFLBOS), two variables repetitive strength: raising troops for 30 seconds (MRSPT30S) and push-ups from resistance hands and knees (MRESKL) and a variable explosive power which is presented by throwing a medicine ball while lying on your back (MFEBML). We can say that here are dominated volleyball players whose predominant mechanism

for controlling the intensity and duration of excitation in the areas of central nervous system with a touch of quality of connective tissue.

Table 2. Regression analysis of the basic - motor abilities and elevation precision of ball from the basic standpoint with fingers

Model	Variables entered	Variables Removed	Method
1	MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR		Enter

a. All requested variables entered

b. dependent variable: SOPEOS

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,631 a	0,398	0,245	4,934

a. Predictors: (Constant), MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR

**Anova(b)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	951,042	15	63,402	2,604	,005
	Residual	1436,503	59	24,347		
	Total	2387,546	74			

a. Predictors: (Constant), MKTOUZ, MFE20V, MFLBOS, MFEBML, MRSPT30S, MBFTAZ, MAGKUS, MRESKL, MBFTAN, MFLPRK, MKLSRL, MFESVM, MFETRO, MFESDM, MFLPRR

b. Dependent Variable: SOPEOS

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.503	24.878		0.381	0.703
	MBFTAN	0.361	0.326	0.152	1.106	0.273
	MBFTAZ	0.323	0.213	0.188	1.519	0.134
	MFE20V	-5.254	3.964	-0.195	-1.325	0.190
	MFLPRR	-0.179	0.081	-0.384	-2.193	0.032
	MFLPRK	0.048	0.133	0.060	0.359	0.720
	MFLBOS	0.100	0.041	0.317	2.428	0.018
	MFESDM	-0.043	0.043	-0.166	-0.992	0.324
	MFESVM	-0.235	0.158	-0.239	-1.488	0.141

MFETRO	-1.428	1.617	-0.143	-0.883	0.380
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MKLSRL	0.328	0.414	0.118	0.793	0.430
MAGKUS	0.787	0.660	0.144	1.193	0.237
MKTOUZ	-1.844	1.148	-0.207	-1.605	0.113

a. Dependent Variable: SOPEOS

From the facts presented in this sample of volleyball players it is possible to predict the impact of the studied variables basic - motor abilities on the criterion variable of precision of rejecting the ball with your

## Discussion

The population from which the selected sample of respondents is defined is a population consisting of top volleyball player who competed in the First Volleyball League of Montenegro, chosen from first five teams to reach the best possible results. This research was conducted on a sample of 75 respondents, senior volleyball players, namely: OK "Future" - Podgorica, OK "Moraca" Podgorica - OK "Rudar" - Pljevlja, OK "Seagull" - Bar, and OK "Luka" - Bar. A significant contribution to the variance of the first canonical pair of space situational-motor abilities give manifest variables of elevation accuracy of ball from the basic attitude with fingers and the ball rebounding into the circle on the wall with your fingers belonging to the hypothetical factor precision. Looking at structuring factors, first canonical pair of basic motor and situational-motor abilities of volleyball players, and knowing the structure of the game of volleyball, we can say that the first canonical pair constructs dominant operators within the framework of skills of both spaces. These female players have enviable speed and movements, predominantly in explosive strength and coordination, markedly, which are the basis for the realization of complex situational conditions. Efficiency of volleyball, whether it's about training or competition, is due to several important factors. For successful participation in the competition and overcoming the situation tasks in the game, it is in some way linked above capacity (Keramičiev, 1991). Regression analysis was applied within the multivariate level to determine the general size and impact of the partial predictor of the system, and basic motor abilities on the criterion system introduced manifestation of situational-motor abilities of volleyball players. Motor skills involved in the realization of all kinds of movement, in their basis the efficiency of organic systems, particularly the nervous-muscle, which is responsible for the intensity, duration and motion control, and the ability to provide powerful, fast, durable, precise and coordinated implementation of various motor tasks (Bartlett, Smith, and Peel Davis, 1991). Regression analysis between basic motor skills, as well as the predictor system, and bouncing the ball in the circle on the wall with your fingers, are the criterion variable whose multiple correlation coefficient is relatively high 68% ( $P = .675$ ), with a total see Turn variability of about 46% ( $R^2 = .456$ ) in a statistically strictest level of  $Sig. = .00$ . Partial influence of individual variables, basic motor skills to refuse the ball into the circle on the wall with your fingers was selected among five variables with statistical significance. The entire system is investigating basic motor abilities that have a statistically significant correlation ( $sig. = .00$ ). With criteria variable of elevation accuracy of ball from the basic standpoint with fingers and multiple correlation coefficient equal to 0.631 ( $R$ ), while the size of the general impact of mediocre is 0.398 ( $R^2$ ). As in all sports activities, as well as volleyball, technical element can not be performed without adequate motor skills and fully manifested without rational techniques of performing motion (Popov, 2013). Specific motor abilities acquired in life, and especially in certain sports, are a result of specific training or personal motor functioning (Nićin, 2000). Based on the opinions of the author (Nićin, 2000; Bokan, 2009) in terms of general and specific motor abilities, it can be said that volleyball players in the training process and rally possess and manifest, both general and specific motor skills. Based on numerous studies and allegations (Kurelić et al., 1975; Gajic 1985; Weeds, 1996; Nićin and Kalajdžić, 1996). Today the practice accepts the following structure of basic motor abilities: coordination, strength, speed, endurance, flexibility, balance and precision, as the dominant abilities in the realization of the sport achievements, which are the subject of this paper. Problem of specific motor skills is researched by many authors. Their findings are included mainly in the area of the structure of the rally in volleyball or volleyball players and solving motor tasks in situational training or volleyball competition (Bernstein, 1990; Gajic, 2005; Karalić, 2007; Liahova and Strelnikova, 2007; Nesić 2006; Stojanović and Milenković, 2005).

Goletić, Ibrahim, Jashari and Džananović (2010) are aimed at research in order to determine the influence of basic motor abilities on the realization of the situational elements of volleyball, and the results showed that the correlation and impact of the predictor system is only one criteria variable, and it is the strength strike- while hitting three criterion variables were not statistically significant level. Cudić, Alice-partition, Celes and Bašinac (2010) in a sample of 93 respondents from volleyball population aged 15-16 years conducted a survey in order to determine the influence of basic motor variables on situational precision necessary for the

success of the volleyball games, and received results that showed a statistically significant effect of the predictors on two variables of criteria, such as elevation accuracy of ball forearms from the basic attitude and precision in tactic serving, while the variable accuracy of ball with your fingers in a circle on the wall, there was no statistically significant effect of the predictor system. Karalić, Vujmilović and Savic (2010) performed the study, which was conducted on a total of 80 volleyball players, aged 14 - 16 years, using 11 motor tests. The aim of this study was to determine the factor structure of precision in volleyball players, and it was concluded that the precision motor ability can be separated as a special phenomenon and interpreted as a success factor in the set of technical and tactical structures of volleyball selected for this study. It seems that in modern volleyball increasingly is used offensive tactic that helps teams to win points, and take the situation into their own hands, rather than focusing on the firm defense (Patsiaouras et al., 2011).

### Conclusion

The value of this work is manifold, both in the practical application of the planning and programming of training process of athletes, as well as to improve their preparation of the training as a whole. The theoretical significance of this research is reflected in contributing to the development of the general theory of psychosomatic status of volleyball players, as well as the correlation and impact of specific dimensions, and the basic - motor potential and situational - motor abilities as essential segments in modern volleyball game. From this information, prerequisites will be created to detect the digression, in terms of correction, with the purpose of proper integrated action in the selection process. The survey data, and actual tests will contribute to a better and more objective work of trainers in monitoring and observation of oscillation of readiness volleyball players in the area studied basic and situational skills and make a significant and concrete contribution to the education of coaches, athletes, contributing to the development of sports clubs and the wider community.

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