

Level increase of competitive readiness of elite judokas in the weight category of up to 60 kg (as an example is the national team of Kyrgyzstan).

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Abstract:

The aim of the research is to find the new methods of the judoists' preparation for the competitive activity. Actually the participants of the researches are the men (n=20) and they are the members of Kyrgyzstan national judo team. Moreover, the median age was 22,8 years. The research period was 1 year. It was revealed that the blocks of coordination and speed-power exercises jointly with the improvement of the technical base of the wrestlers were added in the program of the athletes' preparation of the experimental group (n=10). Besides, the tests were used to determine the level of different motor skills of the athletes to assess the obtained data. Attention should also be paid to the calculation of the values of the competitive coefficients (CC) of the athletes which was made. Besides, the statistical analysis of the data was carried out using Mann-Whitney U-test. Indeed, the test results revealed a significant (P<0,05) advantage of the athletes from the experimental group in the speed running, strength training and running 1 mile. Fortunately, CC data of the athletes showed a significant (P<0,05) discrepancy in the volume of the effective equipment (Nage-waza) and a significant (P<0,01) difference in the intervals between the attacks (Nage-waza) in favor of the athletes from the experimental group. Accordingly, the use of coordination blocks and speed-power exercises in the structure of a year cycle of the athletes' preparation allows to increase the development indicators of the motor skills and technical activity of the judoists during the competitive matches significantly.

Key words: Judo; competitive coefficients (CC); speed-strength exercises; technical indicators of the athletes (Nage-waza); blocks of periodization (BP).

Introduction

Competition high level of the athletes in the judo world dictates the need of continuous improvement of the level of the competitive readiness of the judoists both men and women (Adolf, Sidorov, Kudryavtsev, et al., 2018). The researches data of a number of the large international competitions show some lag of the Russian judoists in the technical and tactical readiness indicators from the direct competitors - the Japanese athletes (Adam, & Sterkowicz-Przybycień, 2018). It is known that the technical and tactical training are the fundamental factors contributing to success in the judo competitive activity (Bocioaca, 2014). This trend indicates the need to find the new approaches to the preparation of the Russian athletes for the competitive competition. However, the constant modernization of the existing training methods and competitive preparation of the judoists is unique not only for the Russian judo school but also for the other judo schools from the countries of the former USSR today. This is due to fairly significant changes of the judo rules which IJF has held from 2013 (Osipov, Kudryavtsev, Struchkov, et al., 2016).

Fortunately, E. Franchini indicates that the success is achieved by the athletes due to the excellent level of physical fitness achieved during the training at the international competitions (Franchini, Del Vecchio, Matsushique, & Artioli, 2011). Consequently, the most scientific research is aimed at finding the ways to increase the level of physical (Osipov, Kudryavtsev, Iermakov, et al., 2018) and functional readiness of the judoists (Rovniy, Mulyk, Perebeynos, et al., 2018; Coswig, et al., 2018). There are the studies that suggest taking into account the individual characteristics of the athletes in the process of the competitive training of the judo wrestlers (Torres-Luque, Hernandez-Garcia, et al., 2016). Moreover, the important features are related to the time indicators of the technical actions of the athletes: the number of attacks during the match, the pauses between the attacks (Koptev, Osipov, Kudryavtsev, et al., 2017) and the average rhythm of attacking actions in each competitive match (Miarka, Brito, Amtmann, et al., 2018). However, the analysis of these indicators should take into account the level of sports skills and weight category of the athletes. Unique characteristics in the phases of attack, protection, fight lying and pauses between the attacking actions are revealed among the athletes of weight category up to 60 kg (Sterkowicz-Przybycień, Miarka, & Fukuda, 2017).

According to O. Koptev, the judo training methods used by the specialists have the main goal – to maintain the achieved level of the athletes' fitness during a long competitive cycle (Koptev, 2018). However, it

is known that the achievement of the certain sports results does not guarantee the continuation of the victories in the next competitive cycle (Julio, Takito, Mazzei, et al., 2011). It is believed that in these conditions it is necessary to search for the new creative methods of the athletes' preparation for the successful competitive activity (Koptev, 2012). For a long time, many Russian coaches have been building the training process using the physical and moral-volition qualities of the athletes neglecting the other training aspects which is indicated by G. Parkhomovich (Parkhomovich, 1993). Nevertheless, the foreign experts are engaged in the searches of the new approaches to the process of training activity of the judoists at this time. For example, L. Marques points to the possibility of applying the approach of periodization of the training loads in the process of training judo of the elite level (Marques, Franchini, Drago et al., 2017). At the same time, the training periodization in judo needs constant monitoring to improve the performance of the athletes in different training periods (Franchini, Del Vecchio, Ferreira Julio, et al., 2015). It turned out that the continuous testing of the athletes is necessary because the scientists have revealed a discrepancy between the volume of training loads which are planned by the coaches and the volume of load adequately perceived by the judoists (Viveiros, Caldas Costa, Moreira, et al., 2011). The specialists use a special judo fitness test - SJFT to assess the level of the special fitness in judo (Farzaneh Hesari, et al., 2014). However, in a number of studies conflicting data were obtained in SJFT results between the men and women (Sterkowicz-Przybycień, & Fukuda, 2014). Therefore, it is necessary to search for the new objective data on the level of fitness of the athletes to the training and competitive influences (Pokhachevsky, Gursky, & Kurzhev, 2018).

However, it should be noted that the authors of the article identified the main purpose of the research – the search for the new methods of training of the qualified judokas to the competitive activities and achieve the significant sports results. According to the authors, it is necessary to introduce coordination and speed-strength exercises into the training programs of the athletes to achieve the goal. Also it is necessary to use the data of the competitive coefficients of the athletes for an objective assessment level of the judokas competitive readiness.

Material & methods

Nevertheless, the participant researches are the members of the Kyrgyzstan men's national judo team (n=20). Moreover, the athletes weight category is up to 60 kg. At the same time, the average age of the athletes is 22,8 years old.

The research duration was 1 year. During the research the athletes were divided into 2 groups: group №1 – experimental (n=10) and group №2 – control (n=10). During the year the judoists from the control group were trained by the national team training program. The basis of this program was training sessions aimed at improving the physical fitness of the athletes (Physical training) improving the level of tactical and technical training (Technique) and control matches simulating the competitive fights (Duels).

Approximate program of the judokas preparation from the control group (group № 2) is presented during the year in Fig. 1.

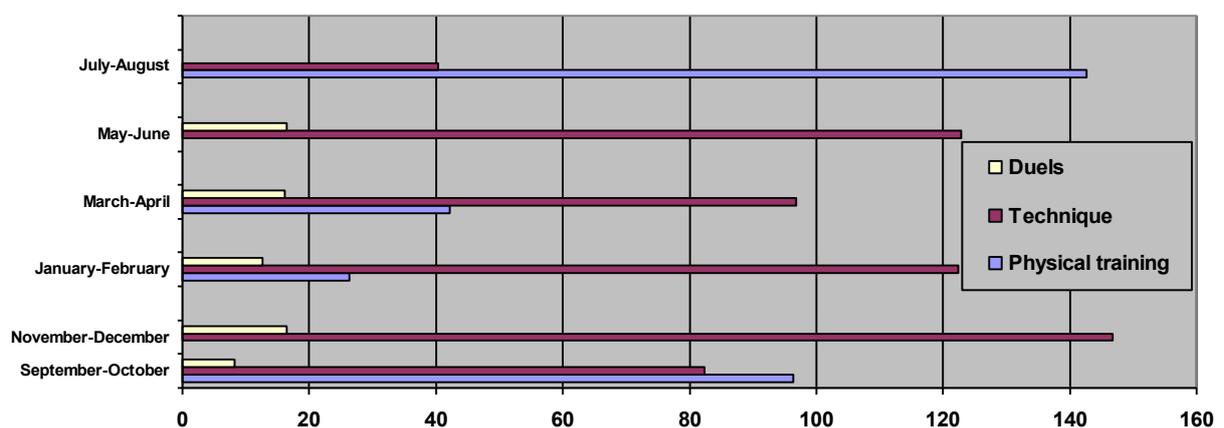


Fig. 1. The amount of core training influence of the judokas control group.

Besides, the program of the training classes was corrected by the authors for the purpose of increasing the level of tactical and technical preparation of the athletes for the judoists from the experimental group. Also, the main differences of the program of the athletes' preparation from the experimental group: the introduction of the block of coordination exercises (Coordination) and use of the block of speed and power exercises (Speed-strength) jointly with the improvement of the technical base of the judoists. Also, the block of coordination exercises included the gymnastic and acrobatic exercises: jumps, somersaults and flips performed at the fastest pace. By the way the exercises with a partner were used: fighting on one leg, pulling and pushing the partner beyond the borders of the tatami, depriving the partner from the position of the stable equilibrium by twisting,

etc. After all the block of speed-strength exercises was a movement performed by the athlete at the fastest pace with the counteraction of the partner: throws in different directions, the transfer of the partner on the tatami, the partner's flips in the stalls (Ne-waza), jumps and squats with the partner lying on his shoulders, etc. The duration of each block of exercises was 20-30 minutes during the training session.

Moreover, the training program of the judokas experimental group (group № 1) is presented during the year in Fig. 2.

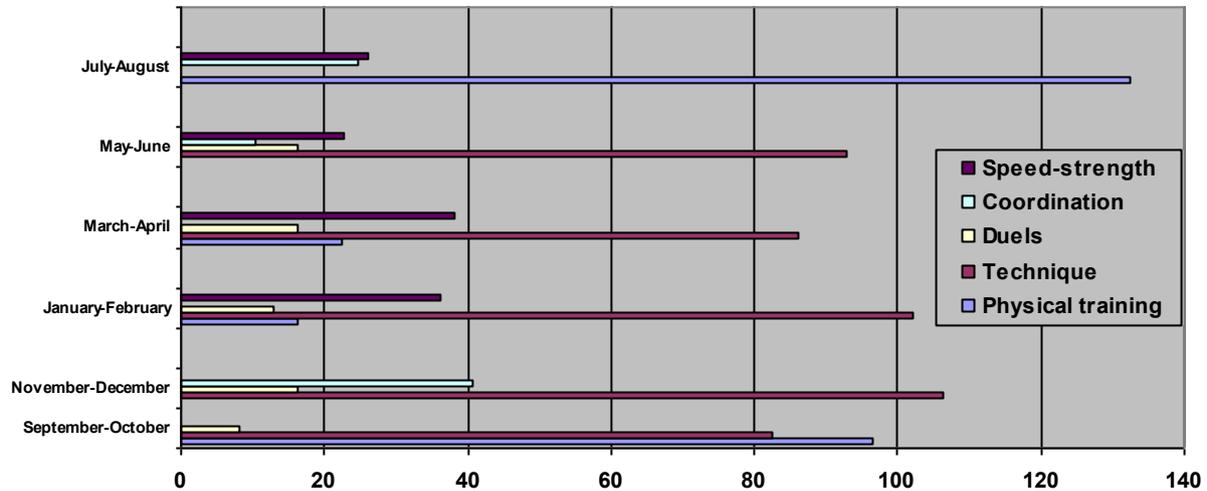


Fig. 2. The amount of core training influence of the judokas experimental group.

Besides, correlation coefficients (CC) of the athletes' tactical and technical actions in the control competitive matches were used to assess the quality of athletes' training. The coefficients were calculated according to Koptev O. (Koptev, Osipov, Kudryavtsev, et al., 2017). **CC1** – technical actions of the standing wrestling (Nage-waza), **CC2** – the effective technical actions (Nage-waza), **CC3** – the intervals between attacking actions (Nage-waza). Also, the authors analyzed the competitive fights of the athletes to determine the average values of these **CC** during the research year. By the way, the invited experts (n=5), the judges of national and international category on judo having an experience of judicial practice at the international competitions helped to define **CC** of the athletes to increase the level of the research reliability. The number of considered competitive matches – 612. On average, **CC** of each athlete was determined after 30 competitive matches.

Nevertheless, it was also applied tests (**TX**) allowing to assess the development level of motor skills of the athletes: **TX1** – throwing the tennis ball into the target (range – 6 m, diameter purpose – 90 cm), **TX2** – pulling of the printed ball (weight – 5 kg) with two hands from the chest to the target, **TX3** – 60 m running, **TX4** – flexion–extension of the arms (push-ups) in push-up position for 15 s, **TX5** – ups body vertically lying on the back for 20 sec, **TX6** – long jump from the place, **TX7** – pull on the bar (number of times), **TX8** – squats with a partner of your weight on your shoulders (number of times), **TX9** – 1609 m (1 mile) running, **TX10** – the speed of a simple motor reaction (pressing the button with a light signal), **TX11** – the speed of a complex motor reaction (responding to the sound and light signals), **TX12** – 10 shots through the back (Ippon seoi nage) of two partners of their weight category (run time). According to the experts, the test set of the physical and coordination tests provides coaches with the ability to predict athletes' results (Norjali Wazir, et al., 2017).

It goes without saying that the data statistical analysis was carried out using the statistical analysis program SPSS20. Thus, Mann–Whitney U–test was used to verify the validity of the results. This criterion for determining the reliability of differences in the studied parameters is recommended for use in assessing the results of a sufficiently small number of samples of the individuals.

Results

At the beginning of the study, the results of testing athletes of group 1 (experimental) and group 2 (control) did not differ significantly. Moreover, the judoists of both groups showed approximately equal motive opportunities. In the test – implementation of 10 shots through the back (Ippon seoi nage) athletes' results were also approximately equal. At the beginning of the research the values of the competitive coefficients were approximately the same for all athletes.

Luckily, at the end of the research it was found a significant ($P < 0,05$) difference in the test results: **TX3**, **TX4**, **TX6**, **TX9** in favor of the athletes from the experimental group. The **TX11** test revealed a significant ($P < 0,01$) difference in the results in favor of the judoists from the experimental group. By the way, the data of **CC** judoists showed reliable ($P < 0,05$) advantage of the athletes from the experimental group in volume (**CC2**) of

the effective technical actions (Nage-waza) performed during a competitive match. A significant ($P<0,01$) advantage of the athletes of the experimental group in the values of **CC3** was also revealed. **CC1** values data of both athletes groups did not differ significantly.

Full data of the research results are presented in Table 1.

Table 1. Comparative data of the results of TX and CC of the judokas who participated in the studies.

TX and CC	Beginning research		The end of research	
	Group №1	Group №2	Group №1	Group №2
TX1	4,41±0,21	4,36±0,25	4,31±0,19	4,28±0,23
TX2	4,30±0,26	4,25±0,33	4,10±0,35	4,08±0,31
TX3	8,22±0,10	8,23±0,04	7,93±0,06*	8,16±0,08
TX4	28,80±1,70	30,00±0,82	32,80±0,89*	29,70±0,92
TX5	26,20±0,66	27,00±0,49	29,04±1,03	28,86±0,73
TX6	244,70±4,77	246,70±2,59	254,60±3,16*	248,40±1,36
TX7	20,80±0,84	19,50±0,37	21,20±0,66	20,92±0,98
TX8	51,40±2,72	50,40±1,92	54,00±2,89	53,36±2,05
TX9	6,94±0,35	6,52±0,31	5,53±0,16*	6,15±0,24
TX10	0,17±0,02	0,17±0,01	0,14±0,03	0,15±0,02
TX11	0,28±0,06	0,28±0,03	0,22±0,01**	0,25±0,04
TX12	13,46±0,54	13,38±0,17	12,28±0,14	12,36±0,21
CC1	8,71±0,82	8,25±1,19	10,05±0,74	9,83±1,01
CC2	2,36±0,97	2,30±0,56	4,10±0,53*	3,22±0,48
CC3	35,52±2,70	35,69±2,47	26,97±2,77**	30,09±2,13

Reliability - * - $P < 0,05$, ** - $P < 0,01$.

Discussion

Consequently, the scientific literature presents data about the possibility of effective application of the block periodization programs (BP) in the training process of the elite judoists (Marques, Franchini, Drago, et al., 2017). However, BP programs are mainly concerned with finding the optimal combination of the load intervals and recovery of the athletes. At the same time, it was revealed that among the coaches there is no consensus about the preferred BP models and the specialists structure training programs are based on the individual preferences (Tavares Junior, & Janotta Drigo, 2017). Furthermore, the high-level coaches believe that in order to achieve high performance training impact in judo should take into account the specifics of the competition (Santos, Fernandez-Rio, Almansba, et al., 2015). However, the modern judo is characterized by a high level of motor skills in the competitive matches. Therefore, the athletes must have a sufficient level of development of the speed-power skills. The data show that the number of attacks in the competitive matches has a positive correlation with the jump height, maximum speed and strength of the upper and lower limbs of the judo wrestlers (Kons, Pupo, Ache-Dias, et al., 2018). In our studies, the BP program is implemented in a way of implementation in 8-week cycles of the physical and technical athletes training of the blocks of coordination and speed-strength exercises (SSE). The results of the use of data blocks allowed to increase the indices of development of general endurance (**TX9**), the speed of motor responses (**TX3**, **TX11**) and power capabilities (**TX4**, **TX6**) of judokas of the experimental group.

At the same time, there are data on the effectiveness of SIT – sprint interval training programs to increase the anaerobic power of the elite judoists in the literature. However, Kim recommends the use of SIT programs for short periods (no more than 8 weeks) between the main seasons of the athletes' training (Kim, Lee, Triilk, et al., 2011). In our studies, speed strength-building activity blocks were used both during the periods of basic training of the athletes (November-December, March-April) and between seasons (January-February, July-August). The results of testing athletes show the presence of significant ($P<0,05$) advantages of the judokas from the experimental group in the short sprint – 60 m running (**TX3**). Also significant ($P<0,05$) advantage of the judokas experimental group revealed in the results of the **TX4** which characterize the level of anaerobic power of the athletes.

Thus, E. Franchini points out that 8-week programs of the judokas daily training with weights aimed at the development of strength which contribute to an increase in the total number of throws performed by the athletes in testing conditions. However, they found no significant changes in the performance of technical actions of the athletes during the matches (Franchini, Branco, Agostinho, et al., 2015). Our studies revealed a significant ($P<0,05$) increase in the volume of the effective technical actions (Nage-waza) in the experimental group of the athletes in comparison with the judoists from the control group.

It is necessary to pay attention to the need of purposeful development of the judokas coordination skills. Thus, the experts say that the level of coordination and balance of the athletes' bodies depends on their age (Mala, Maly, & Zahalka, 2016) and experience of competitive activity (Mašliški, Witkowski, Ciešliński, et al., 2016). Many coaches have the reason to believe that the performance of the athletes' coordination will grow with their age and competitive experience. Therefore, in training programs the purposeful development of coordination skills is not often given the due attention. However, there is evidence of the need for targeted development of coordination skills in sambo and judo wrestlers starting from the young age (Osipov, Guralev, Kudryavtsev, et al., 2018). In our studies, a significant ($P < 0,01$) advantage in the rate of complex motor reaction (TX11) was found among the athletes of the experimental group. Thus, we also believe that a significant ($P < 0,05$) advantage of the athletes in terms of CC2 was achieved including through the use of BP coordination exercises during the judokas preparation process to the competitive activities in this group.

Conclusions

In conclusion, we may say that the competition in the judo world dictates the need to search for the new technologies and methods of the judo wrestlers training that can increase the level of competitive readiness of the athletes. It was revealed that the inclusion of coordination blocks and speed-strength exercises (SSE) in the program of the one-year training cycle of the judoists made it possible to improve a number of indicators of the physical fitness of the athletes from the experimental group significantly. Also, the athletes of this group revealed a significant superiority in the amount of effective judo techniques (Nage-waza) and the attack intervals in fights. However, in the literature it is indicated that the CC indicators of the judo wrestlers in the weight category up to 60 kg correlate poorly with the CC data of the athletes of other weight categories. It turned out that there is a need to continue such studies to determine the effective BP training of the elite judoists of various weight categories for the competitive activities.

Conflicts of interest - If the authors have any conflicts of interest to declare.

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