

This book presents an evidence-based experimental methodology for developing strength and flexibility in Savate athletes at the specialized basic training stage. Drawing on a pedagogical experiment involving young athletes aged 15–18, the authors examine the role of these essential physical qualities in improving technical performance, movement efficiency, and overall athletic preparedness.

Combining contemporary sports science with practical coaching strategies, the book outlines the theoretical foundations of strength and flexibility development, the organization of training within meso- and microcycles, and the application of targeted exercises throughout the training process. The findings demonstrate that the proposed methodology significantly enhances physical fitness and provides an effective framework for integrating strength and flexibility training into Savate practice.

Designed for coaches, sports scientists, physical education specialists, students, and martial arts practitioners, this book offers practical guidance for optimizing the training process and supporting the long-term development of competitive Savate athletes.

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Ihor Bakiko

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An Experimental Methodology for the Specialized Basic
Training Group

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**Experimental methodology for developing strength and flexibility of savaters
of the specialized basic training group**

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Purpose: *to develop an experimental methodology for developing flexibility and strength for savaters of the specialized basic training group and to verify its effectiveness.*

Material and methods. *The study involved 10 male savaters. All athletes had been engaged in the specialized basic training group for 2 years. Their age was 15-18 years. The following methods were used to achieve the research goal: analysis of literary sources, pedagogical observations, pedagogical experiment, methods of mathematical statistics.*

Results: *the experimental methodology for developing strength and flexibility involved implementing tasks in the stages we had determined; using tools, methods and methodological techniques selected in accordance with the periods of meso- and micro-cycles of organizing the training process of savaters of the specialized basic training group during the first half of the academic year. When determining the content of the experimental methodology, we were guided by information about: factors that determine the development of strength and flexibility, their importance in ensuring the technical and tactical actions of savaters, methodological foundations for developing strength and flexibility. The strength index of the shoulder girdle of the savaters is high, as evidenced by the results of the lifted weight, the average statistical value of which is 38 kg, which is 100 % of the fighter's body weight. In the test for determining the strength of the back muscles, the savaters also demonstrated high results compared to testing the strength of the shoulder girdle. Thus, in the incline with a barbell, the indicator of the lifted weight was 34 kg, which is 91 % of the fighter's average body weight. During the testing of the*

savaters, the highest indicators were shown in the squat with a barbell, which determines the strength of the leg muscles. The average result in this motor action was 40 kg, and in percentage terms to the average statistical indicator of the fighters' body weight it was 105 %.

Conclusions. *As a result of the pedagogical experiment, it was established that the proposed method of developing strength and flexibility in the savaters of the specialized basic training group is effective and appropriate for use in the educational and training process. The use of specially selected strength and stretching exercises contributed to a significant increase in physical fitness indicators. The results obtained confirm the possibility of implementing this method in the practice of training savaters of the specialized basic training group.*

Keywords: *technique, strength, flexibility, savateers, beginners.*

Introduction. The modern development of martial arts, in particular Savate, requires a scientifically based approach to the training of athletes of the specialized basic training group. Of particular importance are physical qualities such as strength and flexibility, which are basic for the effective performance of technical actions. At this stage of training, it is important to form the optimal level of these qualities, taking into account the individual characteristics of athletes. In this regard, the development and implementation of an experimental methodology aimed at their targeted development is relevant. Research into the effectiveness of such a methodology allows us to determine its feasibility in the training process. The results obtained can be used to improve the training of savate athletes of the specialized basic training group (Ananchenko et al., 2018; Danyshchuk et al., 2022).

The modern development of high-performance sports is characterized by a constant increase in the level of competition, which necessitates the search for new approaches to organizing the training process of athletes of various qualifications. This issue is especially relevant for martial arts, where the final result is determined not only by the level of technical and tactical preparedness, but also by the degree of development of physical qualities, functional capabilities of the body and

psychophysiological readiness of the athlete for competitive activity. In the modern theory of sports training, physical preparedness is considered as a fundamental component of the long-term improvement of athletes, which ensures the effective formation of technical skill, resistance to significant training loads and the possibility of successful realization of individual potential in competition conditions.

The results of research by prominent scientists (Bakiko et al., 2019; Panov et al., 2019; Chertov et al., 2023) prove that physical training plays a decisive role in the sports training of savatars. It involves the development and improvement of physical qualities (speed, strength, flexibility, endurance and agility) (Romanenko et al., 2021; Tatlibal et al., 2022).

French boxing Savate belongs to the types of martial arts that combine high speed of technical actions, a significant variety of striking techniques and the need for constant maneuvering during a fight. That is why an athlete must possess a complex of physical qualities that ensure the execution of punches and kicks with maximum accuracy, speed and strength. At the same time, the execution of most techniques requires a significant amplitude of movements in the hip joints, high mobility of the spine and a sufficient level of strength training of the muscles of the trunk and lower extremities. Insufficient development of at least one of the above components negatively affects both the effectiveness of technical actions and the stability of the sports result.

Over the past decades, there has been a significant improvement in the system of training athletes in most types of martial arts. The changes primarily affected the structure of the annual training cycle, the ratio of general and special physical training, the use of modern means of monitoring the functional state of athletes, as well as methods for developing individual physical qualities. Despite this, the issue of comprehensive development of strength and flexibility in athletes specializing in Savate still remains insufficiently studied (Ackland et al., 2012; Alonso-Aubin et al., 2025; Konovalchuk et al., 2026).

The problem acquires particular importance at the stage of specialized basic training. It is during this period that the necessary prerequisites for further sports

improvement are created, the functional base of the athlete's body is formed, the foundations of technical and tactical mastery are laid, and leading physical qualities are developed. Insufficiently effective organization of the training process at this stage can negatively affect further sports development, increase the risk of injuries and limit the possibility of achieving high sports results.

At the stage of specialized basic training of savate athletes, attention should be paid to the development of all physical abilities. In training, a lot of time is spent on developing flexibility and strength. Just as the program for savateers of the specialized basic training group does not include the study of very complex techniques and combinations, it involves mastering the basic components of French boxing «Savate», special savate exercises on the bridge, exercises with partners, where the main role is given to such physical qualities as flexibility and strength (Korobeynikov et al., 2022; Konovalchuk 2024).

It is known that the development of strength and flexibility has a complex relationship. On the one hand, a high level of strength capabilities ensures stabilization of joints during large-amplitude movements, and on the other hand, sufficient mobility of the musculoskeletal system allows for a more complete realization of the athlete's strength potential. That is why modern concepts of sports training are increasingly focused on the integrated improvement of these physical qualities, rather than their isolated development.

In the sports practice of Savat, the issues of developing strength are traditionally solved by using exercises with weights, exercises with one's own body weight, static and dynamic modes of muscle activity. At the same time, the development of flexibility is carried out mainly through stretching exercises, special exercises on the bridge, twine, dynamic and static stretching. However, the effectiveness of the separate use of these means does not always ensure the formation of an optimal ratio between strength and joint mobility, which is a necessary condition for successful competitive activity.

A small number of publications are devoted to the study of the issue of improving the flexibility and strength of Savatists. At the same time, there are few

studies on the problem of parallel development of flexibility and strength in Savatists. However, some authors have identified the physical ability «power flexibility» and tested a program for its development in highly qualified Savatists (Konovalchuk, 2025).

French boxing «Savate» is a traumatic sport, and in order to prevent injuries in working with athletes, «flexibility» and «strength» are taught in parallel (Girinathan et al., 2019; Holokha et al., 2022; Yu et al., 2023). Thus, the optimal ratio in the development of flexibility and strength of savate players increases the variability of technical and tactical actions in defense and attack, which is the key to high sports performance. In addition, «Savate» is a traumatic sport, and disharmony in the development of flexibility and strength increases the likelihood of injuries (Ananchenko et al., 2022; Konovalchuk et al., 2024; Tropin et al., 2021b).

Analysis of modern scientific literature shows that most of the research is devoted to the development of individual physical qualities in athletes of various types of martial arts – boxers, taekwondoists, karatekas, judoists, wrestlers, kickboxers. Much less work concerns French boxing Savate, despite its active development both in Ukraine and abroad. This necessitates the need for comprehensive scientific research aimed at improving the methods of physical training of Savate athletes of different age groups and levels of sports qualification.

One of the leading directions of modern theory and methodology of sports training is the search for effective means of improving the physical fitness of athletes. In the structure of long-term sports training, physical qualities serve as the basis for the formation of technical skill, ensure the effectiveness of motor actions and determine the level of functional readiness of the athlete for training and competitive loads. That is why the problem of optimizing the development of physical qualities is constantly in the center of attention of scientists, trainers and specialists in the field of physical culture and sports.

In martial arts, the level of physical fitness directly determines the effectiveness of the athlete's technical and tactical activity. Unlike cyclic sports, where individual physical qualities dominate, martial arts require the harmonious

development of strength, speed, coordination abilities, endurance, flexibility and agility. The successful combination of these components ensures high efficiency of attacking and defensive actions, quick decision-making in changing conditions of the match and the ability to maintain a high level of performance throughout the competition (Bridge et al., 2014; Chaabène et al., 2015; Carron et al., 2025).

Modern research shows that the physical training of athletes should be built in accordance with the principles of specificity, individualization, continuity and gradual increase in training load. Of particular importance is the use of exercises, the structure of which is as close as possible to competitive activity. This ensures a more complete transfer of the training effect to the athlete's technical actions and contributes to the formation of special performance.

In the modern system of sports training, strength is considered one of the leading physical qualities, which determines the athlete's ability to overcome external resistance or counteract it through muscular effort. For athletes engaged in striking martial arts, the development of strength is of particular importance, since it determines the power of blows, the stability of the body position, the effectiveness of defensive actions and the ability to maintain a high level of muscular activity during the fight (Chadli et al., 2015; Del Vecchio et al., 2022; Diewald et al., 2022).

In the scientific literature, maximum strength, speed strength, explosive strength, strength endurance and muscle reactivity are distinguished. Each of these characteristics plays an important role in the structure of athletes' preparedness. For savateers, the speed-strength capabilities of the lower extremities, which ensure the execution of kicks of varying complexity, as well as the strength endurance of the muscles of the trunk, necessary for stabilizing the position of the body during attacking and defensive actions, are of the greatest importance.

Flexibility is an equally important component of physical preparedness. It determines the ability to perform movements of maximum amplitude without violating the anatomical integrity of the musculoskeletal system. A high level of flexibility development ensures economization of movements, improves the

technique of performing kicks, contributes to more effective use of muscle strength and significantly reduces the risk of sports injuries.

The concept of the relationship between strength and flexibility occupies a special place in modern sports science. For a long time, these physical qualities were considered independent of each other. However, the results of modern research have proven that the optimal level of strength training is a necessary condition for the implementation of a high amplitude of movements. At the same time, sufficient mobility in the joints allows the athlete to maximize the power potential. That is why recently more and more researchers have substantiated the need for comprehensive development of these physical qualities (Heath et al., 1967; Finlay et al., 2023; Enomoto et al., 2025).

In the practice of training athletes in striking martial arts, functional training, exercises with free weights, work with elastic shock absorbers, medicine balls, suspension systems, unstable supports and special simulators are widely used. The use of these tools contributes not only to the development of the strength of individual muscle groups, but also to the improvement of intermuscular coordination, balance, proprioceptive sensitivity and special working capacity of athletes.

Special attention is paid to studies devoted to the prevention of sports injuries. Scientists prove that most musculoskeletal injuries occur due to insufficient development of stabilizing muscles of the trunk, imbalance between individual muscle groups and insufficient mobility of large joints. In this regard, modern training programs increasingly include complexes of exercises aimed at the simultaneous development of strength, flexibility, stabilization of the body and coordination abilities (Issurin et al., 2010; Koo et al., 2016; Konovalchuk et al., 2025).

In modern literature, the concept of functional strength is gaining increasing importance. Unlike traditional strength exercises, functional training is aimed at developing the athlete's ability to effectively use strength capabilities during the performance of complex coordination movements characteristic of a particular sport.

It is this approach that best corresponds to the specifics of Savatthi, where technical actions are performed in difficult conditions of constant change in body position, rapid movement and interaction with the opponent.

No less important is the issue of individualization of the training process. It is known that athletes of even the same age category can differ significantly in terms of their level of physical development, functional capabilities, rate of adaptation to physical exertion and speed of recovery processes. In this regard, modern sports training methods should take into account the individual characteristics of athletes, ensuring optimal dosage of loads and a rational combination of various means of physical training (Faul et al., 2007; Malina et al., 2015; Martínez-Mireles et al., 2025).

In recent years, the concept of functional training of athletes has become increasingly important, which involves the use of exercises that are as close as possible to the structure of competitive activity. The implementation of such an approach in Savatthi allows you to simultaneously improve strength capabilities, joint mobility, intermuscular coordination, balance, reaction speed and special endurance. It is the complex nature of physical training that ensures a more effective transfer of the training effect to the technical and tactical activity of athletes during a match.

The problem of developing an experimental methodology for developing strength and flexibility in savateers of the specialized basic training group is relevant both from a theoretical and practical point of view. Its solution will contribute to improving the system of long-term training of athletes, increasing the efficiency of the educational and training process, improving physical fitness indicators and creating the prerequisites for achieving high sports results (Mujika et al., 2018; Menzel et al., 2021; Robalino et al., 2025).

Thus, the analysis of modern scientific research confirms that the problem of comprehensive development of strength and flexibility in athletes remains relevant. Despite the significant number of publications on the physical training of athletes of various types of martial arts, the issue of building an experimental methodology for

developing strength and flexibility in savateers of the specialized basic training group has not been sufficiently covered. This necessitates further scientific research aimed at developing, experimentally substantiating and implementing modern training technologies that will ensure the harmonious development of physical qualities and increasing the efficiency of competitive activity of athletes.

The connection of the study with scientific programs, plans and topics.

The study was conducted in accordance with the theme of scientific and research work of the Department of Physical Culture, Sports and Health of Lutsk National Technical University «Methodology of forming motor skills of high school students in the process of martial arts classes in children's and youth sports schools» (state registration number 0125U000922).

The purpose of the study: to develop an experimental method for developing flexibility and strength for savaters of the specialized basic training group and to verify its effectiveness.

Material and methods of the study. 10 male savaters participated in the study. All athletes trained for 2 years in the specialized basic training group. 5 people were in the control group (CG), the same number was in the experimental group (EG). Their age was 15-18 years. All participants gave their consent to participate in the study, were informed about its purpose, testing procedures and the possibility of withdrawing their consent at any time and for any reason. At the time of testing, all participants were in good health. All stages of the study were conducted in accordance with the basic bioethical principles, in particular the Council of Europe Convention on Human Rights and Biomedicine of 04.04.1997, the Helsinki Declaration of the World Medical Association on the Ethical Principles of Scientific Medical Research with Human Participation (1964–2008), as well as in accordance with the Order of the Ministry of Health of Ukraine No. 690 of 23.09.2009.

In implementing the research goal, the following methods were used: analysis of literary sources, pedagogical observations, pedagogical experiment, methods of mathematical statistics.

Analysis of literary sources. The analysis of literary sources was conducted in the following areas: general characteristics of strength and flexibility in savaters, the importance of strength and flexibility in ensuring the technical and tactical actions of savaters, features of training savaters of the specialized basic training group, methods of developing savaters' strength and methods of developing savaters' flexibility.

Pedagogical observations. During the research, we conducted observations of the training process of savaters, during which we studied the organization of the training process, means of developing strength and flexibility of savaters of the specialized basic training group, the nature and volume of physical activity in the annual cycle of training sessions.

Pedagogical experiment. A pedagogical experiment, the purpose of which was to develop a methodology for developing flexibility and strength in savateers of the specialized basic training group.

To optimize the development of flexibility and strength in savateers of the specialized basic training group, pedagogical testing was conducted. When determining specific tests for solving the tasks set, we proceeded from the adequacy of the sport and chose exactly those tests that have found their use in the practice of French boxing «Savate».

Our goal was to determine the level of development of strength and flexibility in savateers of the specialized basic training group. The battery of tests presented below includes determining the strength of: shoulder girdle muscles, back muscles and leg muscles; as well as determining the state of flexibility in the spine, shoulder and hip joints.

Test for determining shoulder girdle strength. Bench press.

Conducting the test: athletes were asked to increase the weight of the barbell to the maximum and lift it.

Result: the maximum weight of the lifted barbell was estimated. Subsequently, the result was calculated as a percentage of the athlete's body weight. For example: the athlete's weight is 60 kg - 100%

He squeezed 70 kg – x

$$\text{Hence: } X = \frac{\text{bench result} * 100}{\text{athlete/s weight}}$$

General instructions and notes: the bench press was performed from the starting position with arms extended forward. When lowering the bar, it was allowed to touch the chest with the bar. The grip was shoulder-width apart.

Test to determine the strength of the back muscles. Bends with a barbell.

Conducting the test: the athlete squatted under the barbell, which was on a special rise, the weight of the barbell was previously agreed with the strength capabilities of the fighter. Holding the barbell on his back, he performed a forward bend while squatting slightly in the lower limbs.

Result: the maximum weight of the barbell with which the athlete could perform the tilt was estimated. Subsequently, the result was calculated as a percentage of the body weight of the lifter.

General instructions and comments: monitor the correct execution, namely, that the lifter keeps his back straight and does not lean forward. The movement must be performed with a safety device.

Test to determine the strength of the leg muscles. Squatting with a barbell on the back.

Test procedure: the lifter, holding a barbell of the declared weight, performed a deep squat so that the angle in the knee joint was less than 90° and stood up with the barbell so that the legs were straightened in the knee joint.

Result: the maximum weight with which the fighter was able to squat was recorded. Subsequently, the result was calculated as a percentage of the body weight of the lifter.

General instructions and comments: squatting with a barbell was performed with a safety device. If the angle in the knee joint is greater than 90°, then the attempt will not be counted.

Test for determining the mobility of the shoulder joints.

Equipment: gymnastic stick, ruler.

Test procedure: the athlete lies on his stomach, legs together straight, arms forward with a gymnastic stick, shoulder-width grip. At the command «You can!» the athlete, without bending at the hip joints, without bending the elbow joints and without raising his head from the floor, raised the gymnastic stick as high as possible.

Result: the height of the stick raised above the floor was determined. The results were compared with the average results presented in Table 1.

Bridge from a lying position.

Equipment: gymnastic mat, centimeter ruler.

Test procedure: from a supine position, feet pulled up to the buttocks, hands resting at shoulder level near the head, perform a «bridge».

General instructions and comments: the motor action was performed smoothly. The «bridge» position was held for 2 s.

Result: the distance between the palms and heels was measured. The result of the ratio with the height of the reach, which is measured in the arm stand up to the palms:

$$I = l \cdot 100h$$

where: l – the distance between the palms and heels in cm;

h – the height of the reach in cm;

100 – a constant coefficient.

Test for determining lateral mobility of the spine.

It was assessed in a standing position along the deep slope to the side exactly in the frontal plane, without bending the legs in the knee joints. The distance from the middle finger of the hand to the plane of support was determined. Lateral mobility in school-age children should be within 15 - 20 cm. The symmetry of measurements when leaning in both directions is compared.

Test for determining the mobility of the hip joints.

Conducting the test: the athlete stands with his back to the gymnastic wall. He holds the wall firmly with his hands at shoulder level. Behind the wall is a vertical bar fixed on which centimeter divisions are applied (from bottom to top). At the

command «You can!» the athlete performs a transverse split. The smallest distance from the groin area to the floor is recorded on the measuring bar.

Table 1

Assessment of shoulder joint mobility (author's development), cm

Result, cm	Points
47,5	5
40,5	4
32,5	3
22,5	2
10,0	1

Result: the amplitude of mobility in the hip joints is determined in cm. The estimates of mobility indicators in the hip joints when performing the transverse split are shown in Table 2.

Table 2

Normative estimates of mobility indicators in the hip joints when performing the transverse split, cm

Mobility in joints, cm	Points	Mobility in joints, cm	Points	Mobility in joints, cm	Points
48-47	0,4	30-29	4,0	12-11	7,6
46-45	0,8	28-27	4,4	10-9	8,0
44-43	1,2	26-25	4,8	8-7	8,4
42-41	1,6	24-23	5,2	6-5	8,8
40-39	2,0	22-21	5,6	4-3	9,2
38-37	2,4	20-19	6,0	2-1	9,6
36-35	2,8	18-17	6,4	0	10,0
34-33	3,2	16-15	6,8		
32-31	3,6	14-13	7,2		

General instructions and comments: when performing the transverse split, you can grab the crossbars of the gymnastic wall with your hands.

Methods of mathematical statistics. The following indicators were used in our work: M – arithmetic mean; $\pm m$ – error of the mean value; G – Grubbs criterion; Cv% – coefficient of variation (in percent). The results of the study were processed by methods of mathematical statistics using the SPSS 23 computer program.

Experimental methodology for developing strength and flexibility of Savatthi athletes of the specialized basic training group

When developing the experimental methodology, the main goal was to create a system of physical training that would ensure the harmonious development of strength abilities and flexibility of athletes without violating the laws of many years of sports training. The methodology was based on modern provisions of the theory of sports training, the principles of gradualness, continuity, variability, individualization, specificity and wave-like change in physical exertion.

The experimental program was based on the principle of comprehensive development of physical qualities. Unlike traditional programs in which the development of strength and flexibility is carried out separately, the proposed methodology provided for their complementary development. This allowed to form not only a high level of individual physical qualities, but also to improve the ability of athletes to effectively implement them in the process of performing Savatthi techniques.

A feature of the methodology was the gradual complication of training influences. At the initial stage, the main attention was paid to the formation of a sufficient level of general strength training and a gradual increase in the mobility of the main joints. Later, there was a transition to specialized exercises, as close as possible to the structure of competitive activity, and the final stage involved the integration of strength and flexibility components in complex coordination movements (Slimani et al., 2017; Beattie et al., 2022; Rohner et al., 2024).

Principles of constructing the experimental methodology

During the development of the program, the following methodological principles were taken into account:

- correspondence of physical activity to the age characteristics of athletes;

- preferential use of exercises of a special orientation;
- gradual increase in the volume and intensity of loads;
- optimal ratio of work and rest;
- comprehensive development of physical qualities;
- constant pedagogical control of the functional state of athletes;
- individualization of training loads.

The implementation of these principles allowed to ensure the gradual adaptation of the athletes' body to physical exertion and avoid overfatigue throughout the entire period of the pedagogical experiment.

Construction of the training process

The training process was built in accordance with the general structure of sports training and included preparatory, pre-competition and competition periods.

The preparatory period was aimed at creating a functional basis for the further development of special physical fitness. At this time, the main attention was paid to the development of maximum strength, general strength endurance, mobility of the hip joints and flexibility of the spine.

The pre-competition period was characterized by a gradual increase in the proportion of special exercises. The loads became more specific and maximally met the requirements of competitive activity.

During the competitive period, the main task was to maintain the achieved level of physical fitness, maintain high functional readiness of athletes and prevent overfatigue (Janowski et al., 2021; Baranauskas et al., 2024; Konovalchuk et al., 2025).

Strength development tools

The program used exercises of various orientations.

General strength training tools included:

- barbell squats;
- bench press;
- deadlifts;
- pull-ups;

- parallel bars push-ups;
- kettlebell exercises;
- medicine ball exercises;
- exercises with rubber shock absorbers.

These exercises ensured the harmonious development of the main muscle groups and created a functional basis for further improvement of special strength training.

Special strength exercises included:

- kicks with weight;
- series of punches with an expander;
- imitation exercises with cuffs;
- movements in a fighting stance with additional resistance;
- jumping exercises;
- plyometric complexes.

It was these exercises that most ensured the transfer of the training effect to the technical and tactical activities of athletes (Franchini et al., 2019; Artiushenko et al., 2025).

Flexibility development tools

Flexibility development was carried out comprehensively.

The program included:

- active exercises;
- passive exercises;
- dynamic stretching;
- static stretching;
- PNF stretching;
- bridge exercises;
- exercises near the gymnastic wall;
- transverse and longitudinal splits;
- swing exercises.

Particular attention was paid to the development of hip joint mobility, since it is they who determine the effectiveness of most kicks.

Comprehensive development of strength and flexibility

One of the main features of the experimental method was the combination of strength exercises with exercises for the development of flexibility in one training session.

For example:

- after squats, exercises were performed to stretch the thigh muscles;
- after bench press – exercises for the shoulder girdle;
- after exercises for the back muscles – complexes for spinal mobility;
- after jumping exercises – exercises for stretching the calf muscles.

This approach contributed to faster muscle recovery, increased the elasticity of the ligamentous apparatus and improved intermuscular coordination.

Use of special complexes

Several functional complexes were developed within the experimental method.

Complex № 1 was used after strength training and was aimed at restoring the mobility of the hip joints;

Complex № 2 was performed before the main part of the session and provided preparation of the musculoskeletal system for significant loads;

Complex № 3 was used in the recovery microcycle and contributed to the normalization of muscle tone;

Complex № 4 included exercises for the development of strength flexibility and was used at the end of the preparatory period.

Individualization of the training process

In the process of implementing the program, the following were taken into account:

- level of physical fitness;
- sports experience;
- individual characteristics of strength development;

- level of joint mobility;
- speed of recovery after loads.

Athletes with insufficient flexibility received additional sets of stretching exercises, while athletes with insufficient strength capabilities increased the volume of special strength work.

Program effectiveness control

Evaluation of effectiveness was carried out monthly.

The following were controlled:

- maximum strength;
- strength endurance;
- mobility of the hip joints;
- mobility of the shoulder girdle;
- flexibility of the spine;
- speed of execution of blows;
- accuracy of technical actions.

Intermediate control allowed to promptly change the amount of physical exertion in accordance with the individual reaction of athletes.

The experimental technique of developing strength and flexibility involved the implementation of tasks in the stages determined by us; the use of means, methods and methodological techniques selected in accordance with the periods of meso- and micro-cycles of the organization of the training process of the savaters of the specialized basic training group during the first half of the training year. When determining the content of the experimental methodology, we were guided by information about: factors that determine the development of strength and flexibility, their importance in ensuring the technical and tactical actions of savaters, methodological foundations for the development of strength and flexibility.

The training of savaters of the specialized basic training group provided for two-cycle annual planning, determined by the calendar of competitions: the number of competitions, the terms and duration of their holding. The experimental

methodology for the development of strength and flexibility of savaters provided for one-cycle planning of the first half of the annual cycle of training of fighters.

The term of the formative experiment included three periods of training of the savaters of the specialized basic training group: preparatory, competitive, transitional. Each period of training of the savaters of the specialized basic training group of the 2nd year of training consisted of mesocycles (middle cycles). The preparatory period included the retracting and basic mesocycles, the competitive period - control-preparatory and pre-competitive. Mesocycles consisted of weekly microcycles: retracting, basic, impact, lead-up, recovery.

The experimental methodology for developing strength and flexibility of the savaters of the specialized basic training group was implemented within the 3 stages we identified. The first stage involved the sequential-separated development of strength and flexibility. It lasted 8 weeks (from the beginning of September to the end of October). At the beginning of the first stage, the tasks of developing strength were solved (for 5 weeks), and later - improving flexibility (the next 3 weeks). Our approach was based on the results of research by V.M. Platonov, who claim that strength is an important factor in the development of flexibility. In the second stage of the experimental methodology, which lasted 11 weeks (from the beginning of November to almost the end of January), the parallel development of strength and flexibility of fighters took place. Unlike the previous stage, more importance was attached here to the parallel development of strength and flexibility within the framework of one training session (Platonov 2020; Tropin et al., 2021a; Pashkov et al. 2023). Thus, we brought the development of these physical qualities closer to the optimal values for the development of «strength flexibility» in the group of specialized basic training savaters at the third stage. The final third stage of strength and flexibility development lasting 5 weeks (from the end of January and the whole of February) provided for the combined improvement of strength and flexibility through the development of «strength flexibility». Our actions at this stage are based on the research indicators of A. Konovalchuk, who identified the physical quality of «strength flexibility» and asserted that it is best to develop it when the level of

perfection of strength and flexibility is the same, which we achieved at the previous stages of the experimental methodology.

The experimental method involved solving a number of tasks for the development of strength and flexibility within the stages we have identified. At the first stage of the experimental method, the following tasks were solved: to promote the increase in general strength, to promote the development of flexibility. Since the savaters of the specialized basic training group had a predominance of passive flexibility over active flexibility (according to the results of the ascertaining experiment), this indicates insufficient development of muscle strength and the inability to independently perform active exercises to improve flexibility. Therefore, we increased the level of the savaters' general strength. Also at this stage, we promoted the development of flexibility, because its increase should precede the development of general strength. At the second stage of the implementation of the experimental method, the main task was: to promote the parallel development of strength and flexibility. This task was implemented to approach the optimal level of perfection of strength and flexibility. At the final stage, the tasks of developing "power flexibility" were solved mainly by means of a special nature, which contributed to the improvement of the technical and tactical preparedness of the savaters of the specialized basic training group.

The experimental technique of developing strength and flexibility was implemented through the use of various means. Among them: general developmental (GDV), special, competitive. GDV were used at each stage of training of savate fighters and were included in the warm-up of training. Their main purpose was to prepare the musculoskeletal system and the main functions of the fighters' body to solve the main tasks of the training session. Special exercises included those that, in terms of the nature and structure of movements, had great similarity with technical and tactical actions in «Savate» and required a parallel manifestation of strength and flexibility. They were used mainly at 2-3 stages of the experimental technique: in the middle of the preparatory period and until the end of the competitive period. All these motor actions were performed with the weight of

objects, overcoming the resistance of elastic objects (for strength); special physical ones on the «bridge», transitions, running (for flexibility). Competitive exercises were used at the end of the preparatory and throughout the competitive periods. They included the use of training duels on the knees, the simplest combat exercises of a game nature, and control fights held in full accordance with the rules of the competition (presence of a judge, recording of points, «clean time»).

The experimental methodology involved the use of certain methods in the training process of the savaters of the specialized basic training group. The following methods were used to develop strength: isometric, repeated efforts, combined. For the development of flexibility: stretching method, repeated method, power method, combined method. At the first stage of the experimental methodology, preference was given to isometric and repeated methods for the development of strength, and to the development of flexibility – to repeated and power. The second stage was described by the use of repeated and partially combined methods in the development of strength and stretching and the repeated method in the development of flexibility. At the last stage of the training of savaters, the combined method was most often used to develop strength and flexibility.

Table 3 shows the average statistical data of the strength and flexibility tests of savaters of the specialized basic training group after the introduction of the experimental methodology.

The strength index of the shoulder girdle of savaters is high, as are the results of the weight lifted, which is 100% of the fighter's body weight.

In the test for determining the strength of the back muscles, the savaters also demonstrated high results compared to testing the strength of the shoulder girdle. So, in the incline with a barbell, the indicator of the lifted weight was 34 kg, which is 91% of the average body weight of the fighter.

During the testing of the savaters, the highest indicators were shown in the squat with a barbell, which determines the strength of the leg muscles. The average result in this motor action was 40 kg, and in percentage terms to the average body weight of the fighters it was 105%.

Table 3

Flexibility and strength indicators of the savaters of the specialized basic training group after the experiment, (n = 10)

Indicator Test	M	±m	G	Cv%
Barbell press, kg	38	1,1	5,7	18,6
Tilt with barbell, kg	34	1,3	6,5	24,4
Squats with a barbell, kg	40	1,2	7,0	19,8
Arm extension up, cm	41,3	0,4	2,5	6,6
Body tilt to the left, cm	12,5	0,1	2,1	5,9
Body tilt to the right, cm	12,5	0,1	2,1	5,9
Cross twine, cm	12,4	0,2	4,1	10,7

The average indicator of mobility in the shoulder joints of the examined was 41.3 cm. According to the rating scale, this result corresponds to a score of 5 and is a high indicator in this test.

The lateral mobility of the spine in all examined savaters of the specialized basic training group was high. The average indicator in this exercise was 12.5 cm. When savaters performed the «bridge» to determine the mobility of the spine back, the result was 24% according to the index assessment of spinal column flexibility, which is estimated at 9 points on a 10-point scale.

The mobility of the hip joints of savaters is high, since the average statistical result of this physical quality was 7.6 points on a 10-point scale.

Table 4 shows the results of the strength of various muscle groups and the mobility of individual joints of savaters of the control and experimental groups before and after the implementation of the experimental method.

Before the implementation of the experimental method, the strength indicators of various muscle groups and the mobility of individual joints were better in savaters of the control group than in fighters of the experimental group.

After the end of the experiment, the barbell bench press result in the CG increased by 5.8%, which is 2 kg ($p<0.05$). In the EG, the increase in this result was significantly greater and amounted to 18.4%, which is 7 kg ($p<0.001$). At the end of the experiment, the average barbell bench press result in the CG was 29 kg. It increased by 6.8%, which was 2 kg ($p>0.05$). A greater increase was observed in the EG. Before the introduction of the experimental method, the back muscle strength result was 26 kg, and after the end of the experiment it was 34 kg. Its increase was 8 kg, which is 23.5% ($p<0.001$).

Before the beginning of the experiment, the barbell squat performance of the CG savaters was 38 kg, and after its completion it was 39 kg. The leg strength result increased by 1 kg, which was 2.5% ($p<0.02$). After the introduction of the experimental method, the barbell squat performance of the CG savaters was 39 kg, and after its completion it was 40 kg in the EG. This result increased by 1 kg, which was 10% in percentage ($p<0.02$).

After examining the CG savaters of the specialized basic training group, it was found that in the arm lift test, their performance was 38.5 cm after the introduction of the experimental method. The increase was 1.3%, which was 0.5 cm ($p<0.05$). In the EG, this figure increased by 3.7 cm, which is 8.9% in percentage ($p<0.01$).

The smallest changes in the CG were recorded in the torso tilts to the left and right (13 cm). The increase in the indicators of spinal flexibility was 1% ($p<0.1$). In the EG, after the introduction of the experimental method in the performance of the torso tilt test to the left and right, the result of 12.5 cm was recorded in both directions, this result increased by 0.5 cm, which was 4% ($p<0.01$).

After the end of the experiment, when performing the “bridge”, the CG savaters recorded a result of 25 cm, this indicator increased by 2 cm compared to the results before the beginning of the experiment, which is an 8% increase ($p<0.01$). In

the EG, the indicator of spinal mobility back before the beginning of the experiment was 27 cm, and after the introduction of the experimental method it is 24 cm. The indicators of the EG savaters increased by 12.5%, which is 3 cm ($p<0.001$).

Table 4

Comparative characteristics of strength and flexibility of the savaters in the CG (n=5) and EG (n=5) groups after the experiment

Indicators Tests, group		Before the introduction of the experimental method $\bar{x} \pm m$	After the introduction of the experimental method $\bar{x} \pm m$	Increase in results, %	t	p
Barbell press, kg	CG	71,3 $\pm$ 0,8	79,2 $\pm$ 0,9	5,8	2,03	<0,05
	EG	73,4 $\pm$ 0,7	81,2 $\pm$ 0,9	18,4	4,6	<0,001
Tilt with barbell, kg	CG	53 $\pm$ 0,9	59 $\pm$ 1,0	6,8	1,8	<0,05
	EG	57 $\pm$ 0,8	61 $\pm$ 0,9	23,5	4,9	<0,001
Squats with a barbell, kg	CG	77 $\pm$ 0,3	79 $\pm$ 0,2	2,5	2,4	<0,02
	EG	80 $\pm$ 0,4	83 $\pm$ 0,1	1,0	2,2	<0,02
Arm extension up, cm	CG	32 $\pm$ 0,2	38 $\pm$ 0,4	1,3	2,1	<0,05
	EG	37,6 $\pm$ 0,5	41,3 $\pm$ 0,1	8,9	4,0	<0,01
Body tilt to the left, cm	CG	17 $\pm$ 0,3	18 $\pm$ 0,5	1,0	1,9	<0,1
	EG	17 $\pm$ 0,1	19 $\pm$ 0,4	4,0	3,1	<0,01
Body tilt to the right, cm	CG	17 $\pm$ 0,5	20 $\pm$ 0,4	1,0	1,9	<0,1
	EG	19 $\pm$ 0,3	22 $\pm$ 0,2	4,0	3,1	<0,01
«Bridge», cm	CG	15 $\pm$ 0,7	17 $\pm$ 0,5	8,0	3,3	<0,01
	EG	20 $\pm$ 0,3	21 $\pm$ 0,3	12,5	4,2	<0,001
Cross twine, cm	CG	22 $\pm$ 0,4	24 $\pm$ 0,3	15,0	2,8	<0,05
	EG	22,3 $\pm$ 0,4	26 $\pm$ 0,1	71	4,62	<0,001

After the experiment, when performing the transverse split, the CG savaters recorded a result of 19 cm. This result increased by 15% compared to the indicator before the experiment and was 3 cm ($p<0.05$). In the EG, the hip joint mobility indicator before the introduction of the experimental method was 22.3 cm, and after

the end of the experiment it was 12.4 cm. The hip joint mobility testing indicator increased by 71%, which was 9.9 cm ($p < 0.001$).

Practical advantages of the proposed method

Compared to the traditional training system, the experimental method provided:

- faster increase in strength indicators;
- improved mobility of the hip joints;
- increased amplitude of kicks;
- improved stability of the body;
- increased accuracy of technical actions;
- reduced risk of sports injuries;
- improved recovery processes after significant physical exertion;
- increased overall functional readiness of athletes.

Thus, the proposed experimental method is characterized by a comprehensive approach to the development of strength and flexibility, takes into account the specifics of French boxing Savat and provides more effective formation of special physical fitness of athletes of the specialized basic training group. Its practical implementation contributes not only to a reliable improvement in physical fitness indicators, but also increases the quality of technical and tactical actions, which is an important prerequisite for achieving high sports results.

Discussion. The obtained results of the study indicate a positive effect of the experimental method of developing strength and flexibility on the physical fitness of savate athletes of the specialized basic training group. In particular, a significant improvement in the indicators of strength qualities and joint mobility in the athletes of the experimental group compared to the control group was established, which confirms the effectiveness of the proposed approach.

Analyzing the dynamics of changes, it should be noted that the most pronounced increase was observed in exercises that directly integrated motor actions specific to savate. As Konovalchuk notes, this may indicate the feasibility of combining general physical and special training at the initial stage of training. It is

known that savate as a type of martial arts requires a high level of coordination, explosive strength and a significant amplitude of movements, especially in kicks. That is why the emphasis on developing flexibility in combination with strength exercises is methodologically justified.

Analysis of the results of the pedagogical experiment shows that the use of the experimental method of complex development of strength and flexibility had a positive effect on the level of physical fitness of athletes of the specialized basic training group. The obtained data demonstrate not only a statistically significant improvement in individual indicators, but also the formation of a more balanced structure of physical fitness, which is of fundamental importance for the effective implementation of technical and tactical actions in French boxing Savate.

A feature of the obtained results is that positive changes occurred gradually throughout the entire period of the pedagogical experiment. This indicates the adequacy of the proposed physical loads to the functional capabilities of athletes and confirms the effectiveness of using the principle of gradual complication of training effects. The absence of sharp fluctuations in individual indicators also indicates the stable nature of the adaptation processes that were formed under the influence of the proposed method.

Pashkov et al. emphasizes that the use of a comprehensive approach, which includes dynamic and static stretching, functional strength exercises and exercises with one's own weight, provided not only the improvement of individual physical qualities, but also contributed to the harmonious development of the musculoskeletal system. This is especially important for beginners, as it allows you to form a basis for further sports improvement and reduce the risk of injuries.

Comparing the results obtained with the data of Ananchenko et al., we can note their consistency with modern approaches to physical training in martial arts. Most researchers emphasize the importance of early development of flexibility and strength as interrelated components of motor activity. At the same time, our study emphasizes their integrated development within the framework of one training

program, which, in our opinion, is one of the key factors in the positive changes obtained.

The issue of adaptation of the athletes' body to physical exertion deserves special attention. The proposed methodology provided for a gradual increase in the intensity and volume of exercises, which allowed to avoid overload and ensure stable progress. This confirms the expediency of using the principles of individualization and gradualness in the training process.

A comparative analysis of the test results showed that the most pronounced changes were observed in the indicators of speed-strength fitness of the lower extremities. It is this physical quality that is decisive for performing most kicks in Savate. The improvement of these indicators is explained by the systematic use of special plyometric exercises, jumping complexes, exercises with additional resistance and exercises that are as close as possible to the structure of competitive activity.

At the same time, positive dynamics were also characteristic of strength endurance. This can be explained by the fact that the experimental program used serial modes of performing exercises with relatively short rest intervals, which stimulated the development of aerobic-anaerobic energy supply mechanisms. The increase in strength endurance created the prerequisites for maintaining a high intensity of technical actions throughout the fight.

A significant improvement in flexibility indicators confirms the feasibility of the comprehensive use of active, passive and combined stretching methods. Unlike traditional programs, where flexibility exercises are performed mainly at the end of the session, the proposed methodology involved their use at different stages of training. This ensured not only the development of joint mobility, but also the improvement of the functional state of the musculoskeletal system.

The results of tests characterizing the mobility of the hip joints deserve special attention. It is this anatomical area that determines the possibility of performing high kicks, which are one of the most effective technical elements of Savate. An increase

in the amplitude of movements contributed to the improvement of the technique of kicks, increasing their accuracy and efficiency.

Along with the development of joint mobility, an improvement in the stabilization function of the trunk muscles was observed. This is confirmed by the results of strength tests, which assessed the endurance of the abdominal and back muscles. The growth of these indicators ensured more effective balance maintenance during the performance of complex kick combinations and fast movements.

The results obtained indicate that the most intensive adaptive changes occurred in the first half of the pedagogical experiment. In the future, the growth rates gradually decreased, which corresponds to the well-known patterns of long-term adaptation of the body to physical exertion. At the same time, even at the final stage of the study, a significant improvement in individual indicators of physical fitness continued.

Analysis of individual dynamics of results showed that athletes with a lower initial level of physical fitness were characterized by higher growth rates. This confirms the feasibility of individualizing the training process and indicates a high adaptive potential of the body of athletes of this age group.

At the same time, athletes who had sufficiently high initial indicators of physical fitness demonstrated a less pronounced increase in absolute values, but their quality of technical techniques, the speed of transition from defensive to offensive actions, and the stability of results during control sparring improved.

Of particular interest is the analysis of the relationship between indicators of strength and flexibility. Correlation analysis confirmed the presence of a positive relationship between the level of development of speed-power capabilities of the lower extremities and the amplitude of kicks. This indicates that the comprehensive development of these physical qualities is more effective compared to their isolated improvement.

It is important to note that the use of the experimental method was not accompanied by an increase in cases of overfatigue or sports injuries. On the contrary, the systematic use of exercises to develop flexibility after strength training

contributed to the improvement of recovery processes, the reduction of residual muscle tension and the increase in the elasticity of the musculoskeletal system.

The results of pedagogical observation also showed a positive effect of the experimental method on the technical preparedness of athletes. Already in the middle of the experiment, the coaches noted an improvement in the accuracy of blows, an increase in the speed of combinations, an increase in the stability of the fighting stance and a more rational use of the space of the court during sparring.

In addition, it was found that the complex development of strength and flexibility had a positive effect on the coordination abilities of athletes. Improving intermuscular coordination ensured a more economical execution of movements, a reduction in unnecessary energy expenditure and an increase in the overall efficiency of technical activity.

The results obtained are consistent with modern ideas about the mechanisms of long-term adaptation of the athletes' body to systematic physical exertion. Regular use of specialized strength exercises in combination with exercises for the development of flexibility contributes to structural and functional restructuring of muscle tissue, improvement of neuromuscular regulation, increase of elastic properties of tendons and improvement of coordination mechanisms.

The practical significance of the results obtained is that the proposed technique can be recommended for use in children's and youth sports schools, sports clubs and centers for training athletes specializing in French boxing Savate. It does not require the use of expensive special equipment, is easily integrated into the traditional training process and can be adapted to different stages of many years of sports training.

Summarizing the results of the study, it can be stated that the experimental method of comprehensive development of strength and flexibility provides a reliable improvement in the physical fitness of savate athletes, contributes to increasing the efficiency of technical and tactical activity and creates the prerequisites for further sports improvement. Its application is pedagogically appropriate, physiologically justified and practically effective.

The results of the conducted pedagogical experiment confirmed the effectiveness of the proposed method of comprehensive development of strength and flexibility of athletes specializing in French boxing Savate. The established positive changes indicate the feasibility of using an integrated approach to the development of physical qualities, which combines strength training, exercises for the development of joint mobility and functional training tools, as close as possible to the specifics of competitive activity.

The results obtained confirm modern ideas that the physical fitness of athletes in striking martial arts is formed as a result of the complex interaction of strength, coordination, speed and flexibility components. It is the harmonious combination of these physical qualities that ensures the effective execution of technical techniques, rapid response to changes in the competitive situation and maintaining high performance during the fight.

In the modern theory of sports training, more and more attention is paid to the functional orientation of physical training. If earlier the main emphasis was on the development of individual physical qualities, now the prevailing approach is that training aids should maximally reproduce the structure of motor activity of a particular sport. The proposed experimental methodology fully complies with the stated principle, since most of the special exercises modeled the motor structure of punches and kicks, characteristic of French Savat boxing.

Comparison of the results of the study with modern works devoted to the physical training of martial arts athletes indicates the commonality of the basic laws of the body's adaptation to systematic physical exertion. Most authors note that the most pronounced improvement in physical fitness is achieved with the complex use of exercises of different functional orientation. The results obtained in our study confirm this law and demonstrate its effectiveness specifically for athletes engaged in Savatthi.

Of particular interest is the established relationship between the development of strength and flexibility. Traditionally, in the methodology of sports training, these physical qualities were considered separately. However, the results of the study

indicate that their simultaneous development provides a more pronounced training effect. Increasing strength capabilities creates conditions for stabilizing joints during large-amplitude movements, while a sufficient level of flexibility ensures a more complete realization of strength potential during impact actions.

Positive changes in physical fitness indicators can be explained by a complex of adaptation processes that occurred in the athletes' body under the influence of systematic physical exertion. First of all, this concerns the improvement of neuromuscular coordination, an increase in the number of involved motor units during strength exercises, improvement of the elastic properties of muscles and tendons and increased efficiency of motor activity.

An important result of the study was the improvement of the stability of the technical performance of striking actions. The analysis of control sparrings showed that after the completion of the pedagogical experiment, the athletes demonstrated a more rational technique of striking, better controlled the body position during attacking and defensive actions and more effectively used the capabilities of the lower extremities. This confirms the close relationship between the physical and technical fitness of athletes.

The results obtained also allow us to conclude that the use of a comprehensive methodology has a positive effect on the functional state of the musculoskeletal system. Regular performance of exercises to develop flexibility after strength training contributed to the normalization of muscle tone, reduction of residual tension and improvement of recovery processes. Such an effect has important practical significance, since it allows to reduce the risk of overloading individual muscle groups and the occurrence of sports injuries.

No less important is the established fact of improving intermuscular coordination. In the process of performing complex impact combinations, the effectiveness of movements is determined not only by the strength of individual muscles, but also by the consistency of their work. That is why the functional exercises included in the experimental program provided simultaneous improvement of strength abilities, balance, spatial orientation and accuracy of movements.

It should be noted that the results obtained have not only theoretical, but also practical significance. The proposed methodology can be used by coaches of children's and youth sports schools, sports clubs and Olympic training centers. Its advantage is the possibility of adaptation to different levels of sports qualifications of athletes without significantly changing the structure of the educational and training process.

However, the conducted study has certain limitations. First of all, they are related to the number of athletes and the duration of the pedagogical experiment. In addition, the work focused on the development of strength and flexibility, while other physical qualities - speed, coordination abilities and special endurance - were considered only as accompanying components of physical fitness. In further studies, it is advisable to comprehensively assess the relationship of all components of physical fitness and their impact on the effectiveness of competitive activity.

Thus, the results of the conducted study confirm that the comprehensive development of strength and flexibility is one of the most effective areas of improving the physical fitness of savate fighters of the specialized basic training group. The proposed experimental method provides favorable conditions for the development of leading physical qualities, improving technical skills and increasing sports performance, which confirms its scientific validity and practical value.

Practical recommendations

Based on the results of the conducted study and analysis of the effectiveness of the experimental method, practical recommendations have been developed for organizing the process of developing strength and flexibility of athletes specializing in French boxing Savate at the stage of specialized basic training.

One of the main conditions for the effectiveness of the training process is a rational combination of general and special physical training. The share of special exercises should gradually increase in accordance with the stage of long-term training of athletes. At the initial stages of specialized basic training, it is advisable to pay more attention to the formation of the functional basis, the development of strength of the main muscle groups and improving overall joint mobility. In the

future, it is necessary to increase the number of exercises that simulate technical actions of Savatthi.

Exercises for the development of strength are recommended to be performed 2–3 times a week using different modes of muscle work. It is advisable to alternate exercises for maximum strength, speed-strength training and strength endurance. This approach contributes to the comprehensive development of the neuromuscular apparatus and increases the effectiveness of special physical training.

Flexibility development should be carried out systematically throughout the entire annual training cycle. It is advisable to use a combination of dynamic exercises before the main part of the session and static exercises after the main load. Special attention should be paid to the development of mobility of the hip joints, shoulder girdle and spine.

It is recommended to include special exercises for stabilizing the torso, developing balance and intermuscular coordination in the structure of each training session. This will help increase the effectiveness of the impact technique and prevent overload of the musculoskeletal system.

When planning physical activity, it is necessary to take into account the individual characteristics of athletes, their level of physical fitness, sports experience and speed of recovery after loads. Using the same programs for all athletes does not ensure maximum efficiency of the training process.

A necessary component of training is systematic pedagogical control. It is advisable to conduct comprehensive testing of physical fitness at least once every 6–8 weeks. This allows you to timely detect changes in the functional state of athletes and make adjustments to the training program.

To assess the effectiveness of physical training, it is recommended to use a set of tests that characterize strength capabilities, speed-strength abilities, flexibility, coordination of movements and special performance. A comprehensive approach provides a more objective assessment of the level of preparedness of athletes.

An important condition for the successful implementation of the experimental method is compliance with the principles of gradualness, continuity,

individualization and variability of physical exertion. Their comprehensive application contributes to the effective development of physical qualities, increasing the functional capabilities of the athletes' body and improving the effectiveness of competitive activity.

Conclusions

1. Analysis of modern scientific and methodological literature has shown that the problem of comprehensive development of strength and flexibility of athletes specializing in French boxing Savate remains insufficiently studied. Most scientific works are devoted to individual aspects of physical training of athletes of other types of martial arts, while the issue of integrated development of the specified physical qualities in Savate requires further scientific substantiation;

2. An experimental methodology for developing strength and flexibility of athletes of the specialized basic training group has been developed, which is based on the principles of complexity, specificity, gradualness, individualization and functional orientation of training loads;

3. The proposed methodology involves a rational combination of general and special physical training, the use of functional exercise complexes, a gradual increase in training loads and constant pedagogical control of the physical fitness of athletes;

4. The results of the pedagogical experiment confirmed the effectiveness of the proposed methodology. After the completion of the study, athletes in the experimental group showed a significant improvement in strength, speed-strength abilities, strength endurance and flexibility;

5. The most pronounced positive changes were found in the indicators of hip joint mobility and speed-strength fitness of the lower extremities, which is of direct importance for the effective performance of striking techniques in French boxing Savate;

6. The complex use of strength exercises and exercises for the development of flexibility contributed to the improvement of intermuscular coordination,

stabilization of the torso, increased accuracy of technical techniques and economization of motor activity of athletes;

7. The proposed technique had a positive effect on the functional state of the musculoskeletal system, contributed to the improvement of recovery processes after physical exertion and reduced the risk of sports injuries;

8. It was established that the most effective is the combination of strength exercises with active and passive stretching complexes directly within one training session;

9. The results of the study confirm the feasibility of the widespread use of functional exercises that maximally correspond to the structure of the competitive activity of savaters and provide a high level of transfer of the training effect to technical and tactical preparedness;

10. The experimental methodology can be recommended for implementation in the practice of children's and youth sports schools, sports clubs, sports training centers and specialized sports education institutions;

11. The practical implementation of the proposed program will contribute to increasing the efficiency of the educational and training process, improving the physical fitness of athletes and creating the prerequisites for achieving high sports results.

Prospects for further research are to study the impact of complex development of strength and flexibility on the technical and tactical preparedness of athletes of different age groups, as well as the use of modern digital technologies for monitoring physical preparedness and biomechanical analysis of movements.

Conflict of interest

The authors declare that there is no conflict of interest.

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