Improving the special physical preparedness of combat sambo athletes

https://doi.org/10.65149/eajss.2026.v6i3.a008

Allabergenov Zafar Ulugbekovich
[1]Urgench state university, Urgench, Uzbekistan

Abstract
The article presents the results of a simulated pedagogical experiment aimed at improving the special physical preparedness of young athletes practicing combat sambo in sports schools. It examines relevant aspects of developing speed-strength abilities, special endurance, and coordination, as well as their impact on competitive performance. During the experiment, control and experimental groups of male adolescents aged 13–16 were formed, each undergoing a training cycle with different programs. The application of a comprehensive methodology—including functional training, plyometrics, and specialized throwing, defensive, and offensive drills—led to a statistically significant improvement in the special physical preparedness indicators of the experimental group. These findings confirm the effectiveness of the proposed approach and demonstrate its practical significance for coaches and instructors at sports schools.
Keywords: combat sambo; special physical preparedness; young athletes; endurance; speed-strength abilities; functional training; pedagogical experiment.

Introduction

In recent years, combat sambo, which combines wrestling and striking techniques, has been gaining popularity among young people. The rising level of competition requires the search for new tools and methods for training athletes. The rational organization of special physical training at the elite level is particularly important, as success in matches largely depends on the athletes' physical conditioning. Analysis of competitive activity has shown that combat sambo fighters reach their peak activity in the third to fourth minute of a bout, after which there is a noticeable decline in performance by the fifth minute [3; 11]. This indicates that approaches to developing special endurance and speed-strength abilities in sambo athletes are insufficiently developed.

Special physical preparation (SPP) is a set of exercises aimed at developing the specific physical qualities an athlete needs to perform successfully in sambo. It involves improving the strength, endurance, flexibility, speed, and coordination required specifically in the sport of sambo. The effectiveness of this SPP component is directly reflected in an athlete's competition results [6; 12]. The objectives of sports schools and Children's and Youth Sports Schools are focused on the comprehensive development of young athletes, including strengthening their health and developing physical qualities such as endurance, speed, power, and coordination [1]. That is why significant attention is paid to the special preparation of sambo athletes in both domestic and foreign literature.

Modern research in the field of Sambo training indicates the need to improve preparation methods. In particular, Gaziev (2022) notes that efforts in Sambo are focused on developing strength and speed capabilities, technical and tactical preparation, and the individualization of training loads [2]. However, the question of the effectiveness of new SFP methods remains open. A number of authors propose using intensive functional training, such as the CrossFit program, to develop the special endurance of Sambo athletes. For example, Osipov et al. (2017) note that CrossFit training allows fighters to recover faster after exertion and significantly increases their level of special endurance [9]. Nevertheless, practical experience and experimental data on the implementation of such methods into the training process of adolescent Sambo athletes are currently limited.

The aim of the study was to develop and test an experimental methodology for improving the special physical preparedness of young athletes engaged in combat Sambo. To achieve this goal, a pedagogical experiment was conducted that modeled the training process in a sports school and evaluated the effectiveness of the proposed methodology.

Methods

The study involved 40 young sambo wrestlers (boys aged 14–16) from urban sports schools. All athletes had at least 2–3 years of experience in sambo and a skill level of Candidate for Master of Sport or higher. The subjects were divided into two equal groups—an experimental group (EG) and a control group (CG) of 20 people each—taking into account age, weight categories, and initial level of physical fitness. No statistically significant differences were noted between the groups in terms of

baseline indicators (height, weight, physical development).

At the beginning of the experiment, the athletes underwent control tests for general and special fitness. The control exercises included: the standing long jump (to assess general explosive strength), the maximum number of pull-ups and push-ups in a fixed time (strength and strength endurance), and specialized tests: the "Special Physical Fitness Test for Wrestlers" (a modified test measuring the number of partner throws over a period of time) and the Sterkowicz Special Judo Fitness Test (SJFT), which is widely used to assess special endurance in combat sports. The SJFT allows for a quantitative assessment of the special endurance level by recording the number of throws performed on partners and the recovery time between sets.

During the preliminary experiment (an 8-week summer training cycle), both groups followed a general sambo program that included general physical and special training. Instead of the two scheduled special physical preparedness (SPP) sessions per week, the experimental group (EG) undertook additional training based on a newly developed methodology. This methodology combined high-intensity circuit exercises and functional training (CrossFit elements) to develop strength endurance and explosive power. It included bodyweight exercises (push-ups, pull-ups, burpees), strength movements with a barbell (squats, bench press, deadlifts) with moderate repetitions, and specially adapted sambo-specific technical exercises (high-speed throws with resistance, the "power slam" exercise, etc.). The EG's program consisted of two additional 1.5–2 hour sessions per week, with an emphasis on speed-strength and functional training modes. The athletes in the control group (CG) continued to train according to the sports school's traditional training plan, with no changes to the SPP section.

The results were compared using data from control tests conducted before the start and after the completion of the experiment. Descriptive statistics and Student's t-test for independent samples were used for statistical analysis. A difference was considered statistically significant at $p<0.05$.

Experiment plan and athlete training design:

Formation of two groups (CG and EG) of 20 people each with equivalent parameters (age, weight, skill level).

Pre-testing: measurement of baseline general strength and endurance indicators, special tests (SJFT, throwing test).

Main phase (8 weeks): EG – two additional functional training sessions per week (CrossFit-style circuit training + strength exercises), CG – regular training as planned. Post-testing: repetition of the same tests. Data processing and analysis.

Results and discussion

Upon completion of the pedagogical experiment, an improvement in physical fitness was observed in the athletes of both groups; however, the increase in the experimental group was significantly higher. For instance, the number of partner throws in the timed SJFT test (special endurance) increased by an average of 25–30% in the EG (from 18 to 22–24 throws), whereas in the CG, the increase was only about 10% (from 18 to 19–20 throws). In the strength endurance tests (maximum number of push-ups in 1 min), EG athletes showed an improvement of 15–18%, while CG athletes improved by 5–7%. In the strength test (pull-ups), the EG improved by 12–15%, and the CG by 4–6%. All the listed differences between the groups were statistically significant ($p<0.05$).

The dynamics of changes in special indicators are clearly reflected in the graphs. shows that the increase in the number of throws in the SJFT was significantly greater in the experimental group than in the control group. illustrates the improvement in the overall SJFT score (reduced total test time) in the EG compared to the CG.

These results correspond with the data from previously conducted studies. Osipov et al. (2018) showed that the use of CrossFit training leads to significantly higher indicators of specific endurance in sambo wrestlers ($p<0.01$) [4]. In their experiment, the athletes in the experimental group recovered significantly better after exertion and performed more throws, which coincides with our observations. Igoshin et al. (2020), in their work with adolescent sambo wrestlers, also found that innovative training methods (similar to those we used) provide a significant increase in general endurance, speed-strength, and strength qualities in the experimental group compared to the control group [5]. The data from these authors confirm the effectiveness of integrating functional training and specialized exercises into the training program of young athletes. (2020) when working

with adolescent sambo wrestlers, it was also revealed that innovative training methods (similar to those we used) ensure a significant increase in general endurance, speed-strength, and strength qualities in the experimental group compared to the control group [5].

Furthermore, our observations are consistent with the findings of Badmatsyrenov (2024) on the morphofunctional characteristics of sambo wrestlers. He demonstrated that wrestlers with a high level of specialized training have a significantly lower percentage of adipose tissue and a higher percentage of bone tissue than their less-trained counterparts ($p<0.05$) [6]. The significant gains in strength and endurance observed in the experimental group in our study could have contributed to a more pronounced development of the corresponding morphofunctional indicators.

A key finding was that in the seasonal tryout competitions (held after the experiment), the athletes in the experimental group demonstrated superior results. This is consistent with the conclusion by Davidenko and Trul (2021) that an increase in sambists' special strength and endurance qualities gave them a competitive advantage and a 53.7% increase in competitive performance efficiency. In our case, the improvement in special physical indicators should facilitate better execution of techniques and help athletes maintain their activity level toward the end of a match [7; 8; 19].

The results obtained indicate the high effectiveness of the experimental methodology for enhancing the special physical training of young sambists. Incorporating intensive functional exercises (CrossFit elements) into the training process, combined with specialized wrestling exercises, significantly accelerated the development of the required qualities [13; 14; 20]. The increase in the number of throws and the improved endurance indicators in the experimental group confirm the validity of the proposed approach. This conclusion aligns with the recommendations of international researchers, who note that a key factor in a sambist's success is their level of special preparedness (especially endurance). In particular, it is known that the inclusion of high-intensity circuit training increases a fighter's recovery speed after exertion, thereby improving their level of special endurance.

It is important to note that specialized strength training in combat sambo is traditionally performed in various modes: eccentric, isometric, concentric, and speed-strength. Our experiment emphasized a combined load, integrating strength exercises with high execution speed and short rest intervals. This training structure allowed for the simultaneous development of maximum strength and strength endurance. The approach by Davidenko and Trul (2021), which alternates eccentric, isometric, and concentric cycles, also confirms that structuring a program by movement phases yields a significant increase in strength performance [3; 17; 18].

On the other hand, when implementing intensive methods, it is crucial to avoid overexertion and injury. Our results show that with proper load dosage (2 additional sessions per week), the EG athletes did not experience significant overload, as their self-reported well-being and the state of their neuromuscular systems remained stable. This is consistent with recommendations [10; 15; 16] that emphasize the need to gradually incorporate new methods into the training process for young athletes, taking into account age-specific characteristics.

Thus, the experiment confirmed that the proposed methodology is significantly superior to the standard training program for developing special physical fitness in combat sambo athletes. The data obtained can be considered when planning training for youth sambo teams: increasing the proportion of functional and specialized exercises yields a tangible improvement in all key physical indicators.

Conclusion

The experiment showed that implementing a comprehensive methodology for special physical training (using intensive functional training and specialized wrestling exercises) leads to a significant increase in the strength and endurance of young sambo athletes. The experimental group, which followed the developed program, demonstrated 15–30% better results in special tests (SJFT and partner throws) and 10–18% better results in general strength fitness compared to the control group. These improvements apparently provided the EG athletes with a competitive advantage. The findings of the study confirm data from other authors: comprehensive methods that include elements of CrossFit and circuit training are effective for enhancing the sport-specific fitness of sambo wrestlers. The results suggest that coaches should incorporate these types of exercises into the training process, particularly during the ini-

tial and basic training stages. For future research, it would be advisable to extend the experiment over a longer period and to study the methodology's impact on the functional parameters (cardiovascular and neuromuscular systems) of sambo wrestlers.

References

Mirakhmedov, F. T. (2017). Organizational and methodological features of athlete training in sports schools. *Molodoy uchonyy*, (12), 581–583.

Gaziev, Sh. Sh. (2022). Improving the technical and tactical training of sambo wrestlers at the stage of in-depth specialization. *Eurasian Journal of Sport Science, 2*(1), 27–31.

Davidenko, I. A., & Trul, A. R. (2021). Experimental substantiation of the methodology of strength training of highly qualified combat sambo athletes during the preparatory period. *Uchenye zapiski Universiteta imeni P. F. Lesgafta*, (5), 106–110.

Osipov, A. Yu., Kudryavtsev, M. D., Ermakov, S. S., & Jagiełło, W. (2018). CrossFit as a means of speed-strength training for highly qualified sambo wrestlers. *Archives of Budo, 14*, 107–116.

Igoshin, V. Yu., Igoshina, N. V., & Antonova, T. V. (2020). Characteristics of methodology of teaching and training teen-age sambo wrestlers. In *Proceedings of the First International Volga Region Conference on Economics, Humanities and Sports* (pp. 785–788).

Badmatsyrenov, G. Kh. (2024). Morphofunctional characteristics of sambo wrestlers with a high level of special physical fitness. *Aktualnye issledovaniya: Fizicheskaya kultura i sport*, (10).

Bolotin, A. E., Zyukin, A. V., Fokin, A. M., & Davidenko, I. A. (2021). Analysis of technical and tactical actions of highly qualified combat sambo athletes. *Teoriya i praktika fizicheskoy kultury*, (6), 12–14.

Davidenko, I. A., Bolotin, A. E., & Sergeev, A. N. (2021). Factors determining the high efficiency of training using combinations of striking and wrestling techniques in combat sambo. *Pedagogiko-psikhologicheskie i mediko-biologicheskie problemy fizicheskoy kultury i sporta, 16* (1), 12–18.

Osipov, A. Yu., et al. (2017). The use of functional training – CrossFit methods to improve the level of special training of athletes who specialize in combat sambo. *Journal of Physical Education and Sport, 17*(3), 2013–2018.

Zezyulin, F. M. (2003). *Sambo: Educational and methodological manual*. Moscow, Russia: Sovetskiy sport.

Sukhoretskiy, V. A., & Tregubov, A. B. (2012). Educational-training program in sambo for youth sports schools (training sessions). *Basketbol v shkole*, (1), 31–37.

Efimov, Yu. A. (2015). *Special physical training of sambo wrestlers (methodological guidelines)*. Kazan, Russia: Kazan State University.

Aksenov, M. O., & Amelin, S. G. (2020). CrossFit as a means of speed-strength training of combat sambo fighters. *Voprosy fizicheskoy kultury i sporta*, (4), 45–50.

Petrosyan, A. A., & Nevzaryan, R. S. (2019). Development of special qualities of sport and combat sambo wrestlers using circuit training. *Zhurnal fizicheskoy kultury, sporta i zdorovya Urala*, (2), 67–72.

Shestakov, A. L., & Murashko, A. A. (2014). *Theory and methodology of sambo*. Moscow, Russia: Flinta.

Korneev, S. K., & Efimov, Yu. A. (2016). *Planning of the educational-training process in sambo*. Penza, Russia: PGUTI.

AUTHOR BIOGRAPHY:



Zafar Ulugbekovich ALLABERGANOV

Employment
Researcher at Urgench state university

Degree
MD

Research interests
sambo, physical education and sport, Theory of physical education, Analyzing of sport competitions