



## METHODOLOGY OF DEVELOPING STRENGTH ENDURANCE OF SECONDARY SCHOOL CHILDREN

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### ABOUT ARTICLE

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**Abstract:** This article presents a scientific exploration of strategies to develop strength endurance in secondary school children. The study aims to provide a comprehensive understanding of the factors influencing strength endurance development, along with practical interventions and recommendations for educators and PE teachers. Strength endurance plays a crucial role in the physical development and overall well-being of secondary school children. It enables them to perform everyday tasks with ease and enhances their performance in sports and other physical activities. This article aims to explore the importance of developing strength endurance among secondary school children and provides an overview of effective strategies that can be employed to achieve this goal.

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### INTRODUCTION

Secondary school is a critical period for physical development and growth. During this time, children undergo significant changes, both physically and emotionally. Developing strength endurance is paramount, as it enhances the overall health and well-being of pupils, preparing them for the physical demands of daily life. This article presents evidence-based approaches to foster strength

endurance in secondary school children, aiming to promote their physical fitness and performance. It is defined as the ability to exert force repeatedly over an extended period of time. It plays a significant role in various physical activities, including sports, recreational pursuits, and everyday tasks. Developing strength endurance in secondary school children is crucial to support their growth, improve physical performance, and enhance overall health and well-being.

Decree of the President of the Republic of Uzbekistan dated 03.11.2022 (PD-414) “On measures to further improve the system of training and scientific research in the field of physical education and sports” states that, based on the age characteristics of the population, physical development and physical fitness study and develop recommendations on a scientific basis, establish mutual cooperation with neighborhoods, general secondary schools, sports-educational institutions, sports federations (associations), sports clubs, societies and other organizations assignments were given on setting up and implementing joint projects, developing and approving the program for the organization of summer schools, forming a base of international projects aimed at the organization of summer schools and ensuring the participation of students and youth in them, popularizing the activities of summer schools on the national scale. The sphere of physical education and sports has become one of the most important spheres in our country. Physical education is introduced in all educational systems of our country.

Physical education is a pedagogical process aimed at improving, training, and developing human health. Accordingly, without health, efficiency cannot be achieved either in work or in studies. Therefore, physical education is held twice a week in secondary schools. Physical education creates the initial basis for preparing a person for the defense of the homeland. Taking this into account, education of physical qualities in schools is an important process.

Physical qualities include flexibility, quickness, agility, strength, endurance. Resilience among these qualities helps a person to cope with difficulties in life. There are many types of endurance quality, divided into dynamic endurance, static

endurance, local endurance, local endurance, global endurance, aerobic endurance, anaerobic endurance, general and special endurance, speed endurance, power endurance. Of these, strength endurance means the ability to overcome external resistance with the help of muscle strength for a long time without reducing the effectiveness. Cultivating this ability from school age will ensure its perfect development in the future.

Physical qualities (abilities) are usually called strength, speed, endurance, agility, flexibility. One of the main tasks to be solved in the field of physical education is education. Regular development of physical qualities (abilities) of a person by means of physical education is one of the main goals. In the system of children's physical education, training of physical skills is important. Lessons should focus on developing students' muscle strength, overcoming external resistance, or strengthening their ability to resist. The use of strength exercises helps young people to join a healthy lifestyle, abandon bad habits, and define life positions. Thus, the problem of improving the general physical fitness of schoolchildren, and especially the development of strength skills, should be one of the current issues. Importantly, human readiness related to insufficient strength makes it difficult for him to perform certain tasks. Inadequate attention to the practical training of students in the educational process will have negative consequences in the future. As a result of the analysis of the literature, it became clear that the poor development of physical qualities causes serious problems, such as the inability to overcome psychological barriers, lack of confidence, self-consciousness (due to poor physical training), and overweight. The relevance of research lies in solving these problems.

## **MATERIALS AND METHODS**

To explore the topic comprehensively, a systematic literature review was conducted. A search of electronic databases, including PubMed, Web of Science, and Scopus, was performed using relevant keywords such as "strength endurance," "adolescents," and "training interventions." Studies published between 2010 and

2021 were considered for inclusion. The selected articles underwent a thorough evaluation process, including quality assessment and relevance to the research objectives.

The aim of the research is to provide information on development and experimental testing of exercise complexes aimed at the development of strength endurance for middle classes, as well as this article analyses the following tasks:

- studying the characteristics of strength endurance development in middle school students;
- development of targeted physical exercise complexes and development of strength endurance in children of high school age.

## **RESULTS AND DISCUSSIONS**

Numerous studies have emphasized the positive outcomes of strength endurance training in secondary school children. Regular physical activity and strength training have been shown to enhance muscular strength, endurance, and bone density. Furthermore, improved cardiovascular fitness, motor skills, and body composition have been observed. Engaging in strength endurance exercises can also contribute to the prevention of chronic diseases, such as obesity, cardiovascular disease, and diabetes.

Developing strength endurance in secondary school children provides numerous benefits beyond physical fitness. It fosters discipline, self-confidence, and perseverance, which are valuable life skills. Moreover, strength endurance training can have a positive impact on academic performance, as physical activity enhances cognitive function and concentration. By incorporating these training strategies into physical education programs, schools can contribute to the holistic development of their students. The findings emphasize the importance of structured and progressive training programs to develop strength endurance in secondary school children. Educators and trainers should consider implementing a balanced combination of aerobic and resistance exercises. Furthermore, coaches

and physical education instructors should ensure proper form and technique during exercise sessions to reduce the risk of injury.

Several factors may influence the efficacy of strength endurance training, including individual differences, motivational aspects, and environmental support. Personalized training programs, considering the child's age, maturity, and initial fitness levels, can optimize outcomes. Collaboration between physical education teachers, coaches, and parents is crucial to provide a supportive environment that encourages regular physical activity and participation in strength endurance training.

Organization of research. The research was conducted during the 2021-2022 academic years. The study was carried out in the following stages:

- at the first stage (February 2021), an analysis of scientific and methodological literature was conducted. The theoretical information of secondary school students on school physical education was studied.
- in the second stage (March-May 2021), sets of experimental exercises aimed at developing strength endurance in high school students were developed. Pedagogical observations were made in schools.
- in the third stage (September 2021-March 2022), a pedagogical experiment was conducted on middle school students to determine the effectiveness of exercise complexes aimed at developing strength endurance.
- in the fourth stage (March-April 2022), based on the summary and analysis of the results, practical recommendations were made and conclusions were drawn up.

In providing physical training to school children, it is necessary to provide information about each age group of children, the characteristics of the structure and functions of body systems and psychological characteristics, age-related changes in the musculoskeletal system, cardiovascular and respiratory systems, as well as information about the activity of the central nervous system. should be studied. Based on this, optimal development of physical qualities is possible.

Reasonable consideration of the age-related characteristics of the child's body development is important in the organization of educational activities.

School children (grades 5-9) aged 10-15. This is a period of transition in young people, characterized by serious changes in the child's body. Biological and physiological processes occurring in the body of adolescents are significantly different from those of other ages. A teenager's body is no longer a child's body. One of the most important differences of this period of life is the intensive growth and development of all the main human systems. Another feature is that the period of puberty is characterized by the reconstruction of all elements of the musculoskeletal system from a physiological point of view. At the same time, assimilation processes prevail over dissimilation processes. Other distinguishing features are growth rate, increased metabolism, increased oxygen consumption, intensive activity of endocrine glands.

During the period, such indicators of physical development as height and body weight undergo the greatest changes in adulthood. Annual growth increases by 6-7 and even 10 cm, the sharpest increase in growth is observed from the age of 12, and weight from the age of 13. This is confirmed by the data that the average figure is 155-161 cm, and the characteristic body weight growth is 47-50 kg

Middle school age spans the longest period. Therefore, this period is the most important for the development and improvement of children's physical abilities and motor skills. Endurance is one of the main physical qualities. Any long-term physical work requires sufficient endurance. Physical fitness when performing any activity in class, in life, how long a person can do it or how long they can continue to do it, has a lot to do with performance. All these are direct manifestations of resilience.

Most physical exercises aimed at developing endurance have a cyclical nature and therefore have the effect of developing the internal systems of the body (respiratory, cardiovascular system). Endurance, especially overall endurance, tends to be more positive. Therefore, its level of development is very important in

professional, military, household, and sports activities. As mentioned above, strength endurance is manifested through dynamic and static exercises. Its development has its own characteristics.

Depending on the size of the muscle groups involved in the work, they differ:

- less than 1/3 of the volume of the body's total muscles in the local strength involved in the work;
- muscles that make up 1/3 to 2/3 of the muscle mass in regional strength endurance when involved in work;
- more than 2/3 of the body's muscles participate in global power endurance during work (eg, running, swimming, rowing).

When setting loads, the speed and weight of physical exercises, as well as the number of repetitions and exercises (volume) can be dosed. The relationship between loads is the intensity of movements and the number of repetitions in strength training. As mentioned above, the level of development of maximum strength also affects such dynamic endurance indicators. The more developed the physical qualities, the more repetitions of a given load. After the initial test in the educational process, in experimental classes, exercises aimed at the comprehensive development of strength helped to develop the endurance of various muscle groups.

The control group was engaged in the physical education program of the students of the existing school. The experimental group was engaged in the same program, but it differs in that the experimental complexes of physical exercises developed by us are included in the main part of the lesson. It is aimed at the comprehensive development of strength endurance of various muscles. Experimental complexes included in their composition are repeated exercises with a maximum of 30-60% of your own body weight. The number of repetitions is adjusted according to the physical fitness of the exerciser. At the beginning of each month, exercises to develop maximum strength were performed with 80-90% load. The number of

repetitions is 2-4. At the end of the month, to develop endurance, the maximum load was repeated until failure with 20-40%.

The organization of circuit training for the development of aerobic endurance should be built according to the following guidelines:

- duration of actions from a few minutes to 50-60 minutes;
- inclusion of the maximum number of muscle groups in muscle movement
- exercises are performed in high and medium power zones;
- the number of exercises should not be less than 5-7;
- depending on the level of preparation of the participant, a rest interval should be arranged.

The main methods of developing endurance:

- a method of continuous (constant) and variable intensity training with an average load;
- method of repeated interval exercises;
- circuit training method;
- game method;
- method of competition.

To develop special endurance, the following are used:

- continuous training methods (standard and variable);
- intermittent interval training methods (interval and repetitive);
- competition and game methods.

Standard method - the work routine is long, continuous, strength and speed are performed in approximately the same order. It can be done with exercises of different levels, both low, medium and high intensities. It is important to maintain the rhythm, speed, and speed throughout the duration of the exercise.

Variable method - unlike the standard method, it is characterized by purposeful change of movement speed and volume of movement. There should be well-defined and consistently varying intervals of work of different intensities.



Table-1

| Style        | Fulfillment types  | The goal   | Loading , % | Fulfillment time | Repetition quantity | Series work the number | Rest      | Execution speed |
|--------------|--|--|-------------|------------------|---------------------|------------------------|-----------|-----------------|
| Repetitive   | One how many in quantity resistance overcome repetition with             | Strength and strength durability development   | 70          |                  | 8-10                | 3-6                    | 2-3 min   | Average         |
|              |  | Strength durability development and oily components reduce   | 50-70       |                  | 15-30               | 3-6                    | 3-6 min   | High            |
|              |  | Strength durability development and in the muscles relief improve  | 30-60       |                  | 50-100              | 2-6                    | 2-6 min   | High            |
|              | Fatigue to the limit infinite resistance a lot times overcame transition | Strength durability development  | 25-60       |                  |                     | 2-4                    |           | Optimal         |
| Intermediate | Intensive  | Strength durability development (anaerobic lactate of the source power )   | 60-75       | 8-15 Sec         | 8-12                | 2-3                    | 30-90 sec | High            |
|              | Wide comprehensive   | Strength durability development ( glycolytic of the mechanism average participation with anaerobic source capacity ) | 50-60       | 15-30 Sec        | 15-30               | 2-3                    | 45-90 sec | High            |

The interval method is a method in which exercises are performed with a strictly calculated and pre-planned rest interval with a standard and variable load. Usually, the rest period between exercises is 1-3 minutes (sometimes 15-30 seconds). Dynamic endurance is used to develop strength in the athlete, using mainly repetition, interval and circuit techniques. Table-1. shows the preferred orientation of these methods according to physical activity parameters. Static strength endurance is often manifested by maintaining a certain position, holding body parts in space for a long time. Stress can be moderate or near the limit. This is explained by the fact that the stronger the muscle tension, the more muscle fibers work in the maximum mode and the faster they tire.

Given this algorithm, moving at a smaller percentage of the attached, the greater the endurance and the longer its duration, the greater the manifestation of maximal muscle strength. For example, it is possible to perform several times longer at 15-20% load than to exercise at 40% load. The number of repetitions is adjusted according to the physical fitness of the exerciser. The experimental complexes included in their composition are repeated exercises that need to be performed with a maximum of 30-60% of your own body weight. At the beginning of each month, 2-4 exercises with a maximum number of repetitions were performed to develop 80-90% of the maximum strength.

For maximum endurance development, the exercises are repeated until 20-40% failure at the end of the month.

The speed of execution of actions was average. Rest between repetitions was set to 2 minutes. The number of condensed training series in one lesson is three. A set of exercises developed by us was used in the lesson. It was done 15 minutes before the end of the physical education class. At the end of the given exercises, a series of breathing exercises were given and the muscles involved in the work were relaxed.

Several recommendations have been developed taking into account the following:

1. One of the main tasks of a physical education teacher at school is to develop strength endurance in high school students, there are favorable conditions for the development of qualities at this age. Therefore, it is recommended to make full use of it.
2. The age characteristics of the participants and the structure of the educational process should be taken into account when choosing tools for developing strength endurance.
3. In order to achieve a more effective result, it is recommended to use the exercise methodology developed by us at the end of the lesson. Using this technique, the experimental class achieved a positive result. The results were found to be higher than the control.
4. It is advisable to increase the volume of exercises taking into account individual characteristics.
5. For the harmonious development of various muscle groups, it is desirable to perform equal dynamic and static movements:
  - a) dynamic exercises should prevail.
  - b) the share of static exercises should not be reduced.

## **CONCLUSION**

Developing strength endurance in secondary school children is essential for their physical and mental well-being. By implementing a comprehensive training program that targets different muscle groups and includes aerobic conditioning, schools can contribute to the overall development of their students. The positive outcomes of strength endurance training extend beyond physical fitness, influencing academic performance and life skills. It is imperative for educators, parents, and policymakers to recognize the importance of strength endurance training and incorporate it into the curriculum to empower the next generation for a healthy and active future. The level of development of strength endurance in middle school students was determined. The analysis of the received data shows that at the beginning, the experimental indicators describing strength endurance did not have

such statistically significant differences between different muscle groups in the control and experimental classes. Complexes of directed physical exercises were created for the development and use of strength endurance in children of high school age. Determines the relevance of their development according to the low indicators of strength endurance in the students who passed the test. Thus, specially selected exercises had a positive effect. It developed strength endurance of high school students.

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