ISSN 3060-4567

MODERN TRENDS IN THE DEVELOPMENT OF TECHNICAL TRAINING IN SAMBO WRESTLING

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Abstract. *The article examines modern trends in the development of technical training in sambo wrestling. It is emphasized that at the present stage of combat sports, technical training acquires strategic importance in improving the effectiveness of competitive performance. It is noted that the process of forming the technical mastery of sambo athletes requires a comprehensive approach that includes biomechanical, psychophysiological, and pedagogical aspects.*

Particular attention is paid to such trends as the individualization of the training process, the integration of technical and tactical training, and the use of digital technologies and biomechanical motion analysis. It is noted that the introduction of innovative methods and scientific monitoring makes it possible to optimize the learning process, improve the accuracy and variability of technique execution, and reduce the risk of injuries.

The author concludes that the modern system of technical training in sambo should be based on the principles of scientific validity, adaptability, and awareness, ensuring not only the development of motor skills but also the formation of a creative, tactically-minded athlete.

Keywords: *sambo wrestling, technical training, combat sports, training, innovative technologies, individualization, biomechanical analysis.*

Аннотация. *В статье рассматриваются современные тенденции развития технической подготовки в борьбе самбо. Подчеркивается, что на современном этапе спортивного единоборства техническая подготовка приобретает стратегическое значение в повышении эффективности соревновательной деятельности. Отмечено, что процесс формирования технического мастерства самбистов требует комплексного подхода,*

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включающего биомеханические, психофизиологические и педагогические аспекты.

Особое внимание уделено таким тенденциям, как индивидуализация тренировочного процесса, интеграция технической и тактической подготовки, использование цифровых технологий и биомеханического анализа движений. Отмечается, что внедрение инновационных методик и научного контроля позволяет оптимизировать процесс обучения, повысить точность и вариативность выполнения приемов, а также снизить риск травматизма.

Автор делает вывод, что современная система технической подготовки в самбо должна базироваться на принципах научности, адаптивности и осознанности, обеспечивая не только развитие двигательных навыков, но и формирование творческого, тактически мыслящего спортсмена.

Ключевые слова: *борьба самбо, техническая подготовка, спортивное единоборство, тренировка, инновационные технологии, индивидуализация, биомеханический анализ.*

Sambo wrestling is one of the most dynamically developing types of combat sports, combining a rich cultural and historical heritage with modern scientific and methodological approaches to the training process. Sambo includes two main directions — sport sambo and combat sambo, each of which requires athletes to possess a high level of physical, psychological, and technical readiness. In the modern context of sports development, sambo is no longer limited by national boundaries and is actively integrating into the international sports arena, which necessitates the continuous improvement of athlete training systems based on scientific data and innovative technologies.

The current stage of sambo development is characterized by the increasing complexity of competitive activity: higher bout intensity, changes in competition regulations, greater dynamism and variability of technical actions, as well as growing competition on the international stage. Under these conditions, the level of

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technical mastery becomes the decisive factor in athletic success, determining the effectiveness of a wrestler's physical and tactical performance.

Technical training in sambo represents a multi-level system aimed at the formation, improvement, and stabilization of motor actions that ensure the successful execution of techniques under conditions of high competitive intensity. It encompasses the processes of mastering basic elements, automating motor skills, and developing variability and adaptability of techniques depending on the opponent's style and the specific circumstances of the match.

An important feature of technical training in sambo is its interrelation with other components of athletic mastery — physical, tactical, psychological, and theoretical preparation. Only the comprehensive interaction of these elements allows an athlete to form a stable system of motor and cognitive skills that ensure high performance during competition.

Modern trends in technical training reflect a transition from traditional methods of learning techniques to individualized and scientifically intensive training systems. Digital technologies for motion analysis, biomechanical and video monitoring, biofeedback methods, and pedagogical innovations aimed at increasing the athlete's awareness and independence in the process of technical improvement are beginning to play an increasingly important role.

Thus, the study of modern trends in the development of technical training in sambo wrestling is a relevant scientific task that has not only theoretical but also practical significance. The results of such an analysis can serve as a methodological foundation for optimizing the training process, improving the effectiveness of athlete preparation, and further developing sambo as both a national and international sport.

Theoretical foundations of technical training in sambo wrestling

Technical training in sambo wrestling represents a systematic, multi-level process of forming and improving motor skills and abilities that ensure the effective application of technical techniques in competitive conditions. It is based on the interaction of biomechanical, psychophysiological, cognitive, and pedagogical

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factors, which collectively determine the athlete's level of mastery and performance efficiency.

Modern scientific understanding of technical training is based on the concept of the unity between the motor and cognitive components of motor activity. The mastery of technical techniques requires not only physical readiness but also well-developed mechanisms of sensorimotor regulation, spatial perception, motor imagination, tactical forecasting, and operational thinking. In this context, technique is viewed as a dynamic system that constantly adapts to changing external and internal conditions (Grinev, 2019; Kim, 2021).

Biomechanical foundations of technical training

The biomechanical structure of sambo techniques reflects the principles of rationality, efficiency, and economy of movement. The foundation of successful technical performance lies in the optimal combination of strength, speed, stability, and body balance. Sambo technique is based on the laws of mechanics — levers, moments of force, impulse, and inertia — as well as on the athlete's ability to use the kinematic chains of the body to transfer energy from the point of support to the target of impact (Safonov, 2020).

Modern trends in technical training involve the use of biomechanical analysis methods, video recording, and digital motion modeling, which make it possible to objectively assess the parameters of technique — amplitude, tempo, joint angles, reaction time, and energy efficiency. These data form the basis for individual correction of technique, enhancing the precision and coordination of movements.

Psychophysiological and cognitive aspects

Sensorimotor mechanisms play a leading role in the process of technical improvement. The development of movement coordination, the ability to rapidly switch between motor programs, and precise spatial-temporal differentiation of actions are essential conditions for mastering sambo techniques. The central nervous system plays a key role in this process by integrating visual, proprioceptive, and vestibular information to regulate movement.

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Psychophysiological studies (Schmidt & Lee, 2019; Bloom, 2021) show that the process of learning technical skills is based on the formation of stable motor stereotypes and the development of motor memory. At the early stages of learning, actions are dominated by conscious control, requiring a high level of attention and concentration. At later stages, automation of skills occurs, which allows the athlete to free cognitive resources for solving tactical tasks and adapting to unpredictable conditions of competition.

Moreover, the development of mental resilience and the ability to make quick decisions is of great importance. Under competitive stress, the effectiveness of technical actions is largely determined by the level of self-regulation, emotional stability, and the athlete's ability to maintain motor control under the influence of external stimuli.

Pedagogical principles and methodological approaches

The modern pedagogical concept of technical training in sambo is based on the principles of systematicity, variability, individualization, and awareness of the training process. Technical instruction should take into account the age, functional, and psychophysiological characteristics of athletes, as well as their level of motor and cognitive development.

The principle of gradual learning ensures optimal adaptation of the neuromuscular system to new motor programs, while the principle of variability contributes to the formation of flexible and adaptive motor skills. The use of game-based, problem-solving, and competitive methods stimulates active participation of athletes in the learning process and develops their ability for self-correction and self-analysis of technical actions.

Particular attention is given to the principle of feedback. The use of video recording, biomechanical analysis, and digital simulators allows not only to increase the accuracy of technique assessment but also to foster in athletes a conscious understanding of the structure of their own movements. This approach promotes the development of metacognitive skills — the ability to analyze, predict, and independently correct the execution of techniques.

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Thus, the theoretical foundations of technical training in sambo wrestling reflect a modern interdisciplinary approach, combining the achievements of pedagogy, biomechanics, physiology, and sports psychology. Effective technical training does not involve the mechanical reproduction of techniques, but rather the formation of a holistic system of sensorimotor, cognitive, and tactical mechanisms, ensuring stability and effectiveness of motor performance under conditions of competitive uncertainty.

Modern trends in the development of technical training in sambo wrestling

The modern system of training sambo athletes is aimed at increasing the effectiveness of an athlete's technical arsenal under conditions of growing competition and the dynamic development of combat sports. Technical training is viewed as a comprehensive process that includes the improvement of motor skills, the optimization of biomechanical characteristics of movements, and the formation of stable skills for applying techniques in real match conditions.

1. Individualization of the training process

One of the leading trends in modern sambo is the individualization of technical training, based on the principles of a personality-oriented approach and adaptive training. Modern coaches strive to take into account the morphofunctional characteristics of athletes (height, body mass, flexibility, explosive strength, coordination), neurodynamic parameters (reaction speed, nervous system endurance), and the psychological profile of the fighter (temperament, level of anxiety, motivation, fighting style).

This approach makes it possible to develop personalized programs of technical improvement aimed at shaping an individual fighting style. For example, athletes with pronounced speed–strength readiness master an arsenal of fast attacking techniques, whereas wrestlers with high endurance focus on tactical variants of positional combat. Individualization also manifests itself in the selection of optimal recovery means, motivational strategies, and methods for correcting the psychophysiological state of the athlete.

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2. Use of digital and video technologies

Innovative technologies are becoming an integral part of the modern training process. Video analysis and digital monitoring systems make it possible not only to record and review technical actions but also to conduct qualitative and quantitative analyses of movements. This contributes to a deeper understanding of the biomechanics of techniques, the identification of micro-defects in performance, and the optimization of motor structure.

The use of video recordings, 3D modeling, and visualization software helps athletes develop accurate visual–motor representations of proper technique. As a result, the process of forming stable motor skills is accelerated, while the awareness and variability of technique execution are enhanced. In addition, digital platforms provide opportunities for comparative analysis of an athlete's own actions with those of leading competitors, which strengthens motivation and develops critical thinking.

3. Modeling competitive situations. One of the key directions in improving technical training is the modeling of competitive conditions. During training, game-like and simulated situations are created that closely resemble real matches, taking into account temporal, spatial, and psychological factors. This method contributes to the development of technical adaptability, the ability to make instant decisions, and the application of techniques under uncertain conditions. In addition, modeling allows the coach to develop stress resilience, practice behavior tactics under emotional tension and physical fatigue. This is especially important for the formation of psychomotor stability, without which consistent performance in high-level competitions is impossible.

4. Integration of technical and tactical training. The modern approach to training sambo athletes involves the synthesis of technical and tactical components, reflecting the transition from isolated learning of techniques to the comprehensive development of situation-oriented actions. The technical element is considered a functional unit of tactical intent, which requires a conscious selection of techniques depending on position, tempo, opponent's actions, and the characteristics of the match. This approach promotes the development of the athlete's creative thinking,

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flexibility, and variability in implementing technical solutions. Moreover, the integration of technique and tactics contributes to a deeper understanding of the match structure and forms the athlete's intellectual readiness for quick analysis and prediction of the opponent's actions.

5. Application of biomechanical analysis and scientific monitoring. Modern trends in sports training for sambo are closely linked to biomechanical analysis of movements and the use of scientific monitoring systems. The application of motion sensors, kinematic and force analysis software, and pressure-measuring platforms allows for an objective assessment of the effectiveness of techniques, identification of optimal angles and movement amplitudes, and minimization of injury risks. Biomechanical studies provide a scientific basis for correcting technique and make it possible to predict an athlete's performance. Based on monitoring data, individual corrective exercises are developed to improve specific phases of a technique and increase the overall efficiency of motor activity.

Thus, the modern system of technical training in sambo represents a combination of traditional methods and innovative technologies aimed at the comprehensive development of the athlete as a biopsychosocial system.

Methodological directions for improving sambo techniques. Improving the technical training of sambo athletes is a complex pedagogical process based on the laws of motor learning, biomechanical principles, and the psychophysiological characteristics of athletes. Under modern conditions, the effectiveness of developing technical skills is determined not only by the volume of training work but also by the quality of methodological approaches aimed at developing variability, stability, and awareness in performing motor actions.

1. The principle of gradual complication

One of the fundamental methodological principles of improving technique is the gradual complication of training material. This principle is based on the laws of the step-by-step formation of motor skills (according to P. Ya. Galperin and N. A. Bernstein), which state that mastering a technique goes through a series of

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consecutive stages—from conscious performance of a movement under control to its automated and variable use in a real match situation.

At the initial stage, the athlete masters the basic elements and the phase structure of the technique, paying attention to movement accuracy, posture stability, and coordination with breathing. Then, the exercises are gradually made more difficult by introducing additional stimuli, partner resistance, and changes in tempo and movement amplitude. The final stage involves situational application of the technique under uncertain conditions—during sparring that simulates a real competition.

This methodological approach contributes not only to the mechanical consolidation of movements but also to the flexible transfer of skills to new conditions, which is a key indicator of a sambo athlete's technical mastery.

2. Variability and adaptation of technical actions

Modern training methodology in sambo is based on the principle of variability, which involves developing an athlete's ability to apply techniques in various conditions and against different opponents. Technique in combat sports cannot be static—it must adapt to constantly changing tactical situations.

To develop adaptive technique, exercises with changing environmental parameters are used — such as switching partners with different anthropometric characteristics, varying resistance levels, speed, direction, and body position in space. In addition, the method of psychophysical destabilization is applied — performing techniques after fatigue, under limited vision, or with external noise, which helps develop the stability of motor programs. This approach ensures the formation of a high-level dynamic stereotype, allowing the sambo athlete to execute technical actions flexibly and accurately regardless of external factors or psycho-emotional state.

3. Psychomotor training as the foundation of technical mastery. Psychomotor training in sambo occupies a special place, as the effectiveness of technical actions directly depends on the speed of sensorimotor reactions, the accuracy of spatial perception, and the sense of balance. The development of psychomotor qualities is

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achieved through special exercises aimed at improving reactions to visual and tactile signals, forming a sense of rhythm and distance, and controlling the body under conditions of dynamic balance. Particular importance is given to the development of intermodal connections — the coordination of visual, kinesthetic, and vestibular analyzers. Training tools include elements of coordination gymnastics, balance training, exercises with balls and expanders, as well as work in unstable conditions (on moving platforms or with eyes closed). Thus, psychomotor training becomes the neurophysiological foundation of technical stability, ensuring precision, speed, and fluidity of movements during a match.

4. Integration of general and special physical training. The modern approach to technical and physical improvement in sambo is based on the integration of general and special physical training. Technical mastery is impossible without the development of speed-strength, coordination, and endurance qualities, which form the functional foundation for performing complex motor actions. During training, elements of general physical preparation (GPP) are integrated into specialized exercises — for example, throws with additional weights, holds with extra resistance, or accelerated combinations. Such functionally oriented training ensures the transfer of physical qualities into the structure of technical movements, enhancing their power, accuracy, and stability. Moreover, the integration of GPP and SPP (special physical preparation) helps reduce the risk of injury and improves the efficiency of movements, which is particularly important for high-intensity combat sports.

5. Use of feedback and self-control technologies. One of the most important directions in improving technique is the organization of feedback, which ensures self-monitoring and conscious control of motor actions. In modern practice, video correction, biomechanical analysis, and digital monitoring programs are used to allow athletes to see their own mistakes, track progress dynamics, and adjust their movements accordingly. Particular attention is paid to developing reflective skills in sambo athletes — the ability to analyze their own actions, understand the causes of mistakes, and make independent corrections. The use of feedback fosters a high level

of motor self-regulation, increasing awareness and responsibility for the quality of technical performance. Thus, the application of feedback technologies contributes to the formation of a self-learning training system, where the athlete becomes an active participant in their own development.

Conclusion.

The methodological directions for improving technique in sambo reflect the general trends of modern sports training — the shift from mechanical repetition to conscious and scientifically grounded skill formation. Gradual complication, variability, psychomotor development, the integration of physical and technical preparation, and the use of feedback mechanisms create the conditions for comprehensive growth of sambo athletes' mastery and their adaptation to the demands of contemporary competitive environments.

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