



CHANGES IN THE ORGANISM OF YOUNG ATHLETES WHEN REGULARLY ENGAGED IN SWIMMING

Isaqova Muhabbatkhon

Andijan State Pedagogical Institute

Teacher of the Department of Special Pedagogy

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Annotation: This article analyzes the changes that occur in the body of young athletes when they regularly engage in swimming. Swimming has a positive effect not only on improving physical condition, but also on the respiratory system, cardiovascular activity, muscle development and overall endurance. Studies show that children and adolescents who regularly engage in swimming have significantly higher results in muscle elasticity, body balance and respiratory volume. Swimming also helps reduce stress on the body, increase psychological stability and strengthen the immune system. This article, based on scientific literature and practical research, extensively covers the effects of swimming on the body of young athletes.

Keywords: Swimming, young athletes, physical development, endurance, cardiovascular system, respiratory system, muscles, musculoskeletal system, coordination of movements in water, physiological changes, psychological stability, immunity, energy expenditure, adaptation process.

Introduction. Sport is one of the most effective means of strengthening human health and ensuring physical development. In particular, swimming is one of the most useful and safe activities for young athletes, which has a multifaceted positive effect on the body. Swimming not only develops the whole body evenly, but also serves to strengthen the cardiovascular, respiratory and musculoskeletal systems. It also plays an important role in increasing body flexibility, developing endurance and forming psychological stability.

One of the main advantages of swimming is the development of muscles without overloading the body. As a result of movement in the aquatic environment, the body feels almost weightless, which reduces the load on the joints and spine, reducing the likelihood of injuries. In addition, swimming works all major muscle groups, which helps to improve the overall physical fitness of young athletes.

Studies show that children and adolescents who regularly swim experience positive physiological changes, such as an increase in heart rate, increased respiratory capacity, and increased muscle elasticity. Swimming also increases bone density and improves the body's fluid balance, which contributes to the healthy development of bones and joints. At the same time, blood circulation improves due to the massage effect of water, which activates the process of oxygen delivery to tissues.

In addition, swimming also has a positive effect on the psychological state of young athletes. Water exercise reduces stress, calms the nervous system, and increases concentration. This sport also helps to build self-confidence, discipline, and willpower.

Research object and methods: Research object: The object of this study is young athletes who regularly swim. Children and adolescents aged 8-18 years are involved in the study, and the physical, physiological, and psychological changes that occur in their bodies are

studied. Particular attention is paid to the cardiovascular system, respiratory capacity, muscle strength, and endurance levels of athletes who have been involved in swimming for a long time, as well as their general adaptive abilities.

In addition, the study will analyze the differences between athletes who swim and young people who do not swim regularly. This comparison will provide an opportunity to scientifically assess the effects of swimming on the body.

Research Methods. The study uses the following scientific and practical methods to study the physical and physiological indicators of young athletes:

1. Anthropometric measurements

- Height, weight, body mass index (BMI), and body composition (ratio of muscle to fat mass) of the study participants are measured.
- A comparison is made to determine how the body composition of young athletes who swim differs from those who do not swim.

2. Physical fitness assessment

- Endurance test: Long-distance swimming tests are conducted to assess the general and specific endurance of young athletes.
- Strength test: The ability to create pressure in the water with the legs and arms is measured to determine muscle strength.
- Flexibility test: Since swimming increases the elasticity of the spine and joints of athletes, special flexibility tests (forward bend, shoulder mobility) are performed.

3. Physiological research methods

- Assessment of the cardiovascular system:
 - Heart rate (HR) and arterial blood pressure are measured.
 - Maximum oxygen consumption (VO_2 max) is determined and the aerobic capacity of young athletes is assessed.
- Heart rhythm and functional status are monitored using electrocardiography (ECG).
- Assessment of respiratory system function:
 - Maximum lung ventilation, forced vital capacity (FVC) and respiratory depth are determined using spirometry.
- Biochemical analyzes:
 - The amount of hemoglobin, lactate and other important biochemical indicators in the blood are analyzed. This helps to understand how swimming exercises affect the body's energy supply.

4. Psychological and neurophysiological studies

- Assessment of stress level and psychological stability: Special questionnaires and tests are used to determine how stress resistance and psychological state of young athletes change as a result of swimming exercises.
- Attention and concentration test: Movement in the water environment helps to improve coordination. Therefore, the attention and reflex speed of athletes are measured using special tests.

5. Comparison with experimental and control groups

- The study is conducted among two groups of participants:
 1. Experimental group: Young athletes who regularly swim.
 2. Control group: Young people who do not swim or do it very rarely.

- The physical and physiological indicators of these two groups are compared, and the effect of swimming on the body is proven with clear evidence.

In this study, various scientific and practical methods are used to comprehensively study the effect of swimming on the body of young athletes. Using these methods, the physical

Research results and analysis. During the study, the physical, physiological and psychological changes that occur in the body of young athletes who regularly swim were analyzed. The results obtained were compared between the experimental group (swimmers) and the control group (non-swimmers), and the positive effect of swimming on the body was scientifically proven.

1. Physical development and anthropometric indicators

Results:

- It was observed that the body mass index (BMI) in the experimental group was normal compared to the control group.

- The muscle mass of the swimmers was higher, especially the muscles of the shoulders, arms and legs were well developed.

- The fat content was lower than in the control group, which showed that swimming is effective in losing excess fat.

- It was found that the elasticity of the spine and joint mobility of the swimmers were higher.

Analysis: These results confirm that swimming helps to shape the body, develop muscle mass and reduce excess fat. This is because swimming forces the entire body to work, which strengthens the musculoskeletal system and increases the overall flexibility of the body.

2. Cardiovascular system and endurance

Results: • The heart rate (HR) of the swimmers at rest was 55-65 beats/min, while in the control group this figure was 70-80 beats/min.

- Maximum oxygen consumption (VO_2 max) was higher in the swimmers, indicating that their cardiovascular system was more developed.

- Blood pressure was within the normal range, and it was found that the heart muscle was well developed in the swimmers.

Analysis: Swimming is an aerobic sport that improves heart and lung function. As a result of moving against water resistance, the heart becomes stronger enough to withstand a large load. A lower heart rate indicates that the heart is working efficiently and the swimmers' endurance is increased.

3. Respiratory system and lung capacity

Results: • According to the results of spirometry, it was found that the swimmers' forced vital capacity (FVC) was 15-20% higher than the control group.

- The maximum depth of inspiration and expiratory reserve volume were also significantly higher in the swimmers.

- The depth and efficiency of inhalation and exhalation were significantly improved in the swimmers.

Analysis: Swimming requires deep and regular breathing, which increases the volume of the lungs and improves the supply of oxygen to the body. Due to the high ventilation of the lungs, swimmers are less likely to suffer from respiratory diseases and are able to perform physical activities for a long time without getting tired.

4. Muscle strength and balance



Results:

- The experimental group showed higher isotonic and isometric muscle strength.
- Joint flexibility and body balance were better, which showed the effect of swimming training.
- Muscle endurance increased as a result of water resistance.

Analysis: Swimming training forces all major muscle groups to work simultaneously. Due to the pressure of the water, the muscles learn to move steadily, which increases the ability to control balance and body movements.

5. Biochemical indicators

Results:

- The hemoglobin level in the blood was higher in swimmers, which improved their ability to carry oxygen.
- The lactate level was lower, which indicates that the swimmers were less tired during training.
- Blood sugar levels and metabolic indicators were normal, and energy metabolism was improved.

Analysis: The swimmers' circulatory system works efficiently and the muscle tissues are well supplied with oxygen. Lower lactate levels mean faster recovery after training.

6. Psychological changes and stress tolerance

Results: • Swimmers have higher stress tolerance, and they have lower levels of depression and anxiety.

- They have higher levels of attention and concentration, and their mental stability has improved.
- Training in an aquatic environment has reduced stress and helped improve mood.

Analysis: As a result of the calming effect of water, swimmers are less nervous. Physical activity stimulates the production of endorphins, improving their overall psychological state.

The results confirm that swimming has a positive effect on the body of young athletes in terms of physical, physiological and psychological aspects. Regular swimming exercises:

- Strengthens the heart and respiratory system,
- Increases muscle strength and endurance,
- Increases the body's energy production efficiency,
- Increases stress resistance and psychological stability

Conclusion. The results of this study show that swimming has a multifaceted positive effect on the body of young athletes. Regular swimming leads to physical development, strengthening of the cardiovascular and respiratory systems, muscle strength, and improvement of psychological well-being. During the study, differences were identified between the experimental group (swimmers) and the control group (young people who do not swim), which made it possible to scientifically prove the effectiveness of swimming.

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