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COMPARATIVE CHARACTERISTICS OF THE DEVELOPMENT OF SPEED AND POWER CAPACITIES IN THE PRE-COMPETITIVE MESOCYCLE IN TAEKWONDO

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Author's Contribution:

A – Study design; B – Data collection;
C – Statistical analysis; D – Manuscript preparation;
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Abstract

Introduction. The article presents the features of special physical training of athletes in the stage of sports improvement in taekwondo. It is shown that this stage forms and implements a comprehensive base of all aspects of training of athletes, which will allow performing effectively in competitions. The specificity of taekwondo, which is an Olympic sport, is rapidly increasing the requirements for special physical training of athletes. Taking into account this provision in the training of young athletes is a relevant scientific study and can increase the efficiency of the training process, as well as solve the main tasks of the stage of sports improvement.

The aim of the study is to scientifically substantiate the relationship between the means of development of speed and power training of taekwondo athletes of senior school age in the pre-competitive mesocycle.

Material and methods: analysis of literature sources on the problem of training athletes; pedagogical testing; pedagogical experiment; methods of mathematical statistics. The study (pedagogical experiment) was conducted on the basis of the sports club "OLIMP TKD" (Dnipro) with taekwondo athletes in the number of 16 person – athletes of sports improvement groups.

Results. Analysis of literature sources and regulations, shown that taekwondo is very popular in the world. The basis of special physical training in taekwondo is mainly strength and contraction component. At the stage of sports improvement, development is carried out mainly in two directions: power and speed.

The results of testing the level of physical fitness after the experiment show a significant increase in all indicators, both in the first and in the second groups. According to the results of control tests, we can say that the data of the first group is not much smaller than the data of the second group, but this shows that in our experiment, athletes are dominated by power abilities.



Conclusions. After the implementation of our program, the effectiveness of building a training process for the development of speed and power was determined. According to the results obtained after the experiment, we can say that the formula of our testing looks like 53: 47%. Power abilities prevail over speed by 6%.

Key words: taekwondo, physical training, skilled athletes, power abilities, speed abilities.

Introduction

A number of works by Ukrainian and foreign authors are devoted to the problem of improving the training process of athletes, in which the essence of leading qualities is revealed and a special place among them is given to speed and power qualities [4, 10, 13].

Criteria for assessing speed and power qualities and prospects for their improvement are currently being studied in the separate manifestation of speed and power components in their relationship with the structure of competitive exercises [2, 5, 11].

As for the development of the main components of speed and power qualities in taekwondo, which are carried out in the mode of execution and in accordance with the structure of special exercises, these issues in the scientific and methodological literature are not covered enough [2, 8].

It is known from practice that the exclusion from the training of power exercises in the process of speed-power training of athlete's leads to a rapid decrease in the level of the power component, as their excessive use promotes the development of power, prevents the improvement of the speed component and, consequently, reduces level of speed and power qualities [1].

Unfortunately, this provision is not sufficiently taken into account in sports practice, as a result of which many

promising athletes stabilize the development of speed and power qualities at the same level as a result of violation of the principle of moderation in the development of physical qualities.

Training a highly skilled taekwondo fighter is an extremely complex and multifactorial process that includes technical, psychological, competitive and integrated training.

In the system of sports training in taekwondo, the development of speed and power abilities is very important. But this ability is developed in each athlete in different ways and in different proportions. Therefore, we want to know what is more prevalent for taekwondo fighter's speed and power and how it affects the improvement of results [2, 7, 9, 12].

Speed endurance is a kind of special endurance, which is characterized by the ability of a person to perform movements of maximum speed for a relatively long time without reducing work efficiency.

Speed endurance is manifested when it is necessary to perform a series of attacking or defensive actions. It is determined by the anaerobic performance of the body and develops during the performance of exercises of this orientation with short-term accelerations [2].

Strength endurance is a specific manifestation of two motor abilities at the same time – speed and power. It is



characterized by the ability to perform movements with significant external resistance over a period of time without reducing their effectiveness (compare with the general definition of endurance).

Power endurance is directly related to general endurance, but differs from it mainly in the power nature of work.

Based on the fact that power endurance is characterized by the presence of significant external resistance. Power endurance, being a special type of endurance in taekwondo, is also characterized by an anaerobic type of body work.

The study was performed according to the R&D of the Prydniprovsk State Academy of Physical Culture and Sports for 2021-2025 on the topic: «Theoretical and methodological foundations of training athletes in non-Olympic sports» (state registration number 0121U109266).

Aim of the research

The *aim* of the research is to scientifically substantiate the ratio of the means of development of speed and power training of taekwondo fighters of senior school age in the pre-competitive mesocycle.

Task of the research:

- 1) To determine the anthropometric data and features of the state of physical fitness of taekwondo fighters.
- 2) To develop a method of training for the development of speed and power abilities in taekwondo in the pre-competitive mesocycle.
- 3) To determine the effectiveness of the developed program for the performance of taekwondo athletes in competitions.

Material and methods

Analysis of literature sources on the problem of training athletes. To assess speed and power abilities, special tests were used: 1. ap-chagi, 2. dol'e-chagi, 3. tweet- chagi, 4. hurie-chagi, 5. pandal-chagi, 6. yop-chagi, 7. nerye-chagi, 8. sevo-chagi, 9. tornado, 10. two pandal-chagi, 11. miro-chagi, 12. bituro-chagi.

Of these, the first 5 tests are aimed at assessing speed, and the second – power qualities.

The pedagogical experiment was associated with the introduction of two different programs into the training process and the identification of the most effective option for planning and training taekwondo fighters.

Methods of mathematical statistics: \bar{x} - mean, SD – standard deviation, CV – coefficient of variation, t_{score} – Student's *t*-test (at the intra- group level group A and group B), the level of significance was taken as $p < 0,05$.

The study (pedagogical experiment) was conducted on the basis of the sports club «OLIMP TKD» (Dnipro) with taekwondo athletes in the number of 16 person – athletes of sports improvement groups.

Results and discussion

Considering the speed and power training of taekwondo practitioners, it can be considered that its main task is to develop the speed of movement of the blows and the strength of a certain muscle group.

The solution of this problem is carried out in three directions: high-speed, high-speed power and power.

The speed direction includes methods that are aimed at developing the speed of motor response (simple and

complex); a method of responding to a sudden visual or auditory signal; method of performing the exercise in parts and in light conditions.

The speed-power direction aims to develop the speed of movement simultaneously with the development of the strength of a certain muscle group. The task is to develop the muscles that are involved in performing the basic movement.

Two programs were specially developed for our study, the first was aimed at the development of speed abilities, and the second at the development of power abilities [5].

Athletes of the first group, with the focus of training work on increasing speed qualities, used various special exercises in their arsenal, using interval and variable methods with a maximum number of repetitions of exercises up to 50.

Athletes of the second group, with the focus of training work on increasing power qualities, used special exercises, using the repeated method and the method of circular training with the number of repetitions up to 12.

Also, the athletes of the two groups

used special taekwondo equipment to increase speed and power abilities, such as rackets, boxing bags, impact pads and electronic competition system TPSS DAE-DO.

These programs were developed for the pre-competitive mesocycle and were used for a month before the responsible competitions.

The study involved two groups of 16 athletes each. We conducted two tests, before the experiment and after, testing the special physical fitness of athletes, it included such tests on the number of strokes per 1 minute, such as: 1. ap-chagi, 2. dol'e-chagi, 3. tweet-chagi, 4. hurie-chagi, 5. pandal-chagi, 6. yop-chagi, 7. nerye-chagi, 8. sevo-chagi, 9. tornado, 10. two pandal-chagi, 11. miro-chagi, 12. bituro-chagi.

According to the data obtained before the study, we can say that the groups are completely homogeneous and can be compared. After conducting the experiment a month later, we received an increase in percentage (%) in all tests. This we can see in *Figure 1*:

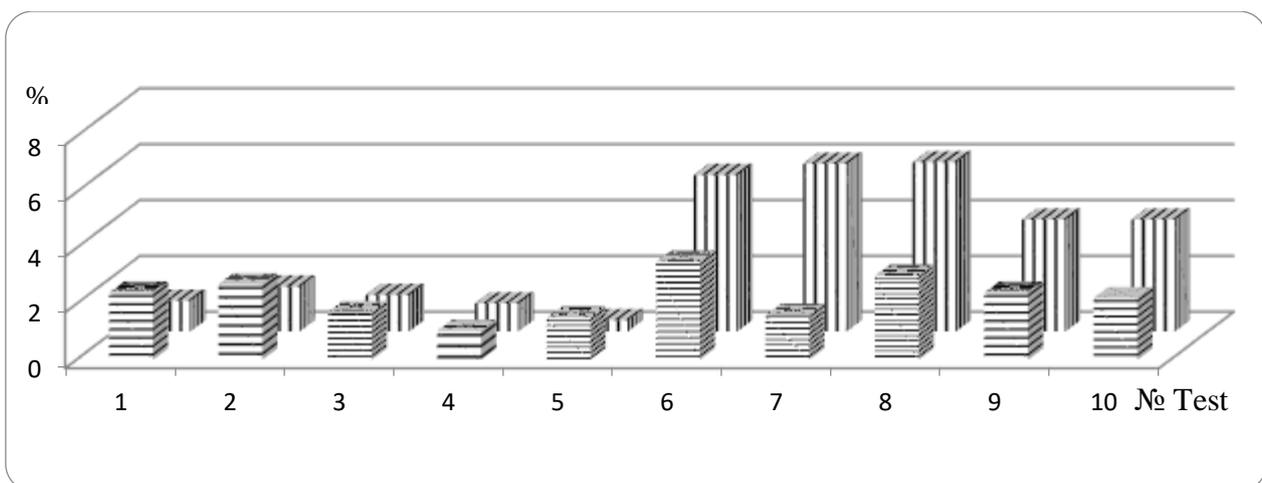


Figure 1. Increase in indicators of tests of special physical fitness of taekwondo fighters (%): - 1 group; - 2 group;

1 - ap-chagi, 2 - dol'e-chagi, 3 - tweet-chagi, 4 - hurie-chagi, 5 - pandal-chagi, 6 - yop-chagi, 7 - nerye-chagi, 8 - sevo-chagi, 9 - tornado, 10 - two pandal-chagi, 11 - miro-chagi, 12 - bituro-chagi



After the implementation of our program, the effectiveness of building a training process for the development of speed and strength was determined.

According to the results obtained after the experiment, we can say that in our groups, athletes have more power than speed, but they are not very closely related (53:47%).

Conclusions

1. In creating our programs, we relied on the developed program for school sports. Take into account the physical fitness of athletes; distribution of exercises by parts of the lesson; the specifics of the sport and the conditions of the training session. The construction of the program is classified as follows:

- (-) exercises of general preparatory nature;
- (-) exercises of special preparatory nature;
- (-) exercises of the nature of the competition.

2. The results of testing the level of physical fitness after the experiment shows a significant increase ($p < 0,05$) for all indicators, both in the first and in the second groups. According to the results of control tests, we can say that the data of the first group (1.13%) is not much less than the data of the second

group (1.3%), but this shows that in our experiment, athletes are dominated by power abilities.

3. After the implementation of our program, the effectiveness of the training process for the development of speed and power was determined. According to the results obtained after the experiment, we can say that the formula of our testing looks like 53:47%. Power abilities prevail over speed by 6%.

Thus, the further search for new approaches to the effectiveness of the training process aimed at improving the physical fitness of athletes can go by intensifying the training process and in-depth special physical training at the stage of sports improvement in taekwondo.

Prospects for further research

Prospects for further research in the direction of increasing the level of special physical fitness will allow the most effective planning of training athletes at various stages of long-term improvement of athletes of various qualifications. In turn, this can give a high rise in the Ukrainian taekwondo not only within the country, but also within increase the sports status at major international competitions.

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