IMPACT OF SPECIFIC MODEL OF TRAINING JUDO ATHLETES OF YOUNGER SENIOR AGE ON THEIR MYOGENIC CHARACTERISTICS

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Abstract
Physical fitness occupies an important place in judo. Force and power are two easily measurable and very informative components of muscular ability. They are excellent indicators of the effects of muscle adaptations to resistance training. Because of this they are taken as main indicators of efficiency of our sport-specific protocols as a part of preparatory training process. For the sample of 32 judokas of a younger senior age is applied a specific model of weight training for a period of ten weeks. Judo men were divided into two groups: control and experimental. The experimental group has implemented 60 training sessions, 40 of which was judo training (25 technical and tactical and 15 situational judo training-randoria) and 20 resistance training (50-80% of 1 RM). The control group in this period worked only judo trainings or 40 training sessions. The research results show that there was a statistically significant increase in strength of the experimental group expressed in absolute units compared to the initial measurement, and compared to the control group. Also, there was a statistically significant increase in the strength of the experimental group expressed in relative units compared to the initial measurement, and compared to the control group. There was no statistically significant difference forces the experimental and control groups at the final measurement.

Key words*: muscular ability, specific training model*

Introduction

Judo belongs to a group of acyclic sports where physical fitness occupies an important place. Central position, of course, belongs to force and strength, and its specific manifestations in the recent literature (Perić, 2007) is collectively referred to as the motor performance with myogenic output. Almost all individual and collective sports require a very high level of development of motor skills of athletes. This confirms the necessity of using complex preparation that, in proportion to needs, develops all significant factors affecting the success of the sport at the desired time. The analysis of the relation between the basic motor abilities and some judo techniques indicated that respondents with greater explosive power, coordination, balance and speed are solving and performing evaluated judo techniques much better in a shorter period of time (Bratić, 1996).

Radovanović and associates (2005) investigated the impact of targeted prepared training-program the parameters of the anaerobic and aerobic capacity in young judokas with significant training and competitive experience. The results showed a statistically significantly higher levels of anaerobic capacity (relative value of the average power) and VO2 max, with a decrease in body weight and percentage of body fat. Based on survey results, the authors concluded that the changes in the curriculum of a six-week training before a competition can result in significant changes even with competitors who have more years in the training process. Since a judo fight is characterized by standing techniques and floor exercise, constantly increasing complexity of technical and tactical elements but also demands on the muscular system, the characteristics of which have a very important role in the successful judo. Research results (Bratić et al. 2007) showed that cadet competitors who achieve better competition results are characterized by greater upper body strength and greater capacity of aerobic endurance. The obtained results gives guidelines for planning the training process in cadet judo players level. Bratić and colleagues (2008) carried out an assessment of muscular strength and muscular endurance of 20 young, highly selected judo athlete, who with her performance at the Championship, Serbia secured a place to go to the official international competitions. The results showed a statistically significantly higher levels of muscular strength in most tests.

Research goal

The aim of the research is to determine whether the specific training model leads to changes of myogenic properties in the experimental group younger senior age judoka, ie to show that with good planning and proper management training process, athletes can at times lead to "the desired shape" .

Methods

The sample for this study represented 32 judokas who met the following requirements: to have at least three years of training process, have no organic and somatic diseases, that are younger senior age, that are male. Application of specific model training lasted 10 weeks.

Judo men were divided into two groups: control and experimental. During this period, the experimental group has implemented 60 training sessions, of which 40 judo training (25 technical and tactical and 15 situational judo training-randoria) and 20 resistance training. Additional resistance training was carried out twice a week, a method that has dominated the training is to raise the submaximal load at maximum speed. The load ranged from 50% to 80% of the maximum, the number of sets 4-6, 4-6 number of exercises, number of repetitions 8-10, resting between repetitions in the series 2-3 minutes between exercises 4-5 minutes. The control group in this period worked only judo trainings or 40 training sessions. Statistical analysis of the results is divided into two segments - descriptive statistics and application of methods of inferential statistics. The data was subjected to statistical analysis and collected by testing in laboratory conditions, with the help of a specially designed system - dynamometer (Fitrodine Premium Fitronić, Slovakia) to assess myogenic capabilities. This system is one of the best devices for measuring muscle strength whose validity and reliability confirmed (Jennings, Viljoen, Durandt, & Lambert, 2005). The maximum force muscular arms and shoulders were measured in a standard-equipped gym, using standard weights. The subject of measuring the musculature hypothetical marked as dominant during the execution of many activities during training and competitions in judo. A complex movement is used in the test procedure, recognized as a classic exercise with the burden, and that is the thrust of flat bench (Bench Press). Test bench-pressing one repetition maximum (Eng. One-repetition Maximum test - Bench press 1-RM) is used to estimate the total force of muscles involved in the extension arm (mm. Pectorales, m. Triceps, m. Deltoideus) based on values the maximum weight you can lift respondent thrust from the bench. In applying the test was followed a standardized protocol (Radovanović, 2009). Assessment of muscle strength of arms and shoulders method of dynamic stress, was performed in a standard-equipped gym, using standard weights and through a test '' Thrust with flat bench "(Bench Press), at a load 60% of 1 RM. Several studies have shown that the largest radiative output power was achieved by applying a load between 30-50% of 1RM. Some other studies have shown the best power output on a percentage of 40-60% of 1RM, while 65% of 1RM proposal Baker et al 2003 Test to assess muscle contraction parameters: maximum power, maximum power, speed during the eccentric and concentric contraction phase and distance of movement load / rods with weights.

Results

The research results are presented in tables with comments. The statistical significance of differences in arithmetic means of observed groups (p) for statistically significant differences ($p < 0.05$) was marked with a * (Star) with ** (two stars) to highly statistically significant ($p < 0.01$).

Values of $p < 0.05$ and other changes are not statistically significant only listed without emphasis rating. Tables 1 and 2 shows the values of the parameters that reflect the basic descriptive out features of both groups (N-number of sample units, SD-standard deviation, Min-minimum measured result, Max-measured maximum score).

Table 1. Experimental group

Parametar	SD	Min	Max
Uzrast (godina)	2.09	18.00	23.00
Sportski staž (godina)	4.19	4.00	15.00
Tjelesna masa (kg)	12.55	54.20	104.20

Table 2. Control group

Parametar	SD	Min	Max
Uzrast (godina)	1.72	18.00	23.00
Sportski staž (godina)	2.04	4.00	12.00
Tjelesna masa (kg)	14.19	53.30	118.30

The basic parameters that reflect the characteristics of both groups are: age, sports experience and body weight. Tables 1 and 2 clearly shows the size of the experimental or control group, which is composed of 16 units or subjects. The average age of both groups was between 18 and 23 years. Sports internship experimental group ranges from 4 to 15 years, and the control from 4 to 12 years. Muscular strength (eng. Strenght), or with us translated as muscular force, the maximum power that muscle, or more often, a group of muscles can produce during a contraction. Measured indirectly through a 1RM value is expressed in Newtons (N). Table 4. represents values of measured force for both groups at the end of experimental protocol. Muscle strength is an explosive aspect of the force and is equal to the product of the force and speed of movement. Because of the physical demands of judo, it is much more important component of muscle ability than force. Real progress is achieved by specifying intragroup variables tested for both groups.

Table 3. Results achieved at first measurement

Group	N	M	SD	SEM
Experimental	16	461.81	87.68	21.92
Control	16	472.22	97.44	24.36
	p<0.753			

Table 4. Results achieved at final measurement

Group	N	M	SD	SEM
Experimental	16	462.98	88.19	22.04
Control	16	471.11	96.92	24.23
	p<0.806			

Table 5. First measurement – both groups

Group	N	M	SD	SEM
Experimental	16	260.16	57.19	14.29
Control	16	279.65	70.04	17.51
	p<0.395			

Table 6. Final measurement – both groups

Group	N	M	SD	SEM
Experimental	16	300.64	72.08	18.02
Control	16	273.05	70.25	17.56
	p<0.282			

Table 7. Strength - experimental group, both measurements

	N	M	SD	SEM
First m.	16	260.16	57.19 **	14.29
Final m.	16	300.64	72.08	18.02
	P <			

Tabela 8. Strength - control group, both measurements

	N	M	SD	SEM
First m.	16	279.65	70.04	17.51
Final m.	16	273.05	70.25	17.56
	P < 0.58			

Corrected by expressing the mean power, and covariance, for both groups was tested by a real difference in progress (Table 9). This once again confirms the differences between planned, dosed and specific training in relation to standard practice. Looking at the value of the relative strength of the initial and final measurement of both groups (Tables 10 and 11), we see that there were no statistically significant differences or the mean of the experimental group showed an increase and is carried out with statistical verification of progress on the basis of the adjusted mean values (covariance) and differences within each group. Intra-group variance for the experimental group shows how much it has been progressed in improving the strength of the experimental group. The values in Table 13 shows that the specific training process improved the relative strength or the individual patient in the experimental group increased strength relative to its weight. Intra-group variance for the control group (Table 14) shows that there was no progress in the relative strength of the group that is not trained under a specific training protocol for judo.

Tablela 9. Strength covariance – both groups, final measurement

Group	N	M	SEM
Experimental	16	310.01**	9.17
Control	16	263.67	9.17
	p<0.001		

Table 10. Relative strength – both groups, first measurement

Group	N	M	SD	SEM
Experimental	16	4.34	0.69	0.17
Control	15	4.60	0.78	0.20
	p<0.352			

Table 11. Relative strength – both groups, final measurement

Group	N	M	SD	SEM
Experimental	16	4.97	0.88	0.22
Control	15	4.56	0.97	0.25
	p<0.228			

Table 12. Relative strength covariance – both groups, final measurement

Group	N	M	SEM
Experimental	16	5.10**	0.14
Control	16	4.43	0.14
	p<0.004		

Table 13. Relative strength – both measurements, experimental group

	N	M	SD	SEM
First m.	16	4.34 **	0.69	2.17
Final m.	16	4.97	0.88	2.22
	P < 0.0001			

Tabela 14. Relative strength – both measurements, control group

	N	M	SD	SEM
First m.	15	4.60	0.79	0.20
Final m.	15	4.56	0.97	0.25
	P < 0.85			

Discussion and conclusions

Judo belongs to a group of acyclic sports whose dynamism is reflected in the performance of complex movements and actions in the fight at maximum power and speed. We analyze the function of muscle groups in the struggle, which are mostly a loaded arm and a shoulder belt, because every standing action begins to distort the balance of the opponent and the movement of the moving arm and shoulder. Muscle contraction during fighting with dynamic and static character, though repetitive stress dynamic and explosive movements in the struggle are slightly dominate. Static contraction dominates the parterre situations keeping operations, defense of the lever and choking, or leading the fight on the ground. Both are equally important, and it is difficult to decide which is more important.

Based on the experiences of Zaciorski and Kramer (2009), working with thousands of elite athletes, including Olympic, world, continental, national champions and record holders, designed by a specific training model that was applied in this study. Based on the obtained results, we can conclude that with the application of a specific model of training there was a statistically significant increase in the strength of the experimental group expressed in absolute units compared to the initial measurement in relation to the control group. Also, there was a statistically significant increase in the strength of the experimental group expressed in relative units compared to the initial measurement in relation to the control group. There was no statistically significant difference in forces in the experimental and control groups at the final measurement, but it is understandable given that the protocol on the workload was not focused on the development of the muscular ability.

This confirms once again the differences between planned, dosed and specific training in relation to the common practice. The presented results show the success of a specific and individually designed training with the allowed weight and justify this kind of work in judo. In addition, application of modern appliances in the quantification of the results of training, such as FytroDyne Premium, closes the door to independent estimates trainers on the progress of athletes and imposes such practices as standard in the sports environment.

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UTJECAJ SPECIFIČNOG MODELA TRENINGA JUDAŠA MLAĐEG SENIORSKOG UZRASTA NA NJIHOVE MYOGENE ZNAČAJKE

Sažetak

Fizičke sposobnosti zauzimaju značajno mjesto u judo sportu. Sila i snaga predstavljaju dvije, lako mjerljive i veoma informativne komponente mišićne sposobnosti. Izvrsni su pokazatelji učinaka adaptacije mišića na trening s opterećenjem. Zbog toga su uzete kao glavni pokazatelji učinkovitosti sport-specifičnog protokola kao dijela pripremnog trenažnog procesa. Na uzorku od 32 judaša mlađeg seniorskog uzrasta primjenjen je specifični model treninga s opterećenjem u trajanju od deset tjedana. Judaši su bili podijeljeni u dvije grupe: kontrolnu i eksperimentalnu. Eksperimentalna grupa realizirala je 60 treninga, od čega 40 judo treninga (25 tehničko-taktičkih i 15 situacijskih judo treninga-randorija) i 20 treninga s opterećenjem (50-80% od 1 RM). Kontrolna grupa je u navedenom razdoblju radila samo judo treninge, odnosno 40 treninga. Rezultati istraživanja pokazuju da je došlo do statistički značajnog povećanja snage eksperimentalne grupe izražene u apsolutnim jedinicama u odnosu na početno mjerenje, i u odnosu na kontrolnu grupu. Također, došlo je do statistički značajnog povećanja snage eksperimentalne grupe izražene u relativnim jedinicama u odnosu na početno mjerenje, i u odnosu na kontrolnu grupu. Nije došlo do statistički značajnih razlika sile eksperimentalne i kontrolne grupe na završnom mjerenju.

***Ključne riječi**: mišićne sposobnosti, specifični model treninga*

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