

# Methods of Development of Physical Training of Weightlifters

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**Abstract**— The article considers methods of developing physical fitness of young weightlifters and analyzes the results of a pedagogical experiment in which a number of indicators obtained before and after the experiment are identified.

**Keywords**— Weightlifting, sports, physical culture, circular training, analysis, physical exercise, methodology, research, experiment, physical fitness.

## I. INTRODUCTION

Training and similar forms of exercise use have become quite widespread in a number of countries. Unfortunately, the literature of our country does not cover these forms enough, although a number of scientific and methodological prerequisites for circular training were laid down in the practice of physical development of a person.

What are the distinctive features of circular training? The answer to this question, it turns out, is not so simple. Circular training is not limited to any particular method of physical development.

The first, although largely external sign of this form is that classes are held as if "in a circle": in the gym or on the site, several "stations" are marked and organized, that is, places for performing physical exercises with certain equipment.

The student class or section is divided into several small sections of working groups. Each group must pass all the "stations" in succession, performing the assigned exercise on each one.

The second feature of circular training is that it was formed as an organizational and methodological form of using physical exercises aimed at the comprehensive development of physical qualities of students.

This goal involves not only the simultaneous development of the main physical qualities (strength, speed, endurance, dexterity, flexibility), but also the improvement of their complex manifestations (speed strength, power endurance, etc.). However, we must admit that the widespread programs of circular training are largely power-oriented.

The third characteristic feature of circular training can be considered that it is based on the use of mostly technically simple movements from the main and sports-auxiliary gymnastics, from weightlifting and other sports.

These movements in most cases have an acyclic structure, but they are artificially given a cyclical character by organizing a series of merged repetitions. The simplicity of the movements allows you to repeat them repeatedly and comprehensively, performing one complete training work.

The fourth sign can be considered the use of the "symbol of circular training" - a special scheme for selecting movements, which provides a consistent effect on all major muscle groups and gives sufficient load on the internal organs,

especially on the cardiovascular and respiratory systems of the body.

In connection with the above, it is assumed that non-standard circular training exercises will contribute to the combined development of special motor abilities and, ultimately, increase the sports result in the classic double event.

In the course of classes, individual characteristics of teenagers and young men are studied; pedagogical and medical observations are conducted to identify the most capable. The main attention is paid to the adaptability of the body to the effects of exercises with weights, the ability to master the technique of classical and auxiliary exercises with a barbell, the development of speed and strength qualities, interest in classes, discipline, diligence, perseverance and relevance.

However, not all coaches use different methods in weightlifting, and train according to the usual method developed in the schools of the Olympic reserve in weightlifting. The main thing, in their opinion, is to raise the bar of the highest weight as quickly as possible, and not the development of versatile physical abilities in a teenager at the stage of initial training.

The object of the study was the educational and training process of beginners in weightlifting (teenagers 11-12 years old).

The subject of the study was a method for improving the effectiveness of the training process with the use of circular training.

The purpose of the study is to improve the effectiveness of the training process of novice adolescent weightlifters by using circular training.

In accordance with this goal, the following tasks were solved.

### Research Problem

To investigate the state of the issue of training novice weightlifters from literary sources.

Determine the level of physical fitness of teenagers 11-12 years old engaged in weightlifting.

Develop a method for improving the effectiveness of training sessions by circular training.

Experimentally test and identify the effectiveness of the

developed method.

Hypothesis: we assumed that the use of circular training during training sessions for novice weightlifters will improve the physical fitness of adolescents and improve their health.

Scientific novelty and theoretical significance. In the theory and practice of physical education, an addition has been made to the meaning of circular training in the training process of weightlifters. The influence of body proportions and physical development indicators on athletic performance in the barbell is shown.

## II. METHODOLOGY

Circular training in its modern form has a number of methodological options. However, all of them are characterized by strict regulation of exercise performance. In other words, in any case, the basis of circular training is the repeated performance of prescribed movements or actions in conditions of precise dosing of the load and a clearly defined order of its change and alternation with rest.

This method of circular training differs from the game and competitive methods, which are characterized only by approximate regulation of the load and actions, which are formed depending on the game situation or conditions of the competition [14, 15, 25]. The main variants of strictly regulated exercise as a method of physical development by standardizing the exercise process (the form of movements and the main components of the load do not change during the exercise - they are standard).

Variants with a directed change in the influencing factors during the exercise, the so-called "variable" exercises.

In addition, whether the load during the exercise is continuous or interrupted by rest intervals, and the "standard" and "variable" options are divided, respectively, into "continuous-flow" and "interval" exercises [4, 8, 13, 14].

Circular training can be built using all these options, while for circular training, a combination of standard and variable loads in each individual session. In this case, within individual series, the load is given as a standard load and changes when switching from one series to another [17].

There are variants of circular training, based on continuous-flow performance of exercises. At the same time, variants of circular training with interval performance of loads are described, when the plan provides intervals for rest between a series of movements that make up a "circle", as well as between "circles" [14, 15].

In our opinion, a very valuable feature of circular training is successfully combined strict normalization of physical activity with its individualization. The individual load measure is determined using the so-called "maximum test" - a test for the maximum number of repetitions for each exercise included in the circular training complex. Depending on the result of the maximum test, the training load rate is assigned, so the training load can be different for each. It seems to us that training individuals with approximately the same indicators of the maximum test should be combined in micro groups.

A prerequisite for the organization of circular training is a constant and accurate accounting of the load performed and a systematic assessment of the achievements of each student.

This condition, in our opinion, is the basis for maintaining a high level of motivation for training and planning the training load.

Load accounting and control in this organizational and methodological form are organically included in the process of physical exercises. The basis for normalizing the load in circular training is a regular measurement of the maximum test indicators. At the same time, it is planned to fix the results of work at each "station". The completed work is recorded by the students themselves [5, 6, 21].

In addition, it is useful to include the heart rate "before" and "after" the laps in the number of recorded parameters. Systematic assessment of achievements on the maximum test and accounting for the growth of successfully performed training load give a clear idea of the development of performance by its external quantitative indicators. Comparing the response of the cardiovascular system, even if the heart rate after a standardized load in circles allows us to judge how well the adaptation to the load is going.

Thus, to a certain extent, it is possible to solve the problem of the "functional problem". As such, the training complex of exercises that makes up the circle itself acts. We believe that these measures provide a clear order of pedagogical control and self-control [26].

Circular training may include elements of competition. The subject of the contest is not quite common in this case. Mapped increase, the increase in volume and other indicators most of the training load and not the absolute sports-technical result, in practice can be recommended to visualize the record will further increase the number of repetitions within the allotted exercise time or who spend less time doing the set-up of the training number of repetitions [14, 15, 17].

Circular training is designed mainly for group classes. This circumstance, however, does not exclude the possibility of some simplified versions of it for individual self-study.

Summing up the features of circular training, you can briefly reduce it to the following provisions.

1. Circular training is one of the organizational and methodological forms of using physical exercises: it is designed to create conditions for the comprehensive development of physical abilities of students [14].
2. The organizational basis of circular training is a cyclical complex of physical exercises that are selected in accordance with a certain scheme - the "symbol of circular training" and performed in the order of successive changes of "stations", which are located on the site or in the hall for classes in the form of a closed figure [15].
3. Sets of exercises for circular training are made up of technically relatively simple exercises. Exercises are usually borrowed from the Arsenal of basic and sports-auxiliary gymnastics, weightlifting, and some other sports. Before the start of a circular training, the exercises are well learned separately [10].
4. In terms of methodology, circular training is a process of strictly regulated exercise with precisely dosed load and rest, a firmly established order of changing the load and alternating it with rest. Circular training can be implemented in variants that differ from each other, in particular, the dynamics of

continuous or intermittent loads (interval)

5. Strict regulation of the exercise process in circular training is provided along with other constant consideration of the work performed and an objective assessment of the achieved performance. For this purpose, it is customary to use the maximum test. The results are recorded in special accounting cards [25].

6. The training load is set relatively equal for all participants at the same time at a strictly individual level.

7. Circular training in its expanded, full form is focused on group classes. Most of the circular training systems are used for a uniform load on all muscle groups, as well as for a constant load on the cardiovascular and respiratory systems [25].

### *1.2. Selection and distribution of exercises for circular training.*

When selecting exercises for certain complexes of circular training with different degrees of load, it is recommended to set the required average effort for each exercise by testing. This makes it possible to develop individual qualities such as endurance, improve muscle strength and complex qualities such as strength and speed endurance with the help of circular training.

Certain training options will also allow you to develop high-speed strength and maximum strength [9, 14, 21].

The choice of exercises and the degree of load of training complexes is based on a number of rules:

The task - development of strength: the degree of effort during the exercise allows up to 10 repetitions:

The task - development of power endurance: the degree of effort during the exercise allows more than 10, but less than 30 repetitions:

The task is to develop endurance: the degree of effort during the exercise allows more than 30 repetitions [14, 15, and 25].

In the latter case, the beneficial effect of exercise for the complex development of motor qualities is significantly reduced. Keep in mind that in this case, the muscle does not thicken, but rather becomes even thinner.

The best power result is obtained under the influence of increased sensor motor coordination ability and improved metabolism in the muscles. The resulting effect of training depends primarily on the methodological design and the degree of load in the exercise, as well as on the method of its implementation. It seems to us that in this connection it is inappropriate to talk about exercises "for strength", «speed», «endurance».

By changing the degree of load in exercises and conducting them in accordance with the characteristics of a particular basic method, we can develop primarily or strength, speed strength, strength endurance, or only endurance. Therefore we propose the following division for classifying exercises according to their specific nature of actions:

1. Running.
2. The power general educational and specialized exercises
3. Stretching exercises.
4. Relaxation exercises.

The main requirement for the distribution of exercises in the complex of circular training is the need to distribute them so that the load changes, covering the main muscle groups in turn. The "symbol" of circular training is intended to formalize and facilitate the process of such distribution of exercises. A certain desired training effect is achieved by applying two or three different exercises to the same muscle group.

It is considered favorable if the first exercise gives a load on the leg muscles or covers all the main muscle groups. In this case, it is believed [11] from the very beginning, the cardiovascular system is well "adjusted". This consideration may not play a role in circular training in large groups (30-40 people). But it emphasizes the need to conduct a short-term, but energetic warm-up, warm-up before the round-Robin training. Mainly in order to prepare the cardiovascular and respiratory systems for the upcoming load before the start of the first exercise [13].

### *1.3. Circular training as an organizational and methodological form of training*

Circular training as an organizational and methodological form of training can contribute more to the education of the young generation, while simultaneous circular training with individual dosing of the load is characterized by a truly reasonable atmosphere. No student is overloaded, since everyone exercises at each "station" according to their individual dosage.

Interest in circular training and the exercise program is constantly supported and encouraged, as the student can check the progress of their functional adaptation and General physical condition on the achievement card. In this regard, there is a controlled competition aimed at improving both the individual initial results and the level of achievement of the entire group. Achievement cards make it possible to compare students' progress with each other [15, 25, 26].

Comparative data encourage more diligent execution of defeats. So, it can be argued that achievement cards, which record individual maximum results and the results of training exercises, are important for awakening and maintaining interest in the classes. In practice, you can constantly observe that interest in a stable set of exercises for a long time disappears if all athletes are assigned the same load standards and if these standards must be performed without visual control. Training is perceived in this case as a very monotonous activity, and the initially enthusiastic attitude to the new form of exercise is soon lost

Especially valuable in pedagogical terms, when a coach who loves sports, explains to athletes the essence of the processes of adaptation that occur in the human body. This is important, in particular, so that they can detect these changes and monitor them using recorded heart rate data, and possibly simple functional tests [1, 19].

Sometimes it is enough if the coach says a few words at the beginning of training that so many people have not only increased their volume of exercises, but also show signs of improving their recovery ability.

All this significantly increases the interest of athletes in training. Interest is also supported by assigning conditional

visual signs that exceed individual results, which can be placed on the form.

Such distinctions can have a psychological impact-teenagers will strive to improve the individual result. The table of records for performing circular training complexes posted in the gym has an encouraging effect [14, 18]. Then, in each group, you will be able to select the best to participate in the competition for passing the circle.

Each coach should set a goal to interest athletes so that they are engaged in a reduced circle at home. Classes on the system of circular training can very effectively contribute to the development of basic physical qualities, as well as give good results in the education of athletes. Main provisions, expressed in the form of an unconditional, categorical requirements, helping to avoid errors in the organization, methodological design and conduct of classes and evaluation of the achievements during circular training, for example, based on the immutable truth, that the system of circuit training should primarily serve the promotion of health practices, we can formulate some mottos, requirements [25,].

Exercise so that your health is enhanced!

Choose such exercises and ways to perform them that are suitable for you!

Repeat your training complex for a long time!

Systematically increase the load!

Exercise according to your age, fitness, and health status!

Exercise so that your health is strengthened!

Exercises in training sessions should be carried out in an organizational and methodological way so that they strengthen the health of students. This requirement is feasible only if the exercises are performed with the minimum intensity that causes the human body to develop an impulse for compensatory reactions, a training effect. The onset of the training effect can be detected by methods of sports medicine on a higher level of functionality achieved as a result of adaptation of the body. If this effect is not present, it means that the circular training was conducted organizationally and methodically incorrectly. Exercises in the circular training system should be selected and compiled in such a way that they provide a rational alternation of the load on the main groups of the mouse in accordance with the «circular training symbol»

The trainer should know and take into account the sports anatomy of the muscles, their location, attachment points and functional anatomy of physical exercises, and have a good idea of the muscle groups involved in this exercise. In addition, the trainer should be able to assess the load volume of the selected exercises and assign the necessary intensity of effort in the exercise. Only if this condition is met will it be possible to provide a reasonable, justified and, most importantly, individual dosage of exercises at each station of the circle. The amount of training load depends on whether the training will be based on a circular system in a continuous-flow or interval version and whether it will consist of one, two or three passes of the entire circle.

The requirement - first and foremost to improve the health of the athlete, is the coach able in appearance practices (e.g., color of the skin, the nature of the perspiration, muscle tremor,

character of breath, nausea or vomiting) and heart rate monitor on the extent of the total load on the body and its adequacy to the individual capabilities of the student. Determining the heart rate before and immediately after exercise, as well as after a recovery break, is mandatory because this is the only way to monitor and evaluate the ability to adapt to the load and the speed of recovery. This list, in our opinion, is the minimum of control studies. A necessary measure is systematic self-control of students, both during the task and after training [16, 18].

The advantage of the circular training system is that it is easy to get an idea of the total amount of training load. At the same time, the following degrees of load are distinguished [21, 25].

Stage 1-active recreation. It is a strenuous exercise that is performed with pleasure, not for sports specialization. State of psychophysical compensation, relaxation, physical and mental recovery. Appetite and sleep are normal, sometimes very good.

Stage 2-low load. A light workout is partially a playful character; almost do not feel the burden. Low requirements for the cardiovascular system and neuromuscular apparatus. After training, you feel good mentally and physically, your appetite and sleep are normal, sometimes very good.

Stage 3-average load. Training with a slightly felt by the load. Average requirements for the cardiovascular system and neuromuscular apparatus are high. Light, felt as pleasant, fatigue after training, appetite and sleep are normal, up to very good.

Stage 4-submaximal load. Training with a sense of strong physical stimuli, high requirements for the cardiovascular system and neuromuscular apparatus. Light fatigue during training, increased need for rest and sleep after training. Good recovery of the feeling of psychophysical comfort. Appetite and sleep are normal and sometimes very good.

Stage 5-maximum load, training with a feeling of very strong loads. Very high requirements for the cardiovascular system and neuromuscular apparatus. During training, the phenomenon of fatigue develops. Then there is a great need for rest and sleep, after which psychophysical comfort is restored.

Stage 6-extreme stress. Training requirements, the performance of which requires the maximum tension force of will. The phenomenon of severe fatigue during training. There is a great need for rest and sleep, after which the feeling of psychophysical comfort is not immediately restored. Appetite is reduced. Sleep sometimes, despite the great need for it, is bad, restless.

The set of exercises should be left in such a way that all the main muscle groups are loaded alternately. Moreover, some exercises should be of general impact - for the whole body. In terms of multi-sided impact in practice, the best justified complex, which consists of 7 exercises. It includes 2 different special impact exercises for each main muscle group (arms, shoulders, stomach, back, legs) and, in addition, 2 general impact exercises. Complexes of 6 or 8 different exercises also justify themselves.

In addition to multi-sided general complexes, special complexes can also be included in sports training. In special

complexes for sports, exercises with high technical requirements should not be presented. The complex should include only simple exercises that are accessible in their technique. Multi-sided load on individual muscle groups through various exercises meets the requirement to promote health. The limits of versatility are defined differently in the basic general preparatory training and in the training for record achievements.

This principle is particularly important for the organization and conduct of circular training. They should be guided by the coach in the organizational and methodological design of circular training in accordance with a particular method of loading. The essence of the load method is characterized by various interaction of load factors such as strength, density, volume and duration of impact in the process of motor activity, which is the exercise [16]. The physiological characteristics of load methods are based on the laws of development of such motor qualities as strength, speed, endurance, mobility, dexterity, as well as complex forms of their appearance - speed strength, power endurance and speed endurance.

#### 1.4 Analysis of physical fitness

Before the start of training sessions, control tests were conducted, including running for 60 meters, long jumps from a place, triple jump from a place, determination of manual and Stanovoy dynamometry, push-ups in the prone position, pull-up on the crossbar, exercises for coordination and flexibility. To determine physical fitness, the following formula was used: where IFP is the index of physical fitness in relative units;

A-sports indicator in one of the exercises;

B - The age;

P-student's weight in kg;

C-height in cm.

Studies of the results of control tests and physical development of 11-12-year-olds allowed us to determine both the average IFP index and its reliable interval when running 60 meters, long jump from a place, determining manual and Stanovoy dynamometry [20].

IFP values based on the result of control tests.

Exercises 11 years 12 years

$M \pm m$  IFP (confidence interval)  $M \pm m$  IFP (confidence interval)

The run to 60 m 10,2  $\pm$ 0,3 4,86 (5,65-4,07) 10,0  $\pm$ 0,2 4,58(4,94-4,19)

Long jump from a place 165,0  $\pm$ 2,7 6,92 (7,5-6,23) 173,0 $\pm$ 2,5 6,8 (7,8-5,8)

Manual dynamometry, kg 22,4  $\pm$  0,9 8,9 (9,9-7,9) 23,9  $\pm$  0,7 8,8(10,3-7,3)

Stanovaya dynamometry, kg 69,8  $\pm$ 1,2 3,76(4,25-3,3) 73,5  $\pm$  0,7 3,76 (3,96-3,6)

Analysis of dynamics of growth of results in control tests during a year's stay of teenagers in the school-preparatory group

The main form of assessing the abilities of young athletes is the study of their individual characteristics of character and psyche, athletic inclinations, motor and functional capabilities of the body when performing training loads. In general, the second stage is aimed at a deeper study of gifted adolescents.

Awareness of indicators of increase in results in control exercises should be evaluated not so much by the absolute result, but by its increase in relation to the initial level.

The confidence interval of the sum of the increase in results over the course of a year (according to four tests every three months) and is recommended for practice [29]:

In the 60 m run-1.95-2.42 sec.;

In the long jump from a place-73.9-120.7 cm;

In the 500 m run-14.7-16.0 seconds.

If the sum of gains in one of the exercises goes beyond the upper limit of the confidence interval, therefore, the progress of the teenager during the year of training was significant, if the lower limit-the increase was below the average level.

To assess the abilities of young weightlifters, qualitative characteristics of changes in power capabilities in special training - in the snatch and push of the bar are of great importance. Training during the year contributed to an increase in results, both in the snatch and in the push of the bar.

Thus, watching a teenager throughout the school year, you can make a very reliable idea of his abilities as an athlete, who has not only high physical capabilities, but also the necessary moral, volitional and psychological qualities.

#### 1.5 Selection of young weightlifters taking into account their age characteristics and opportunities to engage in the method of «circular training».

A teenager was admitted to the sports section. Working with this age group has specific features. It is important to keep in mind that a teenager is not a copy of an adult.

Numerous studies of scientists have shown that the activity of internal organs and systems during puberty is markedly different from that in adulthood. The adolescent period replaces the period of childhood, which is characterized by a relatively calm and even growth in human development. During puberty, the entire body develops rapidly [7, 19]. Evidence of this is a significant increase in height, weight, chest circumference and musculature, increased heart function, deep changes in the activity of the Central nervous system, and especially in the activity of the sexual glands. This period lasts on average from 12 to 16 years. Adolescence is one of the main stages in a person's life on the way to the full flowering of his powers, when physical and functional capabilities are improved, the formation of personality and character occurs.

The organization of classes in school-preparatory groups is provided. As a rule, it is very difficult to determine the ability to engage in weightlifting in an 11-12-year-old teenager. It is known that adolescent peers often differ significantly from each other in the degree of puberty and, consequently, in physical development. Therefore, it is important to take into account the biological age, not the passport age, when selecting. The degree of puberty is determined at the first medical and pedagogical examination of adolescents.

Experimental studies have shown that the greatest effect is obtained when the selection is made at school, and not in groups of youth schools. In addition, the desire to get into the Central section of young weightlifters was one of the

significant psychological incentives that contributed to the manifestation of their best physical and volitional abilities.

Speed and power capabilities were revealed with the help of long and high jumps with a push of two legs, running 60 meters at maximum speed; flexibility and coordination - with the help of acrobatic exercises (tumbling forward over an obstacle, performing a bridge with a tilt back and through a handstand); dexterity - during wrestling matches, sports games. During the training sessions, special attention was paid to such qualities as courage, determination, composure, determination, perseverance, and so on.

A variety of means from various sports created the necessary emotional climate, which plays an important role in classes with teenagers [7].

In special training included familiarization with the technique of the snatch and clean and jerk, and the use of specially-auxiliary exercises to develop strength, power-speed and special endurance: sit-UPS, dips, barbell lifting to the chest and spurt in the floor of a squat, push from the chest, the bench press, squats in the snatch grip.

Studies have shown that for teenagers of 11-12 years of age, the optimal weight is considered to be confidently lifted in the snatch or push at least 5-6 times in a row.

The volume of the training load for the lesson made up, without regard to the exercises of General physical preparation (GPP), average 40-50 lifting of a weight (KFS) optimal weight (excluding the weight of the rod, is raised to warm up). For one exercise, 5-6 approaches and 3-4 lifts were assigned for one approach [17, 29].

So, the content of the school preparatory group is aimed at introducing teenagers from 11-12 years to regular weightlifting, at strengthening their health, fostering love for this sport, developing self-confidence and developing their abilities.

As already noted, comprehensive observations of adolescents over the course of a year allow us to objectively assess the abilities of each, to some extent at this age to determine the makings for weightlifting, physical and functional capabilities. This is the main and very important task of a coach to identify gifted athletes.

There is every reason to believe that some signs of athletic talent of weightlifters 11-12 years old can be identified in the first year of sports. To do this, the training process is divided into three stages:

Entrance control tests, anthropometric measurements, analysis of physical development, initial determination of physical activity of the applicant.

A deep and comprehensive study of the character and personality of a novice, his psyche, physical capabilities, abilities to progress results, sports thinking, the relationship of a teenager to the companions of his discipline and school.

3) Control and pedagogical tests after the end of classes in the school-preparatory group, determination of abilities based on the results of pedagogical observations [17].

So, after the end of classes in the school-preparatory group, there were teenagers and young men who can do weightlifting in the schools of the Olympic reserve. After that, they undergo a comprehensive selection process.

According to the regulations, enrollment in schools of the Olympic reserve is carried out in September. The following control tests are offered:

Running for 30 and 60 meters;

Long jump from the spot, triple jump;

Push-up in the emphasis lying down (on bars);

Determination of abdominal muscle strength;

Flexibility in the shoulder joints (squat with a barbell at the top, grip wide, medium, narrow);

Leaning forward while standing on straight legs and other exercises.

The initial indicators are entered in a special notebook, where later (during the current selection) changes in test indicators are regularly noted. During the selection process, sports games are held; during which dexterity, coordination, flexibility, endurance, and intelligence are studied. Conduct selection during the first two years of training in three stages.

The first stage is initial (duration-1.5-2 months). During this period, the initial level of development of specific motor qualities in those who want to engage in weightlifting is determined. After a medical examination, candidates pass competitive tests: a long jump from a place (210 cm, 220 cm, 235 cm - according to the estimates of 3, 4, 5 points), jumping up from a place with a wave of the hands (48 cm, 52 cm, 55 cm), squats with a neck over the head (snatch, medium, push), throwing a stuffed ball (5 kg) behind the back, standing force, squat with a barbell on the shoulders.

The second stage is the main one (until the end of the first year). The degree of mastering the technique of the jerk and push is determined; activity, hard work, courage and other psychological characteristics are taken into account. Tests are continuing on previous tests in dynamics. At the end of the year, for example, jumps are again evaluated according to the ball system (225 cm, 235 cm, 250 cm-in length, 53 cm, 56 cm and 58 cm-jumping up), the performance of youth categories and adult category III is performed.

The third stage is the final one (during the second year). All previous indicators are studied in dynamics. At the end of the assessment stage, the following:

Long jump - 240 cm, 253 cm, 265 cm;

Jumping up-58 cm, 64 cm, 68 cm;

Performed III category + 5 kg, II category.

Control tests are performed every 1.5-2 months [23].

Regulatory requirement.

The final work on the selection of young athletes should consist in accepting the regulatory requirements for General physical training and special physical training for incoming young weightlifters. The passing score for General physical training for 12-14-year-olds is 40-45 and for special physical training 14-18 [29].

When selecting adolescents, it is important to take into account the functional capabilities of the cardiovascular, respiratory and neuromuscular systems. To do this, it is advisable to apply control standards that assess the athlete's endurance.

For example, to assess the endurance of teenagers 12-14 years old-running 500 meters at the maximum pace before the start of a year's training and at the end of it. Not only the

sports result is registered, but also the heart rate immediately before running (if - the initial background) and after it at 1, 3, 5 and 10 minutes. Then the difference in the heart rate relative to the if in each time period is determined. The difference is added up and the sum of the increase in heart rate is obtained. A decrease in this parameter after a year indicates an increase in the functional readiness of the cardiovascular system [7, 17].

This will allow more effective selection of teenagers and young men in weightlifting and will allow the rapid development of the best athletes in weightlifting with such careful selection.

Thus, according to the existing recommendations of theorists and practitioners of physical culture and sports for selection for weightlifting, control tests were conducted before the start of the study according to the tests presented in.

Control tests for selection in the barbell section of teenagers 11-12 years old.

Exercises Results evaluated in points.

Three Four Five.

Bench press (number of repetitions) 15 20 25

Push-up with emphasis on bars (number of repetitions) 6 8 12

Climbing a rope (4 m) without the aid of feet, sec 22 20 18

Leaning forward (legs straight) Fingers touch the floor with your Palms touch the floor with your Palms touch the floor, and face - knees

Cross 500 m, sec. 100,0 92,0 85,0

Long jump from a place, cm 160 175 190

Shot put 4 kg, m 7 8 9

Circular training weightlifter teen

## 2. Methods and organization of research

### 2.1 Research methods

To solve these tasks, the following research methods were used:

Analysis of scientific and methodological and research literature;

Analysis of factors that characterize the possibilities of weightlifting;

Psychological and pedagogical observation;

Control and pedagogical tests;

Pedagogical experiment;

Method of mathematical processing of results;

Methods of comparative logical and graphical analysis;

Medical and pedagogical control.

The method of studying and analyzing scientific and methodological literature was used to obtain information about the state of the issue in the theory and practice of physical culture.

The method of studying and analyzing factors was used to obtain information describing the possibilities of weightlifting for teenagers aged 11-12 years.

Psychological and pedagogical observations were carried out according to special protocols and were aimed at studying the performance indicators of various training methods.

### 2.2 Organization of Research

The research was conducted in three stages. At the first stage, we studied the scientific and methodological literature, the choice of research methods and the setting of tasks.

At the second stage, a pedagogical experiment was conducted.

The third stage involved processing the obtained data in a pedagogical experiment.

To systematically assess the physical fitness of young weightlifters, control and pedagogical tests were periodically conducted at the beginning, middle and end of the school year. They made it possible to identify the level of physical fitness indicators, track the dynamics and determine the shift over the experimental period. It was based on General development exercises from various sports: running for 60 meters, long jumps from a place, pull-up on the crossbar, and from the Arsenal of special training tools – squat.

The pedagogical, natural experiment provided for the use of tools and methods in the experimental group that contribute to the development of physical fitness, with an emphasis on the effectiveness of circular training and the expansion of theoretical knowledge in the field of weightlifting.

Research on the topic was conducted in the sports children's school of the sports reserve in weightlifting of the city of Samarkand, Uzbekistan during the academic year (that is, for 6 months). The groups consisted of 20 teenagers aged 11-12 years. All of them were physically and technically prepared, and divided into two groups of 10 people each. Only young athletes who had been practicing for at least 6 months were allowed to participate in the experiment.

The distribution of young weightlifters in groups was based on the wishes of each participant in the experiment. However, to reduce the data spread, the athlete's own weight was taken into account when completing the training. So in both groups there were teenagers weighing from 35 to 45 kg.

Training sessions were held in the weightlifting training hall, and control tests in running, jumping and lifting on the crossbar were held in the track and field arena.

Medical and pedagogical control is one of the main conditions for the effective organization of classes with teenagers and young men in the weightlifting section. It provides for the observation of a doctor directly in the course of training sessions, during sports camps and competitions.

Medical and pedagogical control includes:

assessment of the organization and methods of conducting training sessions, taking into account the age, health status, general physical fitness and training of students;

Assessment of the impact of sports training and competitions on the body of those involved;

Verification of sports injury prevention measures and compliance with safety rules;

Advice on the age characteristics of young weightlifters and the impact of weightlifting on the body.

Teenagers, who are engaged in the program of one-year initial training, undergo medical examination at the dispensary at least 2 times a year (in September and March). In addition, they undergo a partial examination in training conditions at least once every 2 months.

Of great importance are the observations of a doctor during training sessions directly in the gym. The results of his observations during training can help identify signs of fatigue and timely prevent its harmful consequences.

One of the factors that are under the supervision of a doctor is the motor density of activities.

After monitoring 1-3 athletes throughout the lesson, the doctor uses a stopwatch to mark the time spent on various exercises. Separately notes the time spent on rest, explanation of the coach, waiting for the approach to the bar, etc.

Motor activity density is usually calculated using the formula:

Time spent performing exercises.

Motor density (%)=100%

Duration of the entire training session.

For example, if a training session lasted 90 minutes and various exercises took 54 minutes, the motor density of the training session will be:  $54 \text{ min}/90 \text{ min} \cdot 100\% = 60\%$

For weightlifters 12-16 years old, it is considered good motor density of classes equal to 50-60 %, for older athletes-60-70 %.

It is useful for the doctor to participate in planning the training load (both for the entire group of young athletes and for individuals), taking into account the results of medical and pedagogical control.

Analyzing and summarizing their observations of young athletes, the doctor can help the coach to fully reveal the functional capabilities of athletes, suggest the most correct ways and means to improve them. To do this, the sports doctor must:

Conduct a thorough analysis of medical examination data in the conditions of a medical and physical training dispensary and data of medical and pedagogical observations (VPN) during training and competitions;

Analyze the correctness of your chosen training methods and tools together with your trainer on a monthly basis;

Together with the coach to discuss the results of performances of young weightlifters at competitions;

Discuss and Refine individual training plans for young athletes together with the coach;

To study the conditions in which sports training is conducted, to achieve, if necessary, its improvement in accordance with the objectives of training sessions;

To conduct propaganda work among trainers to improve their special knowledge in the field of medicine, anatomy, physiology and hygiene.

Only under the constant supervision of a doctor and a coach, classes with young athletes in the weightlifting section give a positive result. It is very important that work with teenagers is carried out by qualified coaches who are familiar with the age-related features of human development and are well aware of the methods of training young weightlifters.

3. Development of methods for improving the effectiveness of training sessions by the method of "circular training"

In weightlifting, the least studied method of training weightlifters at the initial training stage. Therefore, to determine the effectiveness of various training methods, it is important to conduct a pedagogical experiment. In this case, you must adhere to the following:

### III. DISCUSSION

The experiment should not negatively affect the health of

young athletes and the growth of results;

The studied training loads should meet the age characteristics of adolescents and be as optimal as possible;

You cannot use a deliberately difficult load or exercise in an experiment;

All teenagers participating in the experiment should believe in the success of the chosen training method and be in the same conditions;

The experiment should be carried out under constant supervision of a doctor. Teenagers should not be allowed to train after an illness, with poor health, high temperature, etc.;

Every 2-3 months, it is necessary to conduct control estimates, recording their results in a special diary;

The results obtained should be objectively analyzed and then statistically processed. Fulfilling these experimental conditions will allow us to find the best way to train athletes at a young age.

Before starting the work, the possible motor modes of young athletes were determined. Based on the specific capabilities of the participants, the total volume of the load with its ups and downs was planned. In accordance with the modern requirements of pedagogical science, the methodological work was aimed at activating the cognitive, motor and mental activity of young weightlifters.

The experimental group trained using the circular training method. In this group, we place more emphasis on the dosage of the load, the selection of load and rest phases that provide a favorable training effect. The control group trained according to the method developed in the Olympic reserve weightlifting schools.

Sample training package for the first three months:

. Warm-up: running 10 minutes.

. Pull - up on the crossbar.

. Jumping out to a height (horse, goat).

. Push-ups from the floor.

. Squat with a barbell on the shoulders.

. Exercise with a spring expander.

. Jumps with weights on the back from the squat position.

Sample training package for the next three months:

Warm-up: running 15 minutes.

. Lifting the bar to the chin with a narrow grip.

. Pull with a jerk grip.

. Squat with a barbell on the shoulders.

From the hang on the crossbar lifting straight legs to the position of the angle and above.

. Jumping from a squat position.

Flexion-extension of the torso lying with the hips on the gymnastic trestle, face down, the legs are fixed with or without weights.

The determination of the best method of training. This experiment lasted 6 months. Control-pedagogical tests were performed 3 months after the start of the experiment.

To monitor the activity of the cardiovascular system were recorded using pulse rate for 2 minutes prior to the squat, during its execution and during the recovery period.

The pulse rate was calculated in 10-second intervals, and the recovery period was recorded. Physiological registration was performed at the beginning and end of the experiment.



Determination of the load in a squat with a barbell on the shoulders in the control and pedagogical test. Before the start of this experiment, the distribution of adolescents into groups was carried out on the same principle.

Training results were evaluated in control tests.

Registration for the activity of the cardiovascular system was carried out on the same principle.

Special attention was paid to creating a motivational attitude to classes. It is well known that motives are internal motivating forces; they can either be driven indirectly, through a consciously set goal, or through a decision. What is essential for the activity is what motives will become the leading ones. The set of motives includes the concept of motivation. It is not only the core of personality characteristics, but also affects the nature of all processes of physical culture and sports activities. The activity of young weightlifters will largely depend on their understanding of the social value of physical culture and sports. Depending on this of young weightlifters will be formed by those or other motives. In this regard, positive motivation was created and maintained before, on time, and after classes.

When developing the motivational structure, the law of stimulating effects of motivation by Jerks - Dodson was taken as a basis.

A questionnaire survey of coaches showed that in their practical activities, the creation of a motivational attitude in adolescents is most often carried out episodically. There is no system of special events aimed at increasing motivation and sustained interest in compulsory and training classes.

In this regard, we have selected the following tools aimed at increasing the activity of adolescents:

Selection of special exercises. It is very important to diversify the composition of exercises in each lesson, so that they have a versatile effect on the body.

Use of competitive, control and game methods.

The inclusion of means that contribute to the creation of a positive emotional background (music, games, relay races, competitive techniques), and to increase emotionality in the main part of the lesson, it is recommended to introduce elements of competition: who will perform the exercise better.

The influence of the family (interviews with parents, family traditions).

Class hours, conversations, stories, verbal influences. Performance (self-assessment and collective assessment of their actions).

Formation of positive mental states, self-confidence, manifestation of strong-willed efforts and qualities.

Creating the necessary level of psychological protection against physical stress.

It should be noted that the above tools were used differently in various classes.

Additionally, the experimental group conducted viewing and methodological analysis of educational films, film programs, etc. In addition, young athletes were required to perform daily morning gymnastics, as well as tasks of the coach-teacher to work out individual elements of exercise techniques and develop physical qualities, giving them for a certain period and periodically checking the correctness of

performance.

For better observation of athletes in the pedagogical experiment, training diaries were kept in both groups, to analyze the performance of training load and self-control over the functional state of the body.

Medical control over the state of health was determined during the training process and control and pedagogical tests on the sports field in the weightlifting hall by a specialist doctor. To assess the health and training effect of the correct construction of classes, the quality of adaptive responses of the body, we used methods of visual observations, conversations, functional tests to determine the fitness and reaction of the body to the load, including heart rate monitoring made it possible to monitor the condition and level of physical fitness of young weightlifters.

#### IV. RESULTS

This section presents the results of research of young weightlifters using various training methods and their impact on overall physical fitness.

Analysis of indicators obtained after 3 and 6 months in the squat showed that after 6 months of training, sports results increased in the subjects of both groups. However, their growth during this time was different. So, after 3 months of sports activities, the result in squatting increased in the experimental group by an average of 7.5 kg ( $t= 3.1$ ), in the control group - by 5.0 kg ( $t= 1.7$ ). The most reliable increase in the result was observed in the experimental group, in the control group, the increase was unreliable. After 6 months of training, the increase in indicators in the squat was in the experimental group by an average of 13.0 kg ( $t= 5.6$ ), in the control group - by 7.0 kg ( $t= 2.8$ ).

The increase in the subjects of the two groups was significant. If we analyze the increase in indicators in the squat in separate periods between estimates, it turns out that in the experimental group, the increase between the first and second estimates is 7.5 kg, between the second and third 5.5 kg; in the control group-5.0 and 2.0 kg.

Thus, the largest increase over the entire period of the 6-month experiment was in the experimental group that trained using the circular training method. The smallest increase was recorded in the control group that trained using the usual method. The coefficient of variation in the experimental group was the highest ( $V = 5.7\%$ ). In the control group, it was the smallest ( $V = 5.0\%$ ).

The growth of sports results occurred against the background of a significant decrease in the heart rate compared to the baseline level in the test groups (on average from 89 to 82 in 1 min.).

In the first 10 seconds after the end of the exercise in the experimental group of subjects the heart rate was  $148.7 \pm 7.2$  in 1 min And in the control group  $145 \pm 3.4$ . Recovery of the pulse rate after the end of the exercise to the initial value was noted in the experimental group for  $112.3 \pm 4.1$  seconds. and in the control group - by  $121.4 \pm 2.8$  seconds. Recording the heart rate when performing a squat showed that the two test groups had approximately the same increase in heart rate. It was the fastest to return to the initial level in the experimental

group.

Studies have shown that performing a squat with a barbell occurs against the background of more economical heart activity, both during work and in the recovery period, despite a greater increase in results. Changes in the state of the cardiovascular system in the subjects of the two groups are similar. However, the control group of adolescents showed the lowest increase in athletic performance.

Thus, in this experiment, as in the previous one, the best change in results and the most effective shifts in the functional state of the cardiovascular system were observed in the experimental group. This suggests, apparently, that circular training is more effective than conventional training developed by the school of weightlifting for teenagers 11-12 years old and does not lead to significant stress on the cardiovascular system.

Comparative analysis of indicators between groups at the initial and final stages of the experiment showed that the difference in the initial results in the squat was 1.0 %. The difference in the final results was greatest in the squat - 8.6 %. All this suggests that the experimental group by the end of the experiment had the greatest increase in results in squats, compared with the control group, and this indicates the effectiveness of circular training.

At the end of the experiment, the results were compared in the squat. The experimental group outperforms in squats by 9.6 %, which once again emphasizes the effectiveness of circular training of young weightlifters 11-12 years old at the initial training stage.

Systematic use of means of influence during the pedagogical experiment allowed increasing satisfaction from weightlifting up to 100 %. Increasing the motivational attitude contributed to the formation of a stable interest in weightlifting.

In conclusion, it should be noted that the use of all the proposed techniques and tools during the pedagogical experiment also contributed to improving performance. According to the results of the medical examination, only positive changes were noted in the health status of both groups.

The results obtained during the pedagogical experiment were analyzed in experimental and control groups. The shift in indicators was estimated not so much by the absolute result, but by the increase in this result relative to the initial level. The analysis of the level of growth suggests that targeted circular training after 3 months led to a significant increase in the level of overall physical fitness of the experimental group in comparison with the control group.

At the subsequent control tests, the athletes of the experimental group showed a significant increase in results in all exercises. In the control group, there was also an improvement in results, but to a much lesser extent. This indicates that it is informative to assess changes in physical fitness of young weightlifters aged 11-12 by the level of increase in results to characterize their ability to progress in sports.

In the experimental group, the 60 m running time improved after 6 months from 10.2 to 9.0 seconds, and in the control

group from 10.3 to 9.7 seconds. It follows that circular training affects the speed and strength qualities of young weightlifters and their explosive abilities.

Sports work with young athletes of the experimental group, aimed at improving motor skills, contributed to the growth of results in special and general physical training, and in the control group this direction was not, where the load was a normal training, which neither led to an increase in speed and strength qualities, but only contributed to the development of strength qualities of young weightlifters and the growth of results in general physical training was the worst.

The article analyzes the results of the pedagogical experiment and identifies a number of indicators obtained before and after the experiment.

## V. CONCLUSIONS

As shown by the research, the experimental group had a 21.8% improvement in athletic performance in squats, which exceeded the data of the control group by 9.6 %. This once again underlines the effectiveness of circular training for young weightlifters aged 11-12 years at the initial training stage.

Thus, in the squat, the best change in results and the most effective shifts in the functional state of the cardiovascular system were observed in the experimental group. This suggests, apparently, that circular training has the most positive effect on the growth of sports results and does not lead to significant stress on the cardiovascular system.

In performance running at 60 m by the end of the experiment, there have been improvements in the experimental group 12.5 %, while the control group only 6.0 percent in the long jump with respectively 9.1 and 4.9 %, respectively in the pull-up by 55.5% and 40%, with reliable significance level. It follows that training with various loads affects the speed and strength qualities of young weightlifters and their explosive abilities.

The use of the proposed circular training during the pedagogical experiment contributed to more effective training of young athletes. A comparative analysis of the data of the two groups showed that the young athletes of the experimental group had significant quantitative and qualitative changes at a more reliable level of significance.

It should be noted that the use of all the proposed techniques and tools during the pedagogical experiment also contributed to the improvement of recovery processes.

Our research allowed us to formulate appropriate practical recommendations for weightlifting coaches and teachers. In our opinion, their implementation will improve the effectiveness of the training process with novice weightlifters.

The results obtained in the study allow us to recommend the following in the practice of weightlifting:

1. As a means to promote more targeted and effective development of physical fitness of weightlifters aged 11-12 years at the initial training stage, it is necessary to use circular training.
2. At the initial training stages, pay more attention to Learning and improving the technique of classical exercises.
3. To form a stable interest and increase the motivational

structure for weightlifting, the following tools are recommended: agitation and propaganda activities; selection of interesting physical exercises; sports and outdoor games; emphasis on theoretical information; musical accompaniment of classes; class hours; conversations; methods of visual and verbal influence; family traditions.

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