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**RELATIONS OF FUNCTIONAL SKILLS WITH THE RESULTS OF AGILITY AMONG THE YOUNG JUDO ATHLETES****Abstract**

*The sample of respondents consists of 42 Elementary School pupils from the territory of East Sarajevo. They are 12 and 13 ± 6 months years old and have organized training and are active athletes in judo clubs. The main objective of this research is to determine statistically significant relation between functional capacity, as a predictor system, with the results of agility as a criterion system among the respondents. Three tests were applied for the assessment of functional abilities: vital lung capacity (FVKPL), systolic blood pressure at rest (FSIKP) and diastolic blood pressure at rest (FDIKP). Assessment of motor segment agility is defined by tests: envelope test (MKOT), side steps (MKUS) and eight with bending (MOSS). The survey results were analyzed by canonical correlation analysis. The study results showed that the functional abilities of young judo athletes are statistically significantly associated with the results of agility.*

**Keywords:** *functional tests, agility, canonical correlation analysis, a young judo.*

**1. INTRODUCTION**

Judo as extracurricular acyclic sport is defined with highlighted number of complex technical elements, a large volume of work and the intensity of the load. Motor efficiency in this sport is based on the optimal level of functional ability, coordination, strength and speed. Within the speed for efficiency in judo the importance of increased levels of agility is specially highlighted.

The high level of functional capacity and agility is especially necessary when it is necessary to activate agonist and antagonist muscles in short time intervals during the implementation of eccentric-concentric contraction in judo fight. Those are fast-moving activities which are consisted of short, ie, narrower group of explosive movements related to a single entity (Cirkovic, 1996; Malacko 1997; Bratic, Djuraskovic and Randjelovic, 2001; Obadov, Drid and Nurkic, 2006).

Functional abilities have a major impact on the results in judo, because in appropriate relation to motor agility they positively contribute to the achievement of high sports results.

Relations of functional research of agility and mobility tests were the focus of many authors who did it on a sample of athletes and non-athletes – school age pupils. The research results of these authors showed that there is a statistically significant correlation among functional abilities with the results of motor abilities among the Elementary and Secondary school pupils covered by the regular and additional Physical Educational teaching (Ljustina and Pribic, 2007; Marinkovic, 2012; Zivkovic, 2014).

In judo sport research results of the relation of functional ability and agility are essential. This is particularly important in order to achieve the ability to test anthropological development of young judo athletes together with the connection of the desired training technologies for actualization of program content and possibility of purposeful determination of projection for their further development (Bratic, Nurkic and Kasumi 2005).

The aim of this research is to determine statistically significant canonical relations between some functional abilities and results in agility among the young judo athletes. With the realization of such goal would be achieved possibility of forming rational procedures for optimal planning, programming and control of the training process among the young judo athletes.

## 2. METHOD

The survey was done on a sample of 42 Primary School pupils. They are 12 and 13 ± 6 months old and participate in regular Physical Education teaching and training process in judo clubs of East Sarajevo.

For the assessment of functional abilities three tests were applied: vital capacity of lungs (FVKPL), systolic blood pressure at rest (FSIKP) and diastolic blood pressure at rest (FDIKP). These tests are used in the investigation of Heimari and Bear (1997). Assessment of motor segment agility is defined by tests: envelope test (MKOT), side steps (MKUS) and eight with bending (MOSS). Measured characteristics of these tests are validated in research Kurelica and associates (1975).

The data obtained in our study were analyzed by canonical correlation analysis.

## 3. SURVEY RESULTS

**Table 1.** Basic statistical parameters for the assessment of functional abilities

Var.	N	Mean	Min.	Max.	SD	Skewn.	Kurtos.
FVKPL	42	3324,622	2232,00	3854,00	2,54	0.173	2.38
FSIKP	42	114,26	105,26	122,38	3.64	0.431	1.43
FDIKP	42	76,82	59,14	81,67	2.16	0.628	2.12

*Explanation: mean (Mean), minimum (Min.), Maximum (Max.), Standard deviation (Std. Dev.), Skjwnis (Skewn.), Kurtosis (Kurtosi.)*

**Table 2.** Basic statistical parameters for agility

Var.	N	Mean	Min.	Max.	SD	Skewn.	Kurtos.
MKOT	42	18.26	15.72	21.56	2.14	0.402	0.345
MKUS	42	12.32	9.82	14.52	1.96	0.245	-0.182
MOSS	42	14.50	11.53	17.18	2.34	0.183	1.2533

Explanation: mean (Mean), minimum (Min.), Maximum (Max.), Standard deviation (SD.), Skjunis (Skewn.), Kurtozis (Kurtosi.).

The results in Table 1 and 2 show that there is no statistically significant difference between the results of tests of functional abilities and motor skills from the agility segment of the normal distribution.

**Table 3.** Canonical Correlation Analysis of functional ability and success in motor agility

R	R <sup>2</sup>	Chi-sqr.	Df	P- Level
.74	.57	82.23	49	.000

Explanation: canonical correlation coefficient (R), the coefficient of determination (R2), the chi-square test (Chi-sqr.), The degree of freedom (df), signficance (P Level)

Results of canonical correlation analysis (Table 3) show a high correlation (R = .74) between the system of applied functional variables and system motor variables of the segment motor agility. This correlation is confirmed by the results of Barttletovog chi-square test (Chi-sqr. 82.23). The coefficients of canonical correlation is statistically significant. The established connection has the appropriate size of the coefficient determination (R2 = .57), which indicates a statistically significant mutual influence of applied variables. This is explained by the impact of functional abilities with 57%. The probability of error for the rejection of the hypothesis whether the function is significant or not, was found between predictors and criteria (P = .000) at the level of 99%.

**Table 4.** Structure of statistically significant canonical factors in the system functional variables

Functional variables	Root canonical factor 1
FVKPL	.68
FSIKP	.54
FDIKP	.48

After examining the structure of canonical factors can be concluded that the magnitude of correlation coefficients canonical factor of functional variables (Table 4) define well general functionality of the respondents. In addition, this factor is better saturated with tests: vital capacity of the lungs (FVKP) and systolic blood pressure (FSIKP) than with the test of diastolic blood pressure at rest (FDIKP).

**Table 5.** Structure of statistically significant canonical factors in the system of motor variables from the segment agility

Motor variables agility	Root canonical factor 1
MKOT	.72
MKUS	.63
MOSS	.54

Motor agility (Table 5), as one of the segments of motor skills is also well defined with all applied tests. They are good representatives for general motor agility. In this case two tests: test envelope (MKOT), side steps (MKUS) more contribute in defining the general motor agility than the test eight with bending (MOSS).

#### 4. DISCUSSION AND CONCLUSION

Based on the canonical correlation analysis results of respondents (Tables 3,4 and 5), it was concluded that the functional capabilities (vital lung capacity, systolic blood pressure at rest and diastolic blood pressure at rest), as a predictor system, have statistically significant correlation with the results achieved in agility (envelope test, side steps and eight with bending) as a criterion system, among the young judo athletes.

Agility's motor ability is very important in the game, because the structures of this type are highly represented in motor activity in most sports. In most of the studies in which this factor is isolated, agility is defined as the ability to quickly change direction and movement.

Most of the tasks in judo are performed on a relatively small area. Speed of implementation of the complete structure of the movement and overcoming the relatively large inertial forces are in focus. Therefore a high level of functional ability is necessary.

The basis of improving agility consists of reducing the loss of speed in the transfer of the body weight in judo fight. Exercises that require quick changes of direction forward, backward and sideways help develop agility as well as coordination for faster and more efficient performance of the structure movement among judo athletes.

The results of this study may contribute to streamlining the training process with judo players, so in the training process special focus will be to the development of those variables, functional capabilities in the context of the development of motor skills in the segment of motor agility. In addition, the training work on the development of functional skills and motor abilities of the segment agility can contribute to better programming, implementation and control of the training process, and that would contribute to achieving better results among the young judo athletes.

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