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METHODS OF DEVELOPING ENDURANCE PHYSICAL QUALITIES OF ATHLETES (ON THE EXAMPLE OF UZBEK MARTIAL ART)

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ABSTRACT

This article analyzes the methods of developing endurance physical qualities of athletes on the example of Uzbek martial art (Uzbek jang san'ati, kurash, belbogli kurash). The research studied the system of exercises aimed at developing types of endurance – general and special endurance, load parameters and performance indicators. It was found that in the experimental group trained according to a specially developed methodology, endurance indicators significantly improved compared to the control group. The research results serve to improve the physical training of athletes engaged in Uzbek types of martial arts.

Keywords: Endurance, physical qualities, Uzbek martial art, kurash, belbogli kurash, special physical training, load parameters.

INTRODUCTION

The development of physical education and sports in the Republic of Uzbekistan is considered one of the priority directions of state policy. Particular attention is paid to the development of national sports, including Uzbek martial art (Uzbek jang san'ati) and types of wrestling. In December 2009, by order of the Ministry of Culture and Sports Affairs of the Republic of Uzbekistan, Uzbek martial art was granted the status of a national sport, and today thousands of young people regularly train in this direction. Martial arts require complex coordinated

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movements, a high level of physical exertion, and prolonged intensive activity. For this reason, developing the physical quality of endurance is considered one of the main directions in the training of athletes engaged in martial arts. Endurance enables the athlete to maintain high work capacity during competitive activity, effectively perform technical-tactical actions, and prevent fatigue. The relevance of this research lies in the fact that scientifically based methods of developing endurance on the example of Uzbek martial art have not yet been sufficiently developed. Many coaches in practice use methodologies borrowed from other sports, which reduces the effectiveness of special training.

LITERATURE REVIEW

The problems of physical training, particularly the development of endurance, occupy an important place in sports pedagogy and theory. Analysis of research conducted on martial arts shows that a comprehensive approach is required in developing endurance. In a study conducted by Bobomurodov N.Sh. (2023), four main factors were identified in the structure of physical fitness of wrestlers, of which the most important (34% variance) was found to be the factor of special physical fitness. This factor is associated with a high level of development of speed-strength qualities, manifested in pull-ups on the horizontal bar (in 10 seconds), 30 m run, Harvard step test, and complex exercises. In the research of Mirzanov Sh.S. (2024), the effectiveness of using isokinetic exercises and a special "PDSKB-SHER" device in developing strength training of belbogli kurash wrestlers was studied. According to research results, explosive strength indicators improved by 57.4% and maximum strength by 82.5% in the experimental group. Mamanazarov A. (2025) proposed a methodology for developing physical and technical training of students through means of national wrestling. This methodology emphasizes that physical training (general and special), technical training, tactical training, and psychological training should be conducted in harmony with each other.

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Organization of the Research

The research was conducted during 2024-2025 at the "Uzbek Martial Art" sports club in Tashkent city and at the Uzbekistan State University of Physical Education and Sport. Thirty adolescent athletes aged 15-17 participated in the study. Fifteen of them were assigned to the experimental group (EG) and 15 to the control group (CG).

Research Methods:

1. Theoretical analysis and generalization of literature;
2. Pedagogical observation;
3. Pedagogical testing;
4. Pedagogical experiment;
5. Variation statistics.

Endurance Assessment Tests:

- **Cooper test (12-minute run)** – to assess general endurance;
- **400 m run** – to assess special endurance;
- **Sit-ups in 30 seconds** – to assess strength endurance;
- **Standing in the "bridge" position for 3 minutes** – to assess static endurance;
- **Complex of special movements (strikes and throws) for 5 minutes** – to assess special endurance.

Experimental Methodology

Training sessions were conducted in the experimental group for 6 months based on a specially developed methodology. The main content of the methodology consists of the following:

1. Circuit training method – 3-4 rounds at 6-8 stations (rope pulling, barbell squats, strikes on a sandbag, throwing dummies, pull-ups on horizontal bar, exercises with medicine balls), 45 seconds work at each station, 15 seconds rest.

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2. Interval method – high-intensity special exercises (series of strikes, throws, combinations of movements) for 2-3 minutes, heart rate up to 170-180 beats/minute, rest interval 1-2 minutes.

3. Variable method – special exercises of variable intensity for 15-20 minutes (1 minute high intensity + 2 minutes low intensity).

4. Competition method – 4-6 minute sparrings in conditions close to competition rules.

The control group trained according to traditional methodology – long-duration runs of uniform intensity and general developmental exercises.

RESULTS

At the initial stage of the research, the endurance indicators of all participants were determined. Initial test results showed that both groups were approximately equal ($p>0.05$), indicating the equivalence of the groups.

After the 6-month pedagogical experiment, a retest was conducted. The obtained results are presented in Table 1.

According to the Cooper test, general endurance indicators improved by 330 m (13.5%) in EG, and by 150 m (6.1%) in CG. In the 400 m run, speed increased by 6.2 seconds (7.9%) in EG, and by 2.7 seconds (3.5%) in CG.

The obtained results show that the developed methodology has higher effectiveness compared to traditional methods in developing endurance physical qualities of athletes engaged in Uzbek martial art. Particularly, the combination of circuit and interval methods yielded the best results in developing special endurance.

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Table 1 Changes in endurance indicators in experimental and control groups (X±σ)

№	Test types	Group	Before research	After research	Difference	Increase,%
1.	Cooper test, m	EG	2450±120	2780±115	+330	13.5
		CG	2470±125	2620±130	+150	6.1
2.	400 m run, s	EG	78.5±4.2	72.3±3.8	-6.2	7.9
		CG	77.8±4.5	75.1±4.1	-2.7	3.5
3.	Sit-ups in 30 s, repetitions	EG	24.3±2.1	31.5±2.4	+7.2	29.6
		CG	24.8±2.3	27.6±2.5	+2.8	11.3
4.	Standing in "bridge", s	EG	85.4±8.3	112.6±9.2	+27.2	31.9
		CG	84.7±9.1	95.3±8.8	+10.6	12.5
5.	Complex of special movements, repetitions	EG	18.3±2.2	24.8±2.5	+6.5	35.5
		CG	18.7±2.4	21.2±2.3	+2.5	13.4

Note: EG – experimental group (n=15), CG – control group (n=15)

As can be seen from the table data, the increase in indicators in the experimental group was significantly higher compared to the control group across all test types. Particularly high increases were recorded in strength endurance (sit-ups in 30 seconds – 29.6%), static endurance (standing in the "bridge" position – 31.9%), and special endurance (complex of special movements – 35.5%).

Our research results are consistent with the studies of Bobomurodov N.Sh. and Mirzanov Sh.S. They note that special physical training (including endurance) is

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the most important factor in the structure of wrestlers' training. In Mirzanov Sh.S.'s research, an increase of 57.4% in explosive strength was recorded, while in our research an increase of 29.6% in strength endurance was observed. As Murodov K.N. noted, the use of special equipment and devices increases the effectiveness of developing strength endurance by 25-30%. In our research, the use of various special equipment (rope, barbell, medicine balls) in the circuit training method made it possible to achieve high results.

CONCLUSION AND RECOMMENDATIONS

The results of the research conducted on developing endurance physical qualities of athletes on the example of Uzbek martial art allow drawing the following conclusions:

1. Endurance occupies an important place in the training of athletes engaged in Uzbek martial arts (Uzbek jang san'ati, kurash, belbogli kurash). In these sports, endurance manifests in a complex form – as general, special, strength, and static endurance.
2. The methodology based on the combination of circuit, interval, variable, and competition methods has higher effectiveness compared to traditional methodology (long-duration loads of uniform intensity) in developing endurance.
3. In the group where the developed experimental methodology was applied, endurance indicators increased significantly compared to the control group: general endurance (Cooper test) – by 13.5% (in CG 6.1%), strength endurance – by 29.6% (in CG 11.3%), static endurance – by 31.9% (in CG 12.5%), special endurance – by 35.5% (in CG 13.4%).
4. The effectiveness of the experimental methodology was also manifested in the improvement of functional capabilities of the cardiovascular system: the recovery period of heart rate after load was shortened in EG.
5. The research results can be used to improve training programs aimed at developing endurance qualities of athletes engaged in Uzbek martial arts.

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