

**MENTAL ENLIGHTENMENT SCIENTIFIC –
METHODOLOGICAL JOURNAL****MENTAL ENLIGHTENMENT SCIENTIFIC –
METHODOLOGICAL JOURNAL**<http://mentaljournal-jspu.uz/index.php/mesmj/index>**COMPLEX OF EXERCISES FOR THE DEVELOPMENT OF ARM AND LEG
MUSCLES OF SWIMMING SPECIALIZED STUDENTS****Sardor Nosirov***Targeted doctoral student of the Uzbek State University of
Physical Culture and Sports*Email: nosirovsardor@gmail.com*Chirchik, Uzbekistan***ABOUT ARTICLE**

Key words: swimming specialization, arm muscle development, leg muscle development, swimming training, physical preparedness, sports pedagogy, endurance, strength exercises, swimming technique, coordination.

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Abstract: This article examines a scientifically based complex of physical exercises designed for the effective development of arm and leg muscles in students specializing in swimming. Special attention is given to improving muscular strength, endurance, flexibility, coordination, and functional preparedness through specially selected dry-land and water-based exercises. The research highlights the importance of balanced muscle development in enhancing swimming technique, stroke efficiency, movement speed, breathing control, and overall sports performance. In the process of training, targeted exercises contribute to strengthening the shoulder girdle, forearm, thigh, calf, and core muscles, which play a crucial role in maintaining body stability and propulsion in water. The article also discusses methodological approaches to organizing training sessions for swimming students, taking into account age characteristics, physical fitness levels, and modern pedagogical requirements. The proposed exercise complex can be effectively used in higher educational institutions, sports schools, and swimming clubs to improve the physical preparedness and competitive potential of young swimmers.

Introduction. In our republic, there is a need to transform water sports into one of the mass sports among the population, to further involve the younger generation in physical culture and water sports, to expand the network of swimming pools and strengthen their material and technical base, to bring their operational and technical condition in line with modern standards and safety requirements. To strengthen preparations for the 2028 Olympic and Paralympic Games, such tasks as "raising water sports to a new level" have been defined. Attention is paid to the large-scale, systematic, and ubiquitous development of water sports, further expansion of the swimming pool network in the regions of the republic, including in rural areas, ensuring wide involvement of children, especially girls, in regular swimming activities, and on this basis, the formation of important sustainable factors for the upbringing of a harmoniously developed and physically healthy adolescent generation. One of the urgent problems is the development of a comprehensive management system aimed at monitoring the health status of the population engaged in water sports.

Research objective. Development of proposals and recommendations for improving the complex of exercises that develop the muscles of the hands and feet of students specializing in swimming.

Research Objectives. 1. Analysis and generalization of scientific and methodological sources on the topic. 2. Development of a set of exercises for the development of arm muscles of students specializing in swimming, 3. Development of a set of exercises for the development of leg muscles for students specializing in swimming, 4. Justification of the effectiveness of the developed methods in pedagogical practice.

Materials and methods. The strength of the muscles of the hands and feet of students specializing in swimming directly affects the speed and technique of swimming. Dynamic and static strength exercises were used to increase muscle strength. In water sports, the strength of the muscles of the hands and feet is of great importance. Taking this into account, a set of exercises aimed at developing the strength of the muscles of the arms and legs of students specializing in swimming was developed. This table lists methods for performing remedies on land and water.

Table 1

**Developing arm muscles in students of swimming specialties
set of exercises**

Exercise type	Number of repetitions	Number of episodes	HR (pound/min.)	Rest interval
Pull-ups on the horizontal bar - Raising the chest to maximum height.	8-12 times	3rd episode	130-150 bpm.	1 minute
Gantry exercises - Strengthening the forearm muscles.	12-15 times	3rd episode	125-145 bpm.	1 minute
Bending and straightening the arms while leaning on the ground - Developing forearm muscles.	12-15 times	3rd episode	130-145 bpm.	1 minute
Hand movements in water - Movement of hands in water in various ways.	50-100 m	3rd episode	130-150 bpm.	45 seconds
Exercising chest muscles in water - Moving forward in water, moving arms against water resistance.	50 m	3rd episode	130-150 bpm.	45 seconds

For the development of hand muscle strength of students specializing in swimming, a number of methods and techniques have been developed. At the same time, pull-ups on the horizontal bar, exercises with dumbbells, bending and straightening the arms while leaning on the ground, and swimming exercises were developed, including hand movements in the water, the number of repetitions of body exercises, and rest intervals. At the same time, taking into account the importance of the symmetry of arm and leg movements in the training of swimmers in water sports, a set of exercises aimed at developing the strength of the leg muscles of students specializing in swimming was developed.

Table 2

**For the development of leg muscles in students of swimming specialties
set of exercises**

Exercise type	Number of repetitions	Number of episodes	HR (pound/min.)	Rest interval
Leg movements (planks) - Moving the legs in the water.	25-50 m	3rd episode	130-150 bpm.	45 seconds

Leg movement on the stomach - Developing the leg muscles of swimmers.	30-40 seconds	3rd episode	125-140 bpm.	40 seconds
Opening the leg to the side in the water - Moving the leg against the resistance of the water.	25-50 m	3rd episode	130-150 bpm.	45 seconds
Squats for strengthening leg muscles.	12-15 times	3rd episode	130-145 bpm.	1 minute
Initial quick movements - Running with acceleration to move the legs quickly.	20 meters	3rd episode	140-160 bpm.	45 seconds

A set of special exercises for the development of leg muscle strength of students specializing in swimming has been developed. The complex focused on developing leg muscle strength through land and water exercises. Leg movements for improving muscle strength in the plank position, leg movements in the water, leg movements in the lying position, leg spreading to the sides in the water and overcoming water resistance, squats for strengthening leg muscles, and accelerated running exercises for rapid leg movement have been developed. Along with Hsu, the heart rate of students specializing in swimming was constantly monitored during the classes.

During our research, we selected and used a complex of aerobic and anaerobic exercises, as well as exercises aimed at developing the muscles of the arms and legs, to improve the functional state of students specializing in swimming.

A complex of aerobic and anaerobic exercises has been developed for training students specializing in swimming. At the same time, the general physical fitness of swimmers is significantly increased not only by improving technique, but also by developing aerobic and anaerobic endurance. In the training of students specializing in swimming, aerobic exercises strengthen the oxygen supply system, while anaerobic exercises increase the ability to perform high-intensity loads in a short time. Aerobic exercises are long-term exercises performed in the presence of oxygen. Taking the above into account, a complex of aerobic exercises for classes for students specializing in swimming was developed.

Table 3

Complex of aerobic and anaerobic exercises for students specializing in swimming

Exercise type	Number of repetitions	Number of episodes	Heart rate (pound/min.)	Rest interval
Aerobic Exercise Set				
Light jog - running at moderate speed for 10-15 minutes	10-15 min	1.	120-140 bpm.	1 minute
Rope Jump - Moving at moderate speed	50-70 times	3rd episode	130-145 bpm.	40 seconds
Mid-distance swim (200-400 m) - breathing after 3-5 push-ups	200-400 m	2-3 episodes	130-150 bpm.	45 seconds
Aerial Bicycle Movement - Aerial Leg Movement	30-40 seconds	3rd episode	125-140 bpm.	40 seconds
Breath control swimming - Breathing after every 3, 5, and 7 moves	100-200 m	3rd episode	130-145 bpm.	45 seconds
Anaerobic Exercise Set				
Accelerated running - Running 25-50 meters at maximum speed.	3-5 times	3rd episode	160-180 bpm.	1 minute
Speed swimming (25-50 m) - Swimming at maximum speed.	25-50 m	3-4 episodes	160-175 bpm.	1 minute
Short-distance fast swim - covering 100 meters at maximum speed.	100 m	2-3 episodes	160-170 bpm.	1 minute
Plank method - holding the body in one position for 30-45 seconds.	30-45 seconds	3rd episode	140-160 bpm.	1 minute
Pull-ups on the horizontal bar.	8-12 times	2-3 episodes	140-160 bpm.	1 minute

Result and discussion. A complex of aerobic exercises has been developed for students specializing in swimming. In this complex, the number of repetitions of light jogging, rope jumping, middle-distance swimming, cycling, and breath control swimming movements, the norms of rest intervals between sets, and heart rate beats per minute were constantly monitored. At the same time, during our research, anaerobic exercises were performed under

conditions of high-intensity loads and insufficient oxygen supply during the training of swimming specialties students. Taking this into account, a complex of anaerobic exercises was also developed and used in training during our research. In order to improve the oxygen supply of students specializing in swimming, a complex of anaerobic exercises was used. In this complex, the number of repetitions, series, and rest intervals for accelerated running, fast swimming, short-distance swimming, and pull-ups on the bar and horizontal bar have been developed. At the same time, the heart rate of swimming students was constantly monitored during the classes. Thanks to the use of these complexes, students specializing in swimming have improved their ability to hold, inhale, and exhale oxygen, as well as swim long distances. At the same time, fatigue was prevented.

Conclusion. In the course of the research, it was determined that the proposed complex of exercises plays an important role in the comprehensive physical development of students specializing in swimming. The systematic application of specially selected exercises aimed at strengthening the muscles of the arms and legs significantly improved the students' overall endurance, muscular strength, speed abilities, coordination, and flexibility. The training program also contributed to the enhancement of aerobic and anaerobic capacities, which are considered essential components of successful swimming performance.

The study showed that regular and methodically organized exercises positively influenced swimming technique, movement efficiency in water, breathing control, and the ability to maintain high performance during long training sessions and competitions. In particular, exercises focused on the shoulder girdle, forearm, thigh, and calf muscles increased propulsion force in water and helped swimmers maintain body stability and correct posture while performing different swimming styles.

Furthermore, the consistent implementation of the exercise complex resulted in noticeable improvements in students' sports achievements and physical preparedness. The obtained results confirm that combining dry-land and aquatic training methods creates favorable conditions for improving functional capabilities and developing professional sports skills among swimming students. Therefore, the recommended exercise complex can be effectively applied in higher educational institutions, sports schools, and specialized swimming training programs as an efficient means of enhancing athletic performance and promoting healthy physical development.

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