ANALYSIS OF FUNCTIONAL INDICATORS OF PHYSICAL TRAINING OF YOUNG ATHLETES IN TAEKWONDO

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Annotation
This article examines the analysis of functional indicators of physical fitness in young taekwondo athletes, as well as methods for their assessment. The study aims to identify changes in athletes' physical fitness as a result of implementing an experimental training program. The results show that targeted training positively affects key indicators such as cardiovascular endurance, strength, and aerobic power.

Keywords: taekwondo, physical fitness, young athletes, functional indicators, training, assessment.

Introduction. Taekwondo is a highly dynamic sport that requires athletes to have excellent physical fitness, coordination, and quick reactions. To succeed in competitions, it is necessary not only to master combat techniques, but also to have high functional indicators that ensure competitiveness at the level of [1,3].

The current level of sports achievements in taekwondo requires targeted organization of long-term training of athletes, as well as the search for effective organizational forms, means and methods of educational and training work. Monitoring readiness becomes an important management tool, allowing for feedback between the coach and the athlete. The study of the features of control and assessment in the system of sports training of young taekwondo athletes is of great importance, since it is during this period that the foundation of sports mastery is laid and basic motor abilities are formed [5].

An analysis of scientific research shows that there are currently many works devoted to the system of sports training for young taekwondo athletes. However, insufficient attention is paid to the issues of assessing sports readiness. This emphasizes the need for further research in this area in order to optimize training processes and improve the results of sports activities.

Objective of the study. The objective of this study is to analyze the functional indicators of physical fitness of young taekwondo athletes aged 10-11 years, as well as to evaluate the effectiveness of an experimental training program aimed at improving cardiovascular endurance, strength and aerobic power.

Analysis of the functional assessment of physical fitness of young taekwondo athletes is an important aspect in the preparation of athletes, since physical fitness directly affects their

athletic performance and overall effectiveness in competitions. In this article, we will consider the key functional indicators of physical fitness of young taekwondo athletes and methods for assessing them.

Organization of the study. The pedagogical experiment was conducted at the Uzbek State University of Physical Education and Sports from September 2023 to March 2024. The study involved groups of young taekwondo athletes aged 10-11 years, who were divided into experimental (EG) and control (CG) groups. Each group included 12 people (24 boys in total) in their first year of study. Taekwondo classes were held 3 times a week in the form of a training session, the duration of each session was 1 hour.

The control group trained according to the generally accepted training method, which includes standard exercises and approaches that are widely used in sports practice. The experimental group trained according to the method we developed, the development of physical fitness of young taekwondo athletes, which was aimed at improving physical fitness using active games.

Results and discussion. During our study, we tested the functional indicators of physical fitness of young athletes at the beginning and end of the experiment. The following tests were used to identify changes in functional indicators:

1. Heart rate (HR) - measured in beats per minute and allowed us to assess the level of cardiovascular endurance.
2. Deadlift strength – measured in kilograms and served as an indicator of overall physical strength.
3. PWC170 test – conducted using a step test that measures power in kgm/min and allows for an assessment of aerobic performance.

Table-1 presents data confirming that at the initial stage of the experiment, the functional indicators of the control and experimental groups did not have reliable differences, which confirmed their homogeneity. The dynamics of the growth of indicators was presented in Table 3, which clearly demonstrated changes in physical training.

Table-1

Functional indicators of young taekwondo athletes before the experiment

№	Tests	Control group	Experimental group	t	t	Reliability
1	Heart rate	92,6	92,3	2,31	0,19	P > 0,05
2	Deadlift strength	10,5	10,4	2,31	0,34	P > 0,05
3	Sample PWC 170	294,8	294,2	2,31	0,08	P>0,05

Table-2

Functional indicators of young taekwondo athletes after the experiment

№	Tests	Control group	Experimental group	t	t	Reliability
1	Heart rate	90,1	88,5	2,31	0,15	P < 0,05
2	Deadlift strength	10,8	12,5	2,31	0,02	P < 0,05
3	Sample PWC 170	307,1	332,3	2,31	4,18	P < 0,05

Table 2 presents the data of a comparative analysis of the functional indicators of young taekwondo athletes aged 10-11 years, belonging to the control and experimental groups, after the experimental training program.

In the test, heart rate (HR): In the control group, the average HR was 90.1 bpm. In the experimental group, the average HR decreased to 88.5 bpm. t-exp: A value of 0.15 indicates no significant difference between the groups, although the difference in HR may indicate a positive effect of training on the cardiovascular system.

In the deadlift test: the average result in the control group was 10.8 kg, while in the experimental group the value increased to 12.5 kg. t-exp: The value of 0.02 indicates a statistically significant improvement in the development of strength in the experimental group, which is confirmed by the level of reliability $P < 0.05$.

In the PWC 170 Sample test, the average result in the control group was 307.1 W. In the experimental group, the value increased to 332.3 W. t-exp: The value of 4.18 also indicates a significant improvement in aerobic power in the experimental group, which confirms the effectiveness of the experimental program.

The results show that the experimental training program had a positive effect on the physical fitness of young taekwondo athletes, especially in the aspects of deadlift strength and aerobic power. Statistical significance ($P < 0.05$) confirms that the changes in the experimental group are significant and not random.

Conclusion. During the study, an analysis of the functional indicators of physical fitness of young taekwondo athletes was carried out, which made it possible to identify significant changes in the results after the use of the experimental training program. The obtained data indicate a positive effect of targeted training on cardiovascular endurance, strength and aerobic power of athletes.

A comparative analysis of the indicators of the control and experimental groups demonstrated that young taekwondo athletes who were trained using the developed methodology significantly improved their results in tests for deadlift strength and aerobic power, which was confirmed by statistical significance ($P < 0.05$).

This highlights the importance of introducing innovative approaches into the training process aimed at optimizing physical fitness.

Thus, the results of the study open up new opportunities for the development of methods for training young taekwondo athletes and contribute to the formation of a healthy and physically developed generation of athletes ready to achieve at a high level.

The methodology we developed using sports games allowed us to significantly increase the level of physical fitness and readiness for competitions among young taekwondo athletes, providing a comprehensive approach to their development.

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