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Impact of Morphological Characteristics on the Situational-Motor Abilities of Sitting Volleyball Players

Ifet Mahmutović[1], Sabahudin Delalić[2], Serdar Uslu[3], Mirza Ibrahimović[1], Azra Tabaković[1]
[1]Faculty of Sport and Physical Education, Sarajevo, **BOSNIA HERZEGOVINA**
Email: ifetmahmutovic@gmail.com
[2]Faculty of Science, Sarajevo, **BOSNIA HERZEGOVINA**
[3]Bartın University School of Physical Education and Sport, **TURKEY**

Abstract

Analysis of the impact of morphological characteristics on situational-motor abilities of sitting volleyball players was applied on the sample of 90 examinees, registered players of Premier League of Bosnia and Herzegovina in sitting volleyball, and among of them it was fifteen representatives of Bosnia and Herzegovina. In this research is applied a set of battery test which contains 23 variables in which 15 variables are of morphological characteristics and the system of 8 variables for assessing situational-motor abilities of sitting volleyball players. The aim of this research is was to prove which is the impact of morphological characteristics of sitting volleyball players, and what impact these have on certain characteristics of situational-motor abilities of sitting volleyball players. We performed a regression analysis of the first criterion variables of situational-motor abilities in manifest space morphological variables of sitting volleyball players. Morphological characteristics applied in the system of predictor variables, four significantly affect on the results of situational motor tests which respectively means that in test isolated regression situational factors of motor abilities. The research results indicate that the players who have more arms length, the width of the pelvis, upper arm circumference, lower abdominal skinfold will affect and make an advantage in the implementation of situational-motor abilities.

Key words: morphological characteristics, sitting volleyball, situational-motor abilities.

Introduction

Sitting volleyball is a sport activity that gives evident positive effects during rehabilitation and general resocialization persons with physical disable (Mahmutović and Turković, 1999). It was created with the goal of the sports competitions conducted a positive effect on the rehabilitation and resocialization of persons with disabilities. However, this activity has been given the dimensions of recreation and competitive facilities; except that now we have to work dozens of teams and hundreds of disabled persons engaged in these sports disciplines. And what characterizes the sitting volleyball are volleyball body movements, but the movements of the body in volleyball activities are also specific, unnatural and learned, and is significantly different from the natural form of movement. In relation to the natural forms of movement (walking, running, jumping), movements in sitting volleyball have athletic purposes and they used usually for action on the ball (Mahmutović, 2003). The specificity of this game is such that players "must" in the course of the game sit on the ground or in the course of playing game elements must be with gluteal part in contact with the ground. Earlier research studies within populations of athletes with disable are scarce but the research that was done for pointing that match and challenge competitions represent a powerful source of motivation for the players of sitting volleyball and that is practicing for this sport is an important agent of socialization of these athletes (Mahmutović, 2006; Bonacin and Šoše, 2007). It was concluded that elite players of sitting volleyball very good command of technique and execution of motor task well enough to realize the logic of the game of volleyball. Strongly manifested the desire to win, grit and focus on the success of the sport in general, so they attract situations that provide challenging competition. Persons with physical disable represent the largest population in the family sports for people with the disabling, because the highest percentage of participation in the Paralympic Games (Sherrill, 1999; Pensgaard and Sorensen, 2002).

The problem of this research lies in the fact that the study defines whether morphological characteristics as a set of predictor variables affect situational motor abilities of sitting volleyball players as a criterion.

The aim of this research it was to determine the influence of morphological characteristics on the situational-motor abilities of sitting volleyball players.

Method

This research was applied on the sample of 90 examinees, registered players of Premier League of Bosnia and Herzegovina in sitting volleyball, and among of them it was fifteen representatives of Bosnia and Herzegovina. In this research is applied a set of battery test which contains 23 variables in which 15 variables are of morphological characteristics and the system of 8 variables for assessing situational-motor abilities of sitting volleyball players.

To assess the morphological characteristics were used 15 variables and MKSV - sitting height, MKDR - arm length, MKRR - range of hands, MKŠR - shoulder width, MKŠK - pelvic width MKDL - elbow diameter, MKDRZ - wrist diameter, MKTM - body weight, MKOG - circumference thorax, MKON - arm circumference, MKOP - circumference of forearm, MKOT - circumference of the abdomen, MKKNN - skin fold of the upper arm, MKKNT - skin fold OF abdomen, MKKNL - skin fold back. For the assessment of situational-motor abilities were used eight variables and SMUPLP - the ability to suppress

mutual ball, SMUOLO - the ability to sequential suppression of the ball (two-hand) hammer, SMPPLP - precision in suppressing the ball with fingers, SMEPPLP - elevation accuracy of repression ball with fingers, SMEPPLO - elevation accuracy of repression ball hammer, SMNPLP - the ability to alternate suppression ball forearms, SMPTS - precision tactical serving, SMESLZ - efficacy in spike.

Data processing methods

Features and size of the sample examinees defined the basic data processing methods which obtained this research to use software packages for multivariate data analysis. We performed a regression analysis in polulatent space, ie regression analysis of the first criterion variable situational-motor abilities in the manifest morphologic variables of sitting volleyball players.

Results and Discussion

The aim of the analysis was applied to find an analytical expression in the form of equations, which best describes the statistical relationship one with another numerical variable. In our analysis, we used regression analysis in polulatent space. Variables of situational-motor abilities have reduced the first regression factor. The absolute measure of representativeness of the regression is shown through the standard error of regression (engl.Std. Error of the Estimate). The relative measures of representativeness, we used regression coefficient of variation of regression (a relative measure of representativeness of the model that represents the percentage of the standard error of regression in relation to the mean of the dependent variable), the coefficient of determination (R-Square - defined as the ratio of the sum of squared deviations of variance and regression sum total square deviation) and adjusted coefficient of determination - Adj R-Sq. Using analysis of variance, we tested the significance of the regression model as a whole. Standard error of regression (Engl. standard error of estimate) for REGR factor (the first criterion variable of situational-motor abilities) is .89 which is evident from the first resulting model summary table (Table 1). This means that the average deviation of the actual value of the variable REGR factor (the first criterion variable of situational-motor abilities) of the expected value of regression factor of all analyzed parameters is .96. Standard error of regression was calculated as the square root of the mean square error (Mean Square Error) because .89 = .805. Based on the coefficient of variation can be estimated that the average deviation of the regression line is relatively little. Multiple linear correlation coefficient (Multiple R): .575, wherefrom it follows that there is a high linear correlation between the REGR factor (the first criterion variable of situational-motor abilities), as dependent variables, and percentages in variables of morphological parameters treated in this research, as independent variables ; Coefficient of determination: .331, wherefrom it follows that the resulting model of multiple linear regression (explained approximately 33% of the dependent variable depending on all the morphological characteristic treated in this research as independent variables). This kind of connection is the level of significance (sig. .006), table 2.

Table 1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.575[a]	.331	.195	.89719715

Table 2. ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.433	15	1.962	2.438	.006
	Residual	59.567	74	.805		
	Total	89.000	89			

The analysis of the impact of individual morphological variables (Table 3), we can see that four variables have an impact on the criterion statistically significant level. These are variable MKDR - arm length (Beta .221), then the variable MKŠK - pelvic width (Beta - .239), variable MKON - arm circumference (Beta .231) and variable MKKNT - skinfold of abdominal (Beta - .230). All of these variables have a significant impact on individual criteria, the level of significance of .05. A closer examination we see that the two variables have a negative sign Beta coefficient, which indicates that these variables have a negative impact on the criterion.

Table 3. Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.277	.597		.464	.644
MKSV	.001	.000	.023	.221	.826
MKDR	.001	.000	.221	2.099	.039
MKRR	-.002	.000	-.014	-.128	.898
MKŠR	-.001	.001	-.186	-1.747	.085
MKŠK	-.002	.001	-.239	-2.368	.021
MKDL	.004	.005	.091	.856	.395
MKDRZ	-.002	.005	-.043	-.432	.667
MKTM	.002	.001	.149	1.375	.173
MKOG	.000	.000	.034	.335	.739
MKON	.002	.001	.231	2.067	.042
MKOP	.000	.001	-.044	-.413	.681
MKOT	.000	.000	.086	.879	.382
MKKNN	-.001	.001	-.111	-.990	.325
MKKNT	-.002	.001	-.230	-2.211	.030
MKKNL	.000	.001	.016	.143	.886

a. Dependent Variable: REGR factor score 1 for analysis 2

The research results indicate that the players who have more arms length, the width of the pelvis, upper arm circumference lower abdominal skinfold will affect and make an advantage in the implementation of situational-motor abilities. This shows that these morphological measures in sitting volleyball are dominant. Bearing in mind the need to move the body in space and rules of the game we confirm the dominance of the above morphological variables.

Conclusion

Based on the results of this research it can be concluded the: Morphological characteristics applied in the system of predictor variables, four significantly affect the results of situational motor tests in test isolated or situational factors regression of motor abilities. Through this game develop motor abilities (agility, quickness, flexibility, endurance, strength, speed, etc.). Sitting volleyball is a very dynamic game in which each person with physical disable provides the maximum of their capabilities and thus achieves a positive transformation from any walks (physiological, psychological, sociological, motor, etc.). However, it is very difficult to classify all the positive impacts in terms of psychosomatic status of persons with disable and which provides a sitting volleyball.

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