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Original Article

Influence of a basic motor potential on the realization of specific motor skills of elite female volleyball players

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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 specific-motor abilities among elite female volleyball players in Montenegro. Modern volleyball game, as well as the specific characteristic of a volleyball game and for specific playing positions, require a high level of general motor skills from all players. This research was conducted on a sample of 75 subjects, who are competing 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: Precision of the elevation of the ball with forearms, bouncing the ball with forearms against the wall. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system, and basic motor abilities on the criterion system with introducing situational-motor abilities of volleyball players. Based on these facts, it is possible to predict the impact of the studied variables of basic motor abilities on the criterion variable of rejection precision and passing the ball with the forearms within a sample of volleyball players, and based on the obtained data we conclude that there is a statistically significant impact of the basic motor abilities on the accuracy of rejection and passing the ball with the forearms.
Key words: influence, basic motor skills, specific motor skills, female volleyball players

Introduction

Modern Volleyball is a sport with high expectations for the manifestation of motion activities where players with high level of motor and functional abilities can express the proper technical and tactical characteristics over the entire duration of the match (Boras et al., 2011). Modern volleyball game requires for all players to have a high level of general and specific motor skills that are important for a volleyball game, for the players' positions on the field (Bojanic et al, 2015). Motor skills are conditionally defined as latent motor structures responsible for an infinite number of manifestations of motor reaction and they can be measured and described (Findak, 2003). The development of motor skills is just one of many tasks on the road to creating a versatile personality of volleyball players, capable of creative self-realization and competitive process (Vranic, 2013). Movements with a certain degree of difficulty, that are very complex, can be simplified by dividing the exercises or reducing the speed or requests for precision (Raiola 2012). The actual volleyball game is characterized by the increase of the execution speed and the default of the reaction speed, which asks for the more intense training into solicited effort of the segments and of the whole body, as well as the increase of the explosive force. Motor skills are only one of the subsystems that in conjunction with other subsystems (morphological, cognitive, conative and sociological) make the complex structure of man (Bokan, 2009). General motor skills are those motor skills which, by its generality, can be found in other kinds of sports. Specific motor abilities are the motor abilities that are specifically developed in each particular sport branches and are result of a specific training. Based on the previous research that has been conducted (Boras et al., 2011; Čolakhodžić et al., 2011) the largest number of volleyball professionals, under the specific motor skills implies the following abilities: explosive strength and agility, flexibility, body coordination, the speed of alternative movements, coordination of arms and legs. Measuring and evaluating the female sportive neuro-muscular qualities in the explosive effort, by the intermediary of simple, non-specific movements, the vertical jump, may orient the muscular training both in the force-speed relation as in the general control of the movement phases for the inferior level (Cretu & Vladu, 2010). To achieve a high level of performance of some element, from the player is required not only perfection of technical- tactical skills, but also the expression of a high level of motor abilities explosive power, speed and agility (Ziv and Lidor, 2010). Today's modern volleyball is the game of extremely fast, explosive and multiple complex movements, development of action, situational problem solving,

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which all together is characterized by levels of intensity activities, which requires a high level of skills from the player, basic as well as specific abilities (Czerwinski, 1995). Motor skills are involved in the realization of all kinds of movement, in their basis is 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). Research of the motor abilities has confirmed that this segment can't be described with one or several of latent dimensions, but it is a complex structure of quantitative (strength, speed, endurance) and qualitative (coordination, agility, balance, accuracy) motor skills (Meinel, 1977). Problem of the specific motor skills has been researched by many authors. Their findings contained mainly the area of the structure of the rally in male or female volleyball players and solving motor tasks in situational training or volleyball competition (Bernstein, 1990; Gajic, 2005; Karalić, 2007; Liahova and Strelnikova, 2007; Stojanovic and Milenkoski, 2005).

Material and method

This research was conducted on a sample of 75 subjects, who competed in the First Volleyball League of Montenegro, from the chosen first five teams, namely: "Buducnost" - Podgorica, "Moraca" Podgorica - "Rudar" – Pljevlja, "Galeb" - Bar, and "Luka Bar"- Bar. For the assessment of basic motor abilities sub-spaces were selected, which are considered primary in the implementation of complex motion structures which are abundant in the volleyball game, and test 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: Precision of the elevation of the ball with forearms, bouncing the ball with forearms against the wall. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system and basic motor abilities on the criterion system which was represented by situational-motor abilities of volleyball players. The main objective of this study was to determine the influence of the basic-motor potential treated as a predictor (independent) system of variables, on the situational-motor abilities of volleyball players as the criterion (dependent) variables.

Results

Regression analysis of basic motor skills and hypothetical factors of the precision of the rejection and passing the ball with the forearms (PPD) shall determine the size of the general impact of the predictor variables represented by space basic motor abilities on two variables from space situational - motor abilities of volleyball players, defined as: the ball rejection with forearms against the wall (SOPPOZ), elevation accuracy of ball with forearms (SOPEPD) as criterion variables. Once the multiple connections and overall impact are established, influence of each predictor variable on the given criteria will be determined.

The observing calculated parameters of the basic - motor abilities and the ball rejection with the forearms against the wall (see Table 1) gave the evidence of a statistically significant correlation between the predictor system with the criterion (Sig. = .01). Multiple correlation coefficient is slightly higher than 60% and amounts to R = .613 with the total variability explained by 38%, or R Square = .376. The remaining part of variance of 62% belongs to all the other anthropological dimensions and other unknown factors that are not included in this study. In explaining the partial impact of the individual predictor variables on the criterion the impact is reduced to only two variables. Here is the obvious contribution of the same factor as in the previous analysis, of the variable that reflects subspace of flexibility, represented by side rope (MFLBOS) and variable of the segmented speed reported by foot tapping on the wall (MBFTAZ). For the realization of the situational elements of volleyball on a sample of tested volleyball players in this study are responsible basic - motor potentials based on the mechanisms of regulation of tone and synergistic regulation muscles.

Table 1. Regression analysis of basic-motor abilities and elevation precision and rejecting the ball with the forearms against the wall

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,613	0,376	0,218	18,004

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	11537.577	15	769.171	2.372	,010
	Residual	19124.609	59	324.145		
	Total	30662.186	74			

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

b. Dependent variable: SOPPOZ

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.283	90.775		0.080	0.936
	MBFTAN	2.209	1.192	0.259	1.853	0.068
	MBFTAZ	1.991	0.778	0.323	2.559	0.013
	MFE20V	7.147	14.464	0.074	0.494	0.623
	MFLPRR	0.486	0.298	0.290	1.629	0.108
	MFLPRK	-0.024	0.487	-0.008	-0.050	0.959
	MFLBOS	-0.553	0.150	-0.488	-3.674	0.000
	MFESDM	0.255	0.159	0.274	1.606	0.113
	MFESVM	-0.811	0.577	-0.230	-1.404	0.165
	MFETRO	-5.135	5.900	-0.143	-0.870	0.387
	MFEBML	0.685	1.889	0.044	0.362	0.718
	MRSPT30S	-0.256	0.871	-0.042	-0.294	0.769
	MRESKL	-0.718	0.543	-0.193	-1.321	0.191
	MKLSRL	-0.449	1.511	-0.045	-0.297	0.767
	MAGKUS	-1.179	2.408	-0.060	-0.489	0.625
	MKTOUZ	-0.710	4.190	-0.022	-0.169	0.865

a. Dependent variable: SOPPOZ

Regression analysis of these sets (Table 2) showed statistically significant correlation between the basic - motor abilities as a predictor system and elevation precision of the ball with forearms as the criterion variable. Multiple correlation between these two subspaces is 60% (P = .592), with a total explained variability of 35% (R Square = .351) in a statistically significant level of Sig. = .01. We conclude that the studied variables of basic - motor abilities in this study participate in the prediction of expressing the elevation accuracy of ball with forearms with a slight 30% influence, while the remain part of the variance of 70% belongs to all the other anthropological dimensions that are not investigated in this paper as well as other exogenous and unknown factors and factors of error. Partial influence of individual variables of the basic - motor abilities in predicting the manifestation of elevation accuracy of ball with forearms was reduced, as in the previous analysis, to only two variables with statistical significance. Variables of the repetitive strength of the abdomen have the great roll in the isolated predictive function, and they represent the raise of the abdomen with the belly for 30 seconds (MRSPT30S) and variable of flexibility shown through test of bending on the bench (MFLPRK). They include female volleyball players with predominant mechanism for controlling excitation duration and synergistic regulation.

Table 2. Regression analysis of basic-motor abilities and elevation precision of rejecting the ball with forearms

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,599	0,359	0,196	5,474

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	992,015	15	66,134	2,206	0,01
	Residual	1767,984	59	29,965		
	Total	2760	74			

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

b. Dependent variable: SOPPED

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	27.551	27.600		0.998	0.322
	MBFTAN	0.320	0.362	0.125	0.882	0.380
	MBFTAZ	0.263	0.236	0.142	1.114	0.269
	MFE20V	-2.517	4.398	-0.087	-0.572	0.569

MFLPRR	0.067	0.090	0.135	0.748	0.457
MFLPRK	-0.319	0.148	-0.376	-2.154	0.035
MFLBOS	0.028	0.045	0.084	0.626	0.533
MFESDM	-0.040	0.048	-0.143	-0.828	0.410
MFESVM	0.049	0.175	0.046	0.280	0.779
MFETRO	-3.260	1.794	-0.304	-1.817	0.074
MFEBML	0.466	0.574	0.100	0.811	0.420
MRSPT30S	0.595	0.264	0.328	2.246	0.028
MRESKL	0.266	0.165	0.239	1.609	0.112
MKLSRL	-0.263	0.459	-0.088	-0.572	0.569
MAGKUS	0.135	0.732	0.0231	0.185	0.853
MKTOUZ	-1.107	1.274	-0.116	-0.869	0.388

a. Dependent variable: SOPPED

Based on the facts it is possible to predict the impact of the studied variables of basic motor abilities on the criterion variable of precision of rejecting and passing the ball with the forearms on a sample of volleyball players, so we can conclude based on the results that there is a significant impact of basic motor abilities on the accuracy of rejection and passing ball with forearms.

Discussion

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 which was represented by the manifestation of situational-motor abilities of volleyball players. Regression analysis of basic motor skills and hypothetical factors of Precision of rejecting and passing ball with the forearms (PPD) confirmed the size of the general impact of the predictor set of variables represented by space of basic motor abilities on two variables from the space of situational-motor abilities of volleyball players, defined as: the rejection of the ball with forearms against the wall (SOPPOZ), elevation accuracy of the ball with forearms (SOPEPD as criterion variables. If we look at the results of research conducted by Milic, Grgantov and Katic (2012), we can conclude on the basis of the conclusions of that process quality selection in volleyball just depends on the basic motor space primarily psychomotor speed, precision, repetitive strength and flexibility (regulation of muscle tone). Similar results were obtained in the study with Montenegrin volleyball players where the partial influence of predictors on the criterion variable elevation precision of ball forearms as a very important ability in volleyball, achieved precisely the variables repetitive strength of abdomen and flexibility variables, we can be a clear indication that a specific variable considerations for the selection and training process of volleyball players. In volleyball practice is very important special volleyball precision targeting and shooting, as the first volleyball team to solve problems hitting the ball, and as a result, the volleyball hitting targets that are in the field, preferably at least protected. Volleyball is characterized by the fact that the ball achieves a brief contact, that is to say a collision with the ball, regardless of whether it is changing its direction and orientation.

By observing calculated parameters of basic motor abilities and rejecting the ball with forearms against the wall we can see a statistically significant correlation of the predictor system with the criterion. Multiple correlation coefficient is slightly higher than 60% and amounts to R = .613 with the total variability explained by 38%, or R Square = .376. Variables of basic motor skills are involved in predicting the manifestation of elevation accuracy of ball with forearms with a slight 30% of influence, while the remain part of the variance of 70% belongs to all the other anthropological dimensions that are not investigated in this paper as well as other exogenous and unknown factors as well as factors of error. These characteristics listed require adequate preparedness athletes and high performance in relation to sports technique, tactics, basic and specific physical preparation, given that there are a large number of jumping techniques, depending on the specifics of the sports field (Zaciorski and Kramer, 2006). Partial influence of individual variables of basic motor skills in predicting events of elevation accuracy of the ball with forearms was reduced, as in the previous analysis only to two variables with statistical significance. Based on the facts it is possible to predict the impact of the studied variables of basic motor abilities on the criterion variable of precision of rejecting and passing the ball with the forearms on a sample of volleyball players, and based on the obtained data we conclude that there is a statistically significant impact of basic motor abilities on the accuracy of rejecting and passing the ball with the forearms.

Conclusion

The value of this work is manifold, both in the practical application of the planning and programming of training process for athletes, as well as for improvement of their training preparation 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, e.g. 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.

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