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Analysis of Training Models to Increase Endurance in Sambo Athletes

Daminov Ilkhom Ashiraliyevich [1]

[1] Professor of the Department of Theory and Methodology of Physical Education, Termez State Pedagogical Institute

Abstract:

The article is devoted to the analysis of training models aimed at increasing the endurance of athletes in sambo. The main objective of the study is to evaluate the effectiveness of various training methods that improve endurance indicators, which is a key factor in achieving high athletic results in this sport. The study used experimental and statistical methods, including control measurements of endurance levels before and after the use of various training programs. Parameters such as the duration and intensity of loads, as well as their impact on the general condition of athletes, were analyzed. The results showed that the most effective models are those that combine interval training with elements of functional training. The findings of the study emphasize the importance of an individual approach to choosing a training program that takes into account the physical characteristics of the athlete and his level of training, which allows for a significant increase in endurance and, accordingly, results in competitions.

Keywords: sambo, endurance, training models, sports training, interval training, functional training, physical endurance, sports results, body adaptation, individual approach, strength training, analysis of methods.

Introduction. Endurance is one of the key physical qualities that determines the success of athletes in such complex and intense sports as sambo [3]. Sambo competitions require athletes to be able to withstand high physical and psychological stress for a long time. Insufficient endurance can lead to rapid fatigue, decreased efficiency in performing technical actions and, ultimately, to defeat in the competition [7].

The relevance of the problem of increasing endurance in sambo is confirmed by numerous studies aimed at identifying optimal approaches to the development of this physical quality [1, 2]. There are various training models aimed at increasing endurance, each of which has its own advantages and

disadvantages. However, to date, there is no unified approach to the formation of an optimal training model that takes into account all aspects of training athletes in sambo [3, 4]. The study of this problem remains fragmentary, which complicates the choice of the most effective training methods [8]. Some studies focus on aerobic and anaerobic components of endurance, others - on the specific features of sambo, requiring a combined approach to the development of physical qualities. In this regard, a comprehensive analysis of existing training models aimed at increasing endurance in sambo is necessary in order to identify the most effective methods of training athletes [6, 7, 9].

Literature review. The analysis of training models for improving the endurance of athletes in sambo is based on studies that cover various aspects of training both young and elite athletes. In recent years, the attention of scientists has been focused on identifying the most effective methods suitable for developing endurance and other physical qualities required in sambo [10, 11].

Zh. M. Andasova, A. A. Zhastalapov (2016) in their study consider the special physical training of junior sambo wrestlers, emphasizing the importance of targeted training to improve endurance and develop other key physical qualities. Their work emphasizes that the systematic development of endurance helps to improve the overall physical fitness and performance of athletes.

I. Kh. Boimurodov (2022) examines the development of physical and functional qualities of wrestlers of various weight categories, emphasizing the importance of adapting training models depending on the individual characteristics of athletes. This study highlights that training should take into account the athlete's weight category, which has a direct impact on endurance and physical fitness.

Yu. A. Bakharev and colleagues (2023) focus on improving the specialized physical fitness of high-class athletes in combat sambo. They consider modern training methods aimed at increasing endurance and emphasize the importance of integrating innovative approaches in the preparation of elite athletes.

N. R. Davletova (2020) conducts a comparative analysis of the physical development and fitness of athletes involved in sport and combat sambo. Her research shows that specific training for each type of sambo requires different approaches to developing endurance, which indicates the need to create flexible training models.

I. A. Davidenko (2021) studies training models for combat sambo athletes using combinations of striking and wrestling techniques. He notes that the use of various techniques at different distances requires not only tactical training, but also high endurance, which should be taken into account when developing training programs.

M. K. Umarov and his colleagues (2015) propose using interactive training grounds as a means of increasing the ultimate capabilities of athletes in martial arts. They emphasize that such approaches improve endurance and adapt the athlete's body to high loads.

A. Yu. Kanurny, S. B. Naumov (2022) draw attention to the physical training of young men involved in sambo, and emphasize that early and targeted work on endurance lays the foundation for further athletic achievements.

A. A. Zholdasbay (2017) considers the integration of physical and psychological methods in the development of strength, speed and endurance in young sambo wrestlers, emphasizing the importance of an integrated approach to the training of young athletes. Thus, the existing literature indicates a variety of approaches to endurance development in Sambo, but emphasizes the need for further research to determine the most effective training models that correspond to the specifics of this sport.

Results of the study. 1. Analysis of current training models.

As a result of the analysis of various training models used to improve endurance in Sambo, the main approaches used by coaches and athletes were identified. These include:

- Models based on aerobic training: This approach involves the use of long and medium-intensity loads to improve the overall endurance of athletes. It is actively used in the early stages of training to create a strong aerobic base necessary for performing more complex exercises.
- Anaerobic models: Such programs focus on high-intensity training with short rest intervals. This approach is aimed at developing the body's ability to work under oxygen deficiency conditions, which is extremely important in Sambo, where situations of maximum stress often occur over short periods of time.
- Combined models: Modern research shows that the greatest effect is achieved with a combination of aerobic and anaerobic loads, when the training process includes both long exercises and intense intervals. This approach allows for the development of endurance in a comprehensive manner, taking into account all aspects of competitive activity in Sambo.

2. Effect of different training models on endurance indicators.

The conducted experimental study included groups of athletes training according to different training models. Endurance indicators were assessed by several criteria: general endurance, specific endurance (aimed at performing wrestling techniques), as well as functional indicators, such as heart rate (HR) and blood lactate levels after exercise.

The results showed that:

- Aerobic models provide a stable increase in general endurance, which is confirmed by a decrease in HR after exercise and an increase in the time until fatigue. However, specific endurance, which requires high intensity, developed more slowly.
- Anaerobic models showed high efficiency in developing specific endurance, which was expressed in an increase in the strength and speed of wrestling techniques. However, these models caused a significant accumulation of lactate in the blood, which may indicate a potential risk of overtraining if used incorrectly.
- The combination of aerobic and anaerobic loads resulted in the most favorable conditions for comprehensive endurance development. Participants training using the combined model demonstrated significant improvements in both general and specific endurance. This approach allowed maintaining a balance between aerobic and anaerobic training, which facilitates optimal adaptation of the body to competitive conditions.

3. Comparative analysis of the effectiveness of training models.

Comparison of the data showed that combined training models provide a higher level of endurance compared to the use of exclusively aerobic or anaerobic programs. However, it is important to take into account the individual characteristics of athletes and the stage of preparation.

For young athletes at the stage of forming basic physical qualities, the greatest effect was achieved when using models that emphasize aerobic training with the gradual inclusion of anaerobic loads. For more experienced and professional sambo wrestlers who require high specific endurance to perform complex technical actions, anaerobic and combined models showed the best results.

Discussion. The obtained results indicate that the development of endurance in sambo requires a comprehensive approach that takes into account both aerobic and anaerobic aspects of training. The most effective models were those that combine both of these areas, which allows athletes to develop both general and specific endurance necessary for successful performance in competitions.

Practical application of combined training models can significantly improve the competitiveness of athletes at all levels of training. Coaches are recommended to adapt training programs depending on

the individual needs of athletes and the stage of their training, which is suitable for optimizing the training process and minimizing the risk of overtraining.

These findings confirm the importance of further research aimed at optimizing training models in sambo, which will allow creating more effective training programs focused on developing all aspects of athletes' physical fitness.

Conclusions. Analysis of various training models aimed at improving the endurance of athletes in sambo showed that the best results are achieved using a combined approach combining aerobic and anaerobic loads. This approach ensures the development of both general and specific endurance necessary to perform complex technical actions and maintain high performance throughout the competitive process.

Aerobic models have proven effective in improving general endurance, but their use in isolation may be insufficient to prepare athletes for the high loads typical of sambo. Anaerobic models, on the contrary, contribute to a significant improvement in specific endurance, but at the same time increase the risk of overtraining and require a cautious approach to training planning.

A combined training model, including both aerobic and anaerobic elements, allows you to find a balance between these approaches and most effectively prepare athletes for competitive activities. Coaches are advised to adapt training programs taking into account the individual characteristics of athletes and the stage of their preparation, which contributes to the maximum efficiency of the training process. Further research in this area can be aimed at optimizing specific elements of combined training models, as well as studying their impact on different age and qualification groups of athletes. This will allow the creation of even more effective training programs aimed at achieving high sports results in sambo.

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