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**DEVELOPMENT OF REPETITIVE FORCE UNDER THE
INFLUENCE OF SCHEDULED MULTIFACETED PREPARATION
AMONG YOUNG JUDO PRACTITIONERS****Summary**

The main objective of this study is to determine the impact of programmed physical exercises of multilateral preparations for the development of repetitive strength of judokas. It is done in order to check compliance of their development and create the possibility of rational procedures for optimal planning, programming and control of the training process of multifaceted preparation for the development of repetitive strength. The subject of research is the study of repetitive forces to the realization of specially designed multilateral arrangements. The sample consisted of 40 subjects taken from a population of Primary School students, aged 12 years (\pm 6 months) included in regular Physical Education and training process in judo clubs of East Sarajevo. Three tests of repetitive power were applied: mixed chin-ups on the shaft (MMZG); raising troops for 30sec. (MD30) and push-ups on parallel bars (MSKLE.)

The program "Statistica" 8.0 was used for Windows to calculate the following parameters: basic statistical parameters of repetitive tests of strength, T-test, discriminative analysis. The research results of the canonical discriminative analysis showed that under the influence of the specially designed multi-faced preparation appeared a statistically significant transformation of repetitive strength on the final measurement in relation to the initial state.

Key words: *young judo, multifaceted preparation, initial and final state of repetitive strength, discriminative analysis and variance.*

1 INTRODUCTION

Judo requires from the contestants nicely developed and strong body in all its aspects designed for the strong influence of the opponents movements pushing, attracting, lifting, rotating, etc., with the help of a concerted action of agonist and antagonist muscles and contractionary ability of judokas.

Multi-preparation is a process directed to balanced and harmonious development of motor and functional capabilities and different knowledge, skill and habit in order to form a strong and driven locomotive system with muscle mass characteristic of judokas.

The subject of research is the study of repetitive forces to the realization of multilateral arrangements. Anthropological research of those parameters is significant for the following reasons:

- Repetitive force appears as an important factor of success in the fight. It is the ability of long-term dynamic work loaded with 75-80% of the maximum capabilities.
- It significantly contributes to quality of implementation of judo training with the volume of high-intensity, for example endurance training in strength as the basis for the development of maximal strength of ran dory and exercises Buts-Kari (exercise techniques with lifting) and Kakari-Geiko (exercise techniques in motion with resistance) (Cirkovic, 1996; Malacko and Popovic 2001; Kules, Bunić, Viljusic 2003; Bratic, Radovanovic, Nurkic, 2008).

The main objective of this study was to determine the impact of resources of programmed physical exercises of multilateral preparations for the development of repetitive strength of judokas in order to check compliance of their development and create the possibility of rational procedures for optimal planning, programming and control of the training process is multifaceted preparation for the development of repetitive strength.

2 METHOD

The sample consisted of 40 respondents of Primary School, aged 12 years (± 6 months) included in regular Physical Education and training process in judo clubs in East Sarajevo. Three tests of repetitive power were applied: mixed chins (MMZG), raising troops for 30sec. (MD30) and push-ups on parallel bars (MSKLE.). Measuring instruments for assessing repetitive forces were taken on the basis of Kurelic's research (1975). Data were analyzed on the basis of the statistical SPSS 12

2.1. Characteristics of exercising in programmed multilateral preparation

Exploring the impact of multilateral preparations for the adaptive processes of repetitive strength among judokas was achieved after 16 hours in judo clubs in East Sarajevo in 2014, according to the curriculum. Two measurements were performed: initially, before starting work, and finally, after the end of treatment. Motor exercises were selected, dosage of training load was established and schedule of training content was aligned with the goals and objectives of programs multilateral preparation.

Realization of the program tasks of multilateral preparation was suitable to the skills and characteristics of respondents and it was conducted within the homogenized groups.

Multi-preparation began with general exercises that have the greatest impact on the quality of the preparation of judo athletes. These exercises are implemented with longer moderate labor activities (prolonged walking, acrobatics, swimming, sports games, cross, etc..) with a heart rate of 150 beats per minute, and the increased intensity of the use of shorter intervals of motor activity (running at 600, 800 and 1000 meters).

The main condition for performing of these exercises was to strengthen voluntary characteristics, optimal growth of hearth efficiency, and stroke volume (the amount of blood that the heart pumps a contraction).

3 RESULTS

3.1 Basic statistical parameters

Table 1: Basic statistical parameters of the repetitive tests forces on the initial measurement

Tests or repetitive forces	N	Mean	Min.	Max.	Std.dev.	Skewn.	Kurtos.
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MMZG	32	11.43	7.00	16.00	10.45	0.277	-2.479
MD30	32	16.74	10.00	23.00	12.85	0.522	1.528
MSKL	32	5.52	2.00	11.00	17.35	0.822	-0.083

Explanation: mean (Mean, minimum (Min), maximum (Max), standard deviation (Std. dev.), skjunis (Skewn.), kurtozis (Kürtösi.)

Analysis of Table 1 in the area of tests of repetitive forces on the initial measurement among judokas indicates that there is no statistically significant difference between the results of the normal distribution. The test results indicate that the distribution is positive, as evidenced by the results of asymmetry of distribution (skjunis) that does not exceed 1:00. This means that the tests are not heavy (up to +1.00) or light (up to -1.00) but appropriate to respondents and below the unit. Homogeneity results (kurtozis) indicates that there is a good sensitivity (discrimination tests), since the obtained value is below 2.75.

Table 2: Basic statistical parameters of the tests of repetitive forces on the final measurement

Tests of repetitive forces	N	Mean	Min.	Max.	Std.dev.	Skewn.	Kurtos.
MMZG	32	16.42	9.00	20.00	13.31	0.350	2.225
MD30	32	21.75	13.00	26.00	13.55	0.300	0.322
MSKL	32	10.43	5.00	13.00	0.45	0.046	1.755

Explanation: mean (Mean, minimum (Min), maximum (Max), standard deviation (Std. dev.), skjunis (Skewn.), kurtozis (Kürtösi.)

Results presented in Table 2 in the area of tests of repetitive forces on the final measurement judokas indicate that there is no statistically significant difference between the results of the normal distribution. The test results indicate that the distribution is positive and that is confirmed with the results of the asymmetry of distribution (skjunis) that does not exceed 1:00. This means that the tests are not heavy (up to +1.00) or light (up to -1.00) but appropriate to the respondents and they are below the unit. Homogeneity results (kurtozis) indicate that there is a good sensitivity (discrimination tests), since the vault obtained is below 2.75.

3.2. The differences between the initial and final condition repetitive forces

Table 3: Significance of differences between means of repetitive force examined by T-test

Tests	Mean(i)	Mean(f)	T-value	p
MMZG	11.43	16.42	5.55	.000
MD30	16.74	21.75	6.54	.000
MSKL	5.52	10.43	4.61	.000

Explanation: the mean initial (Mean (i)), the mean final (Mean (f)), the vault of T-test (T-value) and the level of significance (p)

Table 4: Significance of isolated discriminative functions of repetitive force examined by discriminative analysis

Disc Func.	Eigenvalue	Cannonical R	Wilks' Lambda	Chi-Sqr.	df	P-Level
1	4.402	.82	.149	112.31	3	.000

Explanation: The squares of the coefficient of discrimination (Eugenvalue), canonical correlation coefficients (Cannonical R), the vault is Bertletov's test (Wilks' Lambda), the size of Hi-square test (Chi-Sqr), degrees of freedom (df) and significance level of the coefficient of determination (P-Level)

Significant discriminative function of high intensity was obtained (CR = 82%) which indicates the correlation of data set. According to that correlation discriminative analysis of the results was performed (Table 4). The results of discriminative strength of repetitive power variables were given by Wilks-Lambda tests (.149). They suggest that the differences between

the initial and the final measurement in the area of repetitive strength among judokas is significant ($p = .000$) since the size of chi-square test has a high value ($\text{Chi- sQR} = 112.31$).

Table 5: Factor structure of the isolated discriminant functions of repetitive forces

Varijables	Root 1
MMZG	0.570
MD30	0.545
MSKL	0.516

Table 5 shows the structure of the discriminant function of repetitive force variables and its participation in the formation of significant discriminant functions. Shown centroids represent the arithmetic mean of the initial and of the final measurement. In order to verify the effectiveness of the training process, three tests of repetitive forces were measured that are supposed to be good predictors of the study area. The present results indicate that the largest contribution to the discriminant function have mixed chins (MMZGB 0570), raising troops for 30 seconds (MD30 0545), and push-ups on parallel bars (MSKLE 0516).

Table 6 Centroids of measurement

Measurement	Root 1
Inicial	-3.257
Final	3.257

The results in Table 6 presents the discriminant function of centroid based on all tests of repetitive force that is 3257 and -3257. Significance shown centroid measurement which has been tested through the significance of the discriminant function indicates that their distance (discrimination) is significant.

Table 7: Classification matrix

MEASUREMENT	Initial	Final	In total
Initial	30	2	32
Final	3	29	32
Initial	93.75%	6.25%	100%
Final	9.38%	90.62%	100%

Displayed results in Table 7 as percentiles, indicating that separation (discrimination) of results clarifies the precision of 92.18% (mean percentage of the groups themselves) from the canonical correlation coefficient, which is $\text{CR} = 82\%$.

4 DISCUSSION

The results of discriminant analysis in the final compared to the initial measurements indicate that under the influence of multilateral preparation of judokas occurred significant changes of repetitive strength ($P\text{-Level} = .000$). Although repetitive force has no leading significance in judo fight, her training is required. That is why there is no workout without a relatively large volume of these exercises, a general or specific character, in the opening and in the final part of the training. Without their participation it is difficult to speak about rational performing of judo techniques. Rational and economical performance of techniques for example. *ura nage*, *o uchi gari*, *soda tsuri komi goshi*, *kata guruma* etc., depends on repetitive strength in large extend. (Obadov 2005; Kules 2008; Bratic, 2008).

Overall performance together with repetitive force plays an important role to achieve high competitive results. It is directly connected with this dimension because it allows execution of long-term motor activity in large-scale judo fight (30 minutes or more) of moderate pace (small or medium intensity) with the use of large muscle groups. General endurance training develops functional skills, especially aerobic capacity and it has the impact on its economical use, improves mental and physical ability of competitors for better endurance of increased workloads.

Overall performance is particularly significant according to the methodological point of view and development of skills and traits among judo athletes. It is the basis for the development of specific resistance, which is determined by the ability of enduring the pressure levels over time in which it takes a specific athletic activity and competition.

Proper selection of work intensity, duration of work and rest provides a targeted impact on the anthropological status of young judokas. Different intensities of work in combination with the duration of the breaks, causing various adjustments of the organism, which can be very precisely controlled in each sport treatment.

5 Conclusion

Judo athletes with good repetitive force can accomplish exercises or performances in competitions stronger, faster and more expressive. Repetitive strength, speed and endurance are the characteristics of each sport. This dimension in endurance sports and strength is essential for increased efficiency of motor systems, and also it contributes to the development of sports form and coordination. Athletes who have optimal levels of repetitive force accomplish showing of force to a greater extent of motion, which increases their speed.

The development of repetitive force would influence the increasing of the efficiency of the result in a judo fight. In addition, the results of repetitive force can contribute to the individualization of training process. Planning, programming, implementation and control of the training process should be suitable to individual capabilities of judo athletes.

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