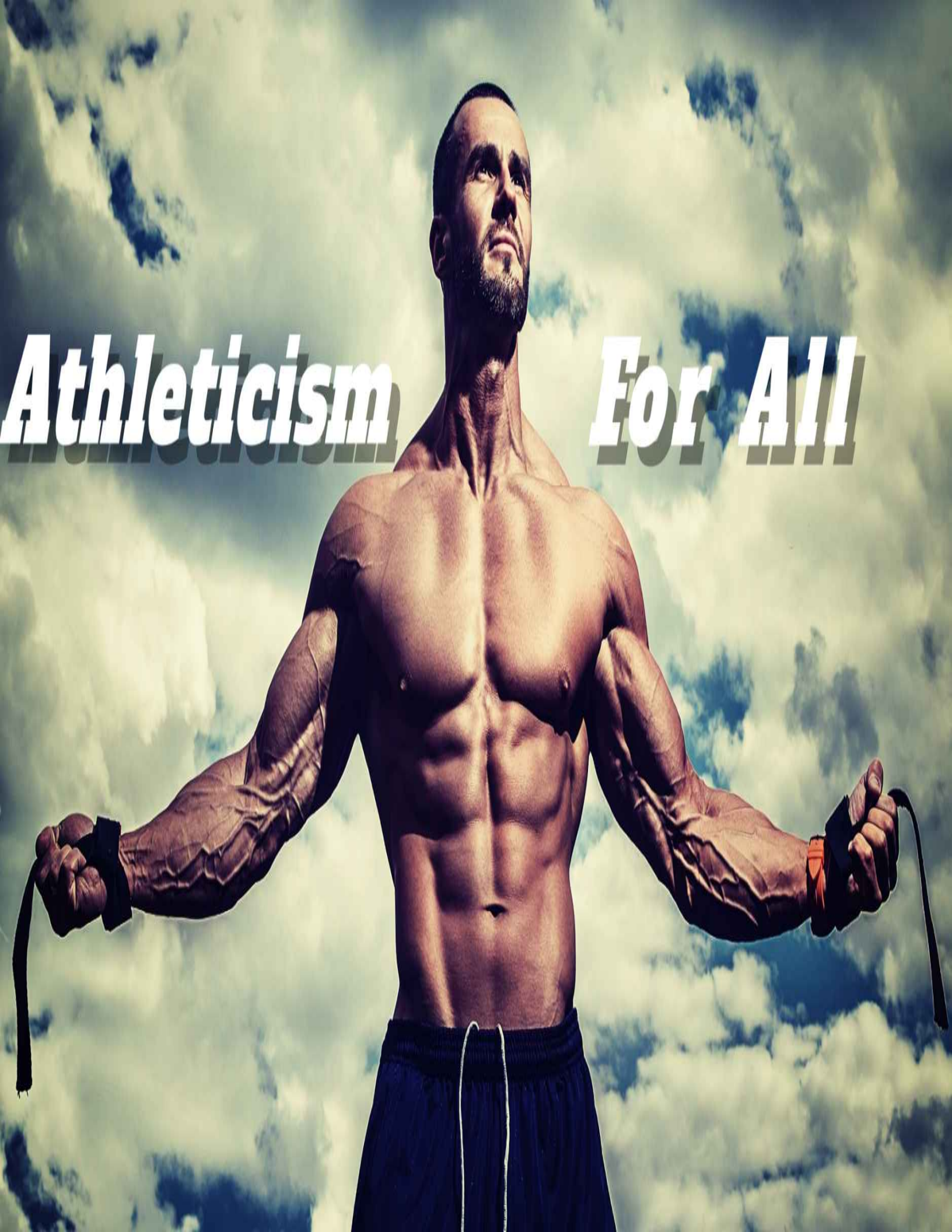

Athleticism For All

APPEARANCE
AND DEVELOPMENT OF ATHLETISM

Strength exercises have been known since ancient times. Rock paintings, legends, fairy tales of all peoples tell about people with extraordinary strength, and that they could lift and carry very heavy objects.

As early as 4000 years ago, competitions of antique bodybuilders were held at the courts of the pharaohs. Weights in the form of shells, reminiscent of modern dumbbells, can be seen on bronze objects, on paintings of ancient Roman temples, mosaics and engravings.

In the Middle Ages, artisans demonstrated their strength abilities: millers lifted the wheels of carts, brewers - barrels of beer, etc. To this day, the popular form of competition in some countries remains the press of stones, and at the recent shot put competition in the Swiss canton of Valais the shell was a huge stone weighing 100 kg.

Athleticism was born in Ancient Greece. The cult of body beauty, physical perfection was raised to unprecedented heights. Sports equipment, which are stone or metal cores connected by handles (halters) - the prototype of modern dumbbells - were widely used not only for muscle development, but also for therapeutic and prophylactic purposes to correct posture, form a beautiful physique, and preserve health. Descriptions of exercises with Halters are found in the writings of Hippocrates and followers of his school.

At the end of the last century in Russia, France and Austria, the special development of strength began to acquire an organized and well-defined character in such sports as weightlifting, wrestling, boxing, hammer throwing, shot put and lifting round weights. As a triathlon, there was such a combination: pushing stones, long press, free press.

Circus athletes also demonstrated their power, tying "ties" and "bracelets" of iron

rods, bent rails and crowbars, carried by several people. In these exercises, called "brutal gymnastics", tremendous strength is manifested, but it was impossible to accurately measure it and express it in numbers.

With respect, although with some skepticism, one can regard the fantastic achievements of athletes shown in the distant past. For example, in 1891, the Englishman Danton squeezed a barbell weighing 34 kg 845 times, Ster (Austria) in 1897 - a 50-kilo weight 25 times. In 1912, Gessler (Germany) lay down and stood up with a bag weighing 250 kg (the bag was filled with metal), Sir (Canada) in 1892 with his right hand raised a spherical barbell weighing 440 kg to the level of his knees!

Since 1901, international competitions have been organized for the strongest athletes in the USA, Canada, England, France, Belgium, Germany and other countries, in which they (both men and women) have demonstrated absolute power capabilities, beauty and harmony of the figure. Competitions were often held to music in the presence of spectators. The winners were solemnly awarded with cash prizes and medals, and, as a rule, the final crown of such championships was a male athletic beauty contest.

A significant contribution to the formation and development of athleticism was made by our compatriot Eugene Sandov (aka Eugene Sandow), who at the end of the last century put forward a hypothesis about the possibility of correcting body defects. He practically and theoretically substantiated the ways of forming an athletic figure through exercise with weights, publishing in 1903 in London a book called "Bodybuilding" (bodybuilding), setting out the principles that later formed the basis of culture. The origin of bodybuilding dates back to the period between world wars, widespread - to the first post-war years.

The Sandov system consisted of 18 exercises with dumbbells, applied on the principle of a gradual increase in loads. Working according to this system, the athlete achieved outstanding achievements for his time, becoming the owner of an excellent athletic figure: height 174 cm, weight 90 kg, neck volume 44 cm, chest 122 cm, waist 80 cm, pelvis 107 cm, hips 66 cm, shins 44 cm, arms (biceps tense) 44 cm.

Without belittling the merits of this great athlete, for comparison, we present some anthropometric data of the modern thirty-year-old Belarusian hero Nikolai Grishanov: height 177 cm, weight 100 kg, chest volume 135 cm, waist 78 cm, hips 73 cm, shins 45 cm, biceps

52 cm. With such a powerful muscle mass, an athlete is able to pull himself up on the bar with a wide grip 60 times and squeeze 200 kg lying down!

Another well-known specialist, French de Bonnet, developed a training program consisting of 17 exercises. After each exercise with weights, it was recommended to perform freestyle without objects, for stretching and relaxation.

The Breitbart system was born, which used a horseshoe with springs. A "force lever" appeared, which was an iron bar with a load attached to one end. A similar projectile these days is a weight attached to one end of a collapsible dumbbell bar.

Along with men, into the magical power of weight training to create a beautiful with harmoniously developed muscles and graceful posture figures have long been believed by women. Historical drawings and sculptures that have survived to this day testify to this. There are known examples when women competed on equal terms with men in weight lifting. "Madame Athletes" from Belgium (Anna Grüfflen), standing on the platform, lifted a platform with two riders on the straps, and waltzed from three men on shoulders. The strongest woman in Russia, Marina Lypc, carried three people on her back, while lying on her back, she kept nine on her feet. Lydia Rybakova from the city of Serpukhov near Moscow tears off a barbell weighing 900 kg!

However, the standard of a woman's perfect body is determined not by the level of strength development, but mainly by slenderness, plasticity, and mobility. A slender figure, light gait, beautiful posture can be created and maintained only through exercise.

In Russia at the beginning of this century, athletic training among women was quite specific and organized. Thus, in the March 1913 issue of the Hercules magazine, an advertisement was placed by the Sanitas Physical Development Society: "Exercise in corrective body culture with a guarantee of an increase in breast volume by 6-15 cm, lung capacity by 500-1000 cc, neck volume , biceps and hips by 3-5 cm, forearms, calves by 1.5-3 cm and a corresponding increase in the strength of all muscles in 36 lessons. Medical examination. Strict hygiene. Complete comfort. All the latest devices for the comprehensive development of the human body. For I'll give you a special watch. "

Agree, the ad looks very modern, and the last phrase is more than relevant.

It is generally accepted that modern athleticism was born

on the American continent, although there is information that his homeland is the British Isles, where contests and competitions were first held.

Gradually, the mass and rather organized enthusiasm of people of different ages and physical fitness for exercises with various weights led to the fact that in weightlifting, which existed as a sport, the process of differentiation began. In 1946, the existing International Weightlifting Federation (IWF), created in 1920, was transformed into the International Weightlifting Federation and the International Bodybuilding Federation, taking control of the physical development system, which is based on weight training.

Unlike weightlifting, where the goal is to achieve record results in lifting the barbell, bodybuilding involves the formation of an ideal athletic figure.

In the postwar years, bodybuilding gained further distribution. Those who practice it strive to create a massive figure with heavy layers of muscles (typically the American standard of male beauty). The enormous muscle mass of bodybuilders had to testify to an abundance of food consumed and processed into muscle. Competitions were held for the most powerful neck, chest, back, arm, lower leg. Two giants of bodybuilding - Americans Bob Hoffman and Joe Weider - grew up on the basis of the "muscle boom".

The formation of the International Federation of Bodybuilding was not easy. In 1949, it was forced to reunite with the International Weightlifting Federation, but since 1968 it finally gained independence and became known as the International Federation of Bodybuilding (IFBB) with headquarters in Montreal. Since 1946, the IFBB has been led by Ben Weider. In 1991, the IFBB united 142 countries.

In addition to IFBB, there are national (NABBO) and Worldwide (WABBO) professional bodybuilding associations, accounting for about three percent of athletes involved in athleticism. They hold their own than pionates of the world, Europe, claim the titles "Mr. Olympia" and "Miss Olympia". These associations allow individual and non-country participation in competitions and do not recognize the provisions of international doping control rules, which is why the IFBB automatically disqualifies all athletes participating in tournaments held by NABBO and WABBO.

By far the strongest in the world of culture

American stami are considered. According to experts, our athletes are inferior to them not in muscle mass, but in their quality, in proportion to development. Artistry is also lacking. This is mainly due to the worst training conditions, limiting the choice of diets.

Bodybuilding in the United States is considered a very fashionable sport, and these are not just words, but information, supported by numerous examples. Television constantly fuels interest in it, including daily sports programs. Six-time Mr. Olympia Lee Heine teaches television lessons for beginners, Miss Olympia Corina Everson leads the morning wellness program, and the legendary Arnold Schwarzenegger chairs the Presidential Council for Wellness and Sports. Bodybuilders take part in various shows, competitions, and act in films. This is how the fashion for a healthy lifestyle is formed.

Happy birthday of national athletic sports

considered August 10, 1885. On this day, the "Circle of Athletics Amateurs" was created, the chairman of which was elected Dr. Vladislav Frantsevich Kraevsky, who was engaged in the study of the muscular development of a person, the study of the influence of athletic exercises on the physical state of the body. For training, he equipped the athletic room with a set of weights and gymnastic apparatus. The best foreign and Russian professional strongmen trained in the office, for whom the recognition of their high results by the "Circle" was very valuable. Kraevsky was one of the first to try to scientifically substantiate the training methodology, actively promoted sports in Russia, and organized grandiose athletic holidays and competitions. The world famous athletes V.A. Pytlyasinsky and Georg Gakkenshmidt, who were called "

After the death of V.F.Kraevsky in 1908 in Peter

bourg, a weightlifting league was created, which led the work of all Russian weightlifting circles and clubs, and five years later the first All-Russian Weightlifting Union was formed there, which was headed by the holder of two world records L.A. Chaplinsky. Then Russia entered the World Weightlifting Union.

Thanks to the efforts of enthusiasts, in 1913-1914, the first All-Russian Olympiads were held in Kiev and Riga.

Weightlifting and kettlebell lifting were developing in the USSR before the Second World War.

In 1964, at the All-Union Weightlifting Federation, chaired by M. Akopyants, a commission of athletic gymnastics was established, whose task was to promote and popularize athletic gymnastics among the population as a new form of general physical training. She actively got to work organizing athletic clubs and running athletic competitions.

In the 70s and 80s, in the Soviet press, bodybuilding was sharply criticized as a bourgeois system, alien to our society, preaching the cult of the body, the cult of a certain superman, knocked together from a pile of muscles, filled with thoughts about himself, about his exclusiveness. In pursuit of an external effect, sensationalism, ostentatious records in muscle building, bodybuilding supposedly completely loses sight of concern for human health, for the development of various useful physical qualities.

Such an attitude towards bodybuilding, which flourished at that time in the capitalist world, was explained by the social and physical inferiority of its essence. Such a policy can be justified, perhaps, only by the fact that such a slander cleared the way for domestic athleticism, which seemed to have nothing in common with bourgeois bodybuilding.

Only in 1987 did the USSR State Sports Committee officially recognized athletic gymnastics as a sport, forming the All-Union Athletic Gymnastics Federation. It was chaired by the Olympic champion in weightlifting Y. P. Vlasov. Already in 1988, at the IFBB Congress, the USSR Athletic Federation was admitted to the International Federation, replenishing the IFBB.

The peculiarity of the structure of our federation was that it cultivated two areas of athleticism: bodybuilding (bodybuilding) and powerlifting (powerlifting).

Athleticism attracted everyone to the classes, regardless of gender and age. As soon as the Federation of Athletic Gymnastics was officially created in our country, this type fell to the liking of the current and, to a greater extent, former weightlifters, who became clear that by doing athleticism one can get moral and physical satisfaction, regardless of age. A purposeful and educated athlete with an appropriate lifestyle, diet, etc., can perform up to sixty years of age. Moreover, the World Powerlifting Championships are held for veterans.

Sports results began to grow, and there was a significant difference between the athletes - "siloviki" and

athletes - "bodybuilders" both in the organization of the educational and training process and in external parameters. It became clear that these are two independent sports. Therefore, in 1990, the federation was divided into the All-Union Federation of Bodybuilding (Bodybuilding) and the Federation of Powerlifting (Powerlifting).

Competitive strength triathlon exercises have always been and will remain basic in the training complexes of "pure poseurs". But let us emphasize that the training methodology and, in particular, the diet for them differ significantly.

Powerlifting competitions are very entertaining. It is always interesting to see with what weight an athlete can sit down, what weight he will not only lift off the ground, but also straighten up with him, what is the muscle strength in the bench press. The oldest International Federation of security officials regularly hosts World and European Championships.

The performance of the USSR national team (1991) can be recognized as a truly sensation of the men's world powerlifting championship, which ended in the Swedish city of Orebro. For the first time, 26-year-old A. Lekomtsev won a gold medal in the 82.5 kg weight category with a total of 790 kg (sitting - 300, bench - 200, deadlift - 290 kg). Silver medalists were S. Zhuravlev (weight 57 kg, amount - 527.5),
A. Sivokon (67 kg, 687.5), V. Ivanenko (100 kg, 867.5),
B. Naleykin (125 kg, 902.5).

As a result, our team took, also for the first time, the second team place, leaving the USA athletes ahead.

The Powerlifting Federation regularly holds its championships and tournaments. She is not opposed by athletes-"bodybuilders" (bodybuilders). For example, in the White Russian Athletic Club "73" both bodybuilders and "lifters" are successfully engaged.

The USSR Bodybuilding Federation organized and held international matches between the USSR and the USA, an international tour of the Man and Woman nir for the prizes of Soviet Sport, a tour of Soviet bodybuilders in America, European Championships (1990), USSR and other competitions. It was one of the first federations in the country to switch to self-financing and self-financing.

In April 1989, in Oslo, the USSR national bodybuilding team took part in the European Championship for the first time. The debut can be considered successful, as our athletes won the team posing, and the Belarusian athlete N. Shila won the gold medal in the weight category up to 65 kg.

The participation of Soviet athletes in
45th World Amateur Bodybuilding Championships

(1991) in the Polish city of Katowice. For the first time in the history of domestic bodybuilding, 25-year-old S. Otrokh from Kiev became a bronze medalist in the weight category up to 65 kg. Representative of Belarus K. Dubkov took part in this championship.

At the World Junior Championships held in Lisbon, 18-year-old Soviet bodybuilder V. Tarakanov won the world champion title in the most prestigious category - over 80 kg.

Bodybuilding became widespread in Belarus. In the fall of 1991, the first national bodybuilding championship of the republic was held in the city of Bobruisk. Here are the names of the winning athletes that went down in the history of the formation of this sport: A. Kriksin, N. Likhtor, K. Dubkov, A. Rudakov, A. Makarevich. T. Kovalenko, I. Kazando, L. Schepko took the lead among women.

At the open championship of the country-91 in bodybuilding, which took place in the city of Minsk, the Belarusian team became the second after the Russian national team, and in the weight up to 80 kg the Minsk resident K. Dubkov became the winner, A. Kriksin (65 kg, 2nd place), A. Rudakov (90, 3), N. Grishanov (90, 3), and among women - I. Cotrand (52, 3) and L. Schepko (57.3). It is pertinent to recall that the national team of the republic won the USSR Cup. Undoubtedly, the merit in these successes belongs to the federation of culture of the republic. It pays scholarships to leading athletes, helps them purchase rehabilitation funds abroad, and pays for some of the costs associated with participating in competitions. He earns money by making simulators, holding commercial competitions, and doing other economic activities.

An independent path of development of the Republic of Belarus opens up wide opportunities for athletes to perform at European and world championships, which in turn makes high demands on both athletes and their training system.

Bodybuilding is a specific sport. Its main symbols and goals are strength, grace, health, power and high motor culture. The magnificent musical accompaniment, together with the free exercises (voluntary programs) demonstrated by athletes and athletes during the competition, captivate the audience and form their interest in the beauty of the human body - one of the most wonderful creations of nature.

Thus, athleticism should be understood as a variety of physical exercises aimed at strengthening health, harmonious development of strength qualities and improving a person's physique. Conditionally it

can be divided into two types: a) athleticism, consisting of such independent sports as bodybuilding (bodybuilding); arm wrestling; powerlifting; weight-lifting; Weightlifting; b) athletic gymnastics, subdivided into dumbbell, exercise, string pulling (expander), etc. Athletic gymnastics is a system of versatile strength exercises performed with a barbell, kettlebells, dumbbells, espander, rubber harness, on universal machines, simulators, block devices, with their own weight, without shells, etc., aimed at developing strength, shaping a proportional figure and strengthening health.

A variety of athletic gymnastics for women - shaping ("shape" in translation from English - "form") allows you to conduct classes for the correction of a woman's figure. The Shey Ping Association has been formed in St. Petersburg. Scientists and trainers use a computer into which they enter anthropometric data and many other information about a particular person. The machine, having processed the information, "draws" a model of the ideal figure, which you can strive for without prejudice to your health, following the recommendations on the training and nutrition regimen. In this case, a woman after a while will reduce the volume of some parts of the figure, and increase others (if necessary). The computer recommends the pace of exercise (on apparatus, with a barbell, dumbbells, etc.), the maximum allowable heart rate and the number of repetitions, taking into account the physical fitness and emotional state of the person, his temperament and even character. This allows you to regulate the load on the nervous, cardiovascular, endocrine and other systems. Anyone wishing to study fills out a special form in which she indicates the length of her arms and legs, the volume of various parts of the body, the thickness of the fat folds. Based on these data, the woman is recommended a set of exercises, their description, as well as a diet and exercise regimen.

Due to the ability to accurately dose the amount loads, athletic gymnastics is an affordable and effective training tool for representatives of various sports, a wide range of people of different ages, sex, health status.

HUMAN MOTOR APPARATUS

To successfully engage in physical exercise with weights and on simulators, you must have a clear understanding of the human musculoskeletal system.

The backbone of all tissues and organs is the skeleton, which consists of many bones. The movable joints in the skeleton - there are up to 230 of them - are called joints. The ends of the articulating bones are tightly surrounded by a connective membrane called the articular bag. The main role in strengthening the joints is played by the ligaments - strong and elastic strands of connective tissue. They, growing together with the connecting bag, strengthen it. Tendons that attach to the bones are of great importance in strengthening the joints. For a variety of movements, some joints have special plates or discs made of connective tissue fibrous matter. The viscous fluid (synovia) released into the joint cavity by the inner layers of the tissues of the joint capsule reduces friction between the contacting surfaces of the bones. The main movements in the joints are flexion, extension, adduction, abduction, rotation (rotation), circular movements. Thanks to exercises, the joints become stronger and more mobile, but with excessive load and an increase in the degree of freedom, injuries are possible - dislocations, sometimes with rupture of tissues and blood vessels.

A person performs all movements thanks to the contraction
physical activity of more than six hundred skeletal muscles. There are two types of muscles - smooth, contracting without will (stomach, walls of blood vessels), and striated, moving the body in space, due to human-controlled muscle contraction. The striated muscle consists of thin filaments of actin protein and thick filaments - myosin, which, when combined, form sarcomeres - elementary motor units, where chemical energy is converted into mechanical energy, causing a person to move.

There is an assumption that the contractile process of the muscle occurs as a result of the mutual penetration of the filaments of actin and myosin. In this regard, the energy level of the sarcomere depends on the position of these filaments in it. Combining into groups, sarcomeres form more than a thousand thin filaments - fibrils, of which the muscle fiber consists. The fibers form muscle bundles, and those, when combined, form the muscle itself. The contractile fibers of the muscle terminate at the connective tissue, which passes into the tendon and transfers tension during contraction. The connective tissue is highly durable.

Depending on the appearance, the muscles received the following names: long, short, wide, ring-shaped. Almost all broad muscles are located on the trunk, long muscles are located mainly on the limbs, short muscles are located between individual vertebrae. The long muscles are like a spindle. The middle part of the muscle is called the abdomen, the beginning is the head, and the other end (longer) is the tail. Some muscles have several heads or, in the middle, are pulled by tendon formations, dividing them into several parts. Muscle tendons attach to the roughness, tuberosities and protrusions of the bones, weaving into the periosteum and partially penetrating deep into the bone substance, and sometimes to the articular bursa, fascia or skin.

When it contracts, the muscle moves the bones, which act as levers, in the joints. By shortening relatively a little, it develops quite large efforts. Therefore, in the human motor apparatus, there are usually bone levers with a loss of strength when the muscle is working, but with a gain in the way of applying this force. The magnitude of the moment of force depends on the angle at which the force acts on the lever. The greatest effect is achieved when the force acts at right angles to the lever.

With a change in the angle of flexion in the elbow joint from 0 to 100º, the shoulder strength increases on average from 11.5 to 44.5 mm, that is, four times, with the maximum external force is achieved at an angle of 90º. However, in reality, the moment of the external force of a person is much less than the maximum due to the application of the force of the muscle to the bone not at a right angle.

Various tubercles and protrusions on the bones of the skeleton, as well as sesamoid bones (for example, the patella), contribute to a more rational effect of the muscle on the bony levers. Muscles that cause movement of the body links in only one joint during contraction are called single-joint, and those attached at their ends are one

temporarily to the bones and individual parts of the skeleton and leading to a change in angles in many joints at once - polyarticular.

When performing articular movement due to contraction of certain muscle groups - synergists - it is always possible (with the exception of the presence of opposition from external forces) to return the moving link to its original position due to the presence of antagonist muscles.

Muscle strength depends on the anatomical structure. Muscles with a pinnate structure, spindle-shaped with parallel fibers are distinguished. It has been established that the muscles of the plumose structure are short and adapted to the development of high tension (for example, the gastrocnemius), while the muscles with parallel and spindle-shaped fibers are longer and provide fast, dexterous and sweeping movements (tailor's, biceps).

The strength of the muscles is the greater, the larger the area of their cross-section, and the magnitude of the contraction is the higher, the longer the muscle fibers. Some muscles can be shortened to 1 / 3-1 / 2 of the original length. The muscles have fast and slow fibers. The former, represented mainly in the cirrus muscles, for example, in the gastrocnemius, contract faster than slow ones, all other things being equal. The contraction also depends on the external load, on the activity of the central nervous system and on the strength of the muscle itself.

The relationship between the strength of a muscle and its diameter is determined by the number of fibers included in it. For example, a single striped fiber can develop a voltage of 0.1-0.2 g.

The contractile ability is characterized by the absolute force developed by the entire muscle per 1 cm2 of the cross section (physiological diameter). This allows you to compare the strength of different muscles, regardless of their size. For example, the absolute strength of the gastrocnemius muscle in the sum of the soleus muscle is 6.24, the biceps shoulder - 11.4, the triceps shoulder - 16.8, and the shoulder - 12.1 kg / cm2. The physiological diameter of some muscles is much larger than the anatomical diameter.

The muscle contracts due to an impulse coming from the central nervous system (for a single impulse - a single contraction). The higher the load, the greater the latent period of the moment of arrival of the pulse until the moment of contraction. The magnitude of this contraction depends on the applied external load: the greater it is, the less the muscle is shortened.

Having reached the maximum contraction after a single

irritation, the muscle relaxes again and lengthens to its original level. But this does not happen instantly, but over a period of time. Therefore, if you do not allow the muscle to completely relax, repeat the irritation, it will contract again, but even faster and more powerful than the first time. With frequent impulses of irritation, single contractions merge into one, called tetanus.

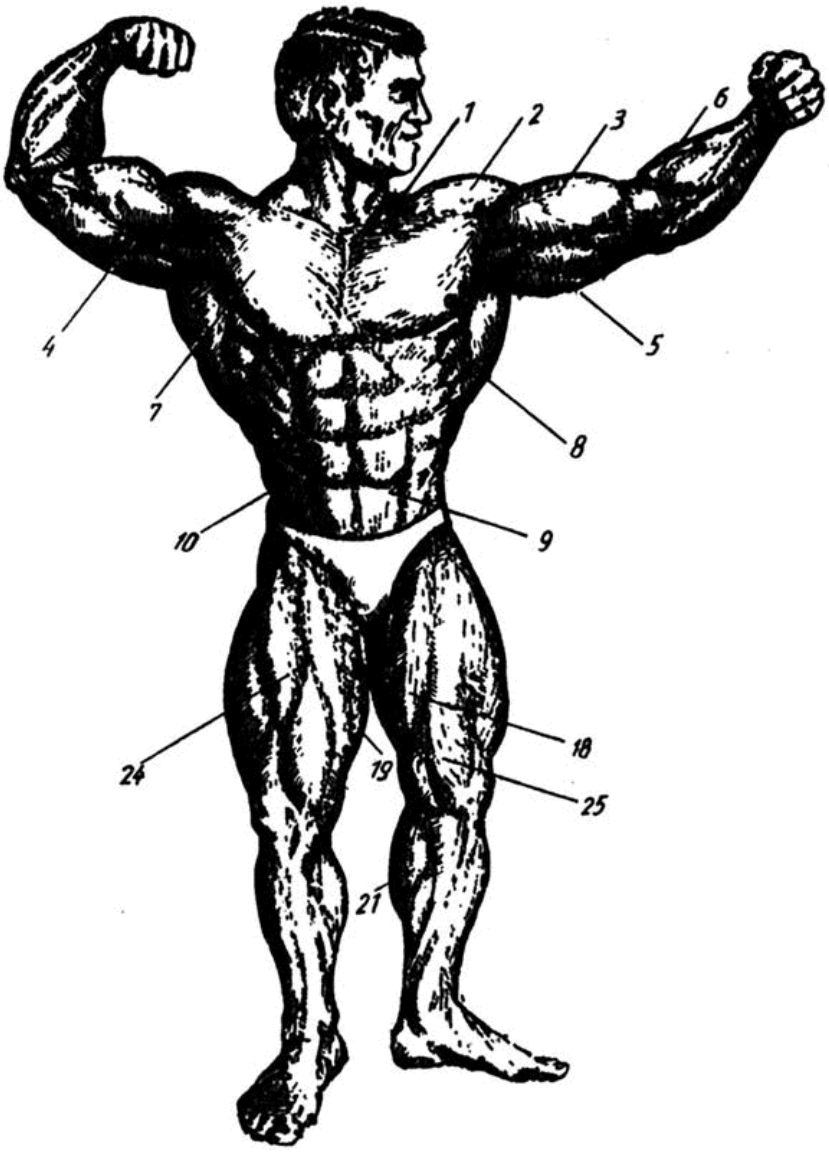
In sports movements or during normal muscular activity, there is always a tetanic contraction of skeletal muscles, and the higher, the stronger and more often the impulses from the central nervous system occur.

In a non-working muscle there is always some tension and it is slightly contracted due to incoming weak impulses. This circumstance largely determines the relief of the muscles, which is especially pronounced in athletic athletes.

Each state of a muscle corresponds to its definite length. If there are no obstacles from external factors, then with a change in its physiological state, the muscle tends to take on a length corresponding to this state. In the case when, due to external conditions, the length and physiological state of the muscle do not correspond to each other (if the length of the muscle is greater than its length in the unloaded state), it is deformed relative to its own length, that is, it is stretched. Taking into account the elastic properties of the muscle, we can talk about the presence of potential energy of elastic deformation, due to which, when external conditions change, work can be done to move the surrounding bone levers and other bodies associated with them.

Muscle traction results from interaction
the human motor apparatus with external objects. The type of muscle work is determined by the nature of this interaction - the relationship between internal and external forces. If the main moment of the forces of a muscle group is greater than the moment of forces opposing the thrust, they perform overcoming work, otherwise - inferior. Moreover, when the moments of muscular traction forces are equal to resistance, we are dealing with a holding type of muscular work. In the position of the main stance, the leg muscles work in a static mode, while sitting down - in the inferior mode, and when straightening the legs - in the overcoming mode.

Thus, physical work of a static or dynamic nature is always preceded by a change in the potential energy of elastic muscle deformation.



Each muscle in the body performs a strictly defined motor function. Let's consider some of them (fig. 1).

The muscles of the shoulder girdle. The sternocleidomastoid muscle is attached to the handle of the sternum, the inner
the end of the clavicle and to the mastoid process of the temporal bone of the skull. With the simultaneous contraction of the right and left muscles, the head tilts forward; with one-sided

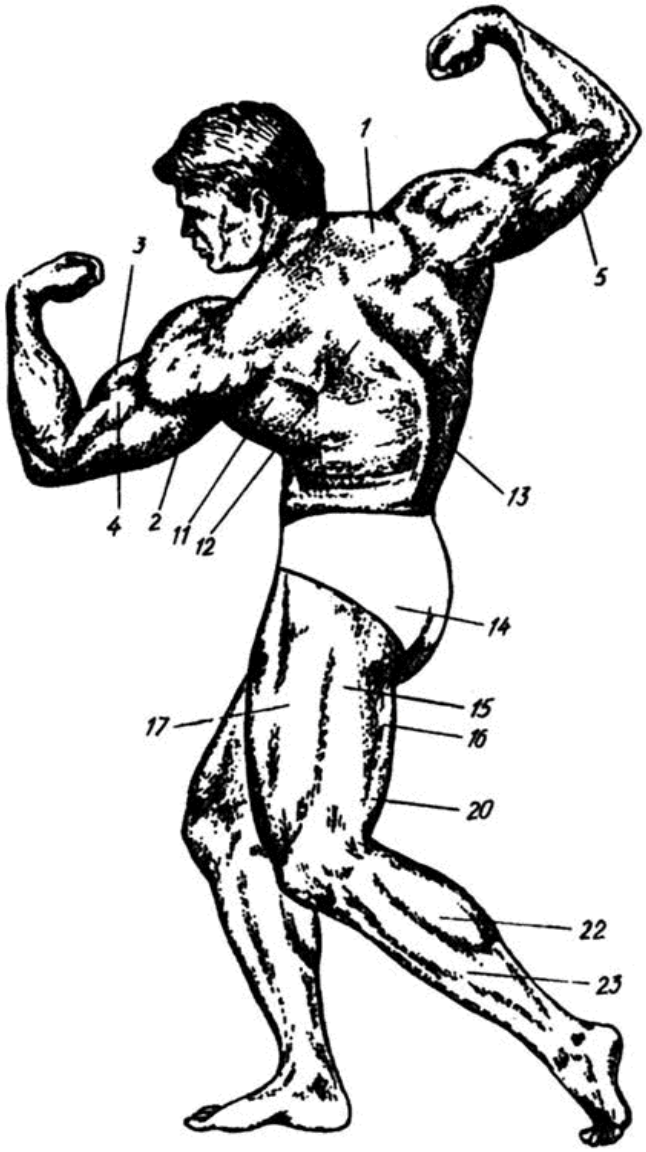


Fig 1. Main muscles:

1 - trapezoidal; 2 - deltoid; 3 - biceps (biceps); 4 - shoulder; 5 - three-headed (triceps); 6 - brachioradial; 7 - large chest; 8 - front ribbed; 9 - external oblique abdomen; 10 - straight abdomen; 11 - the broadest back; 12 - diamond-shaped; 13 - back extensor; 14 - berry; 15 - iliotibial; 16 - semi-dry vein; 17 - outer wide thigh; 18 - tailor; 19 - large leading; 20 - biceps femur; 21 - gastrocnemius, inner head; 22 - gastrocnemius, outer head; 23 - soleus; 24 - straight thigh; 25 - tailor

work, the head turns and tilts towards the working muscle.

The deltoid muscle is a powerful superficial muscle that attaches to the deltoid tuberosity, located in the upper part of the humerus. Depending on other attachments and functions, it is subdivided into clavicular, humeral and scapular, and all three parts are capable of independent contraction. The front of the muscle brings the arm forward and rotates inward; middle - takes the hand to the side, as well as forward and up; back - takes the hand up and back and rotates outward.

The small round muscle is attached to the lower and upper the edges of the scapula and to the large tubercle of the humerus. Provides outward rotation of the shoulder and adduction of the arm.

The large round one stretches from the lower angle of the scapula to the crest of the lesser tubercle of the humerus. Participates in pulling the shoulder down and back and in its rotation.

The biceps brachii (biceps) has two heads and one tail. It starts from the fossa of the shoulder joint and coracoid process and is attached to the radius. Flexes the shoulder and forearm at the elbow joint, turns the forearm outward.

The triceps muscle of the shoulder (triceps) has three heads: the long one starts from the scapula, the inner and outer - from the humerus. All three heads converge to a single tendon attached to the olecranon of the ulna. The muscle extends the forearm.

The muscles of the forearms are divided into the muscles of the anterior and back groups. The muscles of the anterior group flex the hand and fingers, rotate the forearm inward, and flex at the elbow joint. The muscles of the posterior group extend the hand and fingers, rotate the forearm outward, unbend it.

Chest muscles. The pectoralis major muscle lies superficially and has a triangular shape. It starts from the outer part of the clavicle, sternum, from the cartilage of the 2-7th ribs. Attaches to the crest of the large tubercle of the humerus. Brings the arm to the body, rotating it inward.

The pectoralis minor muscle is fan-shaped and located deeper than the pectoralis major. When contracting, pulls the scapula forward and down.

Back muscles. The trapezius muscle is located in upper back. Its upper part raises the scapula, the lower part lowers it, and the middle part brings it closer to the spine. With the contraction of the muscle as a whole, the scapula is brought to the midline. Its upper part largely determines the external outlines of the neck, since it begins

in the neck and continues up to the twelfth thoracic vertebra.

The broadest muscle of the back covers the lower-lateral part of the back and, rising up, attaches to the crest of the lesser tubercle of the humerus. The muscle pulls the arm back with the shoulder, while simultaneously turning it inward, brings the lower angle of the scapula to the chest.

The deep muscles of the back are located on both sides of the spine itself along its entire length and form the long extensor of the spine.

The external oblique muscle of the abdomen goes in a wide layer from the outside and from top to bottom. It begins with teeth from the eight lower ribs. In front and below it passes into a wide flat tendon - aponeurosis.

The oblique muscles of the abdomen provide lateral inclination of the spine and its turns to the right and left.

The rectus abdominis muscle lies outside the midline and runs longitudinally from top to bottom. It is divided into 4 parts by tendon formations and, therefore, has four abdomens. Participates in bending the trunk forward.

Leg muscles. Big and small gluteal muscles. The big one rotates the thigh outward, while unbending it. Small - abducts the hip.

The quadriceps femoris (quadriceps) - extends the lower leg at the knee joint and flexes the thigh.

The biceps femoris is located on its back surface at the outer edge. Flexes the lower leg at the knee joint, produces extension in the hip joint, turns the lower leg outward.

Flexion of the lower leg is also carried out using the semitendinosus, semimembranous and slender muscles of the back of the thigh.

STRENGTH DEVELOPMENT METHODS WITH THE APPLICATION OF WEIGHTENING

Strength is due to the manifestation of some relatively independent abilities: self-strength (maximum strength), speed-strength (explosive) and strength endurance. The greatest practical interest for those who go in for athleticism are their own strength abilities.

Methods and methodological techniques used in domestic athleticism to develop strength and increase muscle mass can be conditionally divided into two groups: those transferred to athleticism from the theory and methodology of physical culture and sports training and those that were developed and experimentally substantiated by foreign professional bodybuilders.

The development of strength occurs when a person performs physical exercises to overcome external resistance or counteract it through muscle tension. Depending on the goals and objectives of athletic training, external resistance can be selected from extreme to very low. V.M. Zatsiorskiy recommends to consider the limiting weight (resistance) as such, at which the practitioner in one approach can perform one repetition of the exercise (MP), near limiting - 2-3, large - 4-7, moderately large - 8-12 , medium - 13-18, small - 19-25 and very small - over 25.

For the development of self-strength abilities, manifested in relatively slow movements with large external weights and with isometric efforts, LP Matveev advises to use "extensive" methods. They are based on the performance of exercises with an unsatisfactory weight of weights, but with a limiting number of repetitions, and serve to increase the physiological diameter of muscles and body weight, and increase the functional readiness of an athlete. The number of repetitions of an exercise in one approach is from 5-6 to 7-8 (80-90% of the weight of the maximum external weights). For pova

The athlete brings the number of repetitions to 3-5, increasing the weight of the weights, and if there is a need for muscle hypertrophy, he uses 75-80% of the maximum weights with 8-12 repetitions in the approach.

A variation of the use of extensive methods will be a variant in which the number of approaches in each exercise is 3 or more (depending on the number of repetitions in the approach), the rest between them is 60-180 s. It is recommended to determine the maximum strength level every week and based on the results obtained, recalculate the weight of the training resistance for each exercise.

Intensified methods are based on the use of multiple limit and near-limit weights to increase the level of strength and speed-strength readiness.

Performing strength exercises in a dynamic mode with near-limit weights allows you to successfully develop strength abilities in sports that require maximum manifestation of strength (power air-lifting, arm wrestling, weightlifting, etc.). The range of weights used is in the range from 80-90 to 95-100% in relation to the maximum. In a separate training lesson for the development of strength abilities, you can use up to 6 types of exercises with near-limit and extreme weights, with the same number of approaches. The number of repetitions in each approach is 2-4. Rest between sets should be 3-5 minutes, and it is less for lighter athletes than for heavy ones.

The isotonic mode of muscle work, proposed by V.N. Platonov, can also be considered a variation of the dynamic mode of muscle contraction. It provides for the implementation of exercises with traditional weights (for example, with a barbell), with constant resistance throughout the movement. However, this idea of exercise is rather arbitrary, since the strength capabilities of an athlete during the execution of a movement change significantly due to a change in the values of the levers for applying forces. Muscles experience maximum resistance, as a rule, at various points in the range of motion (Fig. 2).

Exercises with a barbell, block devices and other weights should be performed at a constant low speed, since only in this case the load affects the muscles along the entire amplitude

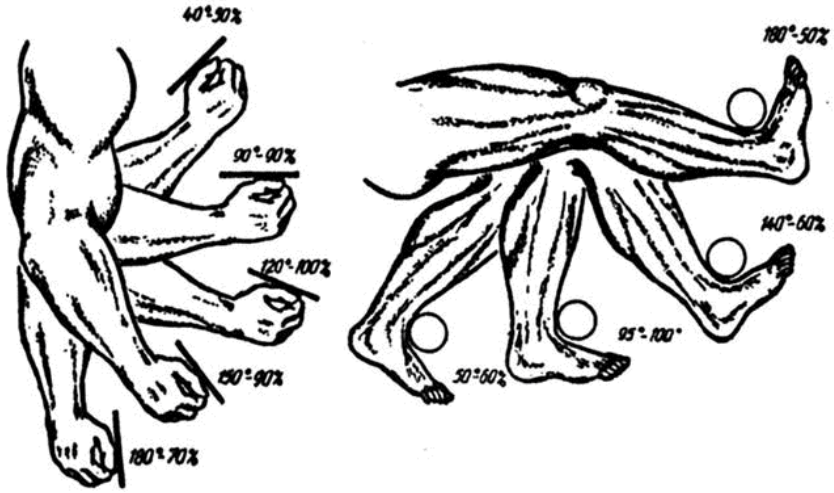


Figure: 2. Points of range of motion

movement, ensuring the growth of muscle mass. At the same time, performing exercises at a high speed is ineffective, since the maximum effort at the beginning of the movement gives the projectile acceleration. In addition, the muscles are practically not stressed when performing various exercises in the end positions. This is found in various types of movements of the weightlifter, bending and extending the arms in support on parallel bars. The combination of overcoming and inferior modes of muscle work allows performing movements with a sufficiently large amplitude, which contributes to the manifestation and development of strength qualities.

To develop maximum strength, you should perform

tasks with large weights (80-95%) with a small number of repetitions (4-8 in one approach) and a slow pace (1-2 seconds are spent on the overcoming part of the work, 2-4 on the inferior part) with rest pauses between sets 1 -2 minutes.

A slightly different view of the speed of exercise (time of muscle tension) and their effectiveness - in bodybuilders. They believe that if the duration of muscle tension is 6-8 seconds, the movement is slow. The slower the exercise, the longer the tension of the working muscle fibers and the higher the energy consumption. When doing squats slowly with submaximal weights, the costs

energy will be 20-40% more than when performing the same exercise at a moderate pace (muscle tension - 2-4 s).

It is assumed that at a moderate pace, a stronger metabolism occurs in the muscle and its growth is better stimulated, therefore, in training aimed at muscle development, movements should be performed only at a moderate pace.

Attempts are being made to establish the effectiveness of the influence of exercises performed in an inferior mode of muscle work due to the use of weights, which are 10-30% higher than those available for overcoming work. For example, slowly lowering the bar until it touches the chest on a bench press. With the best result in the press of a projectile of 100 kg, the weight of the weight in the inferior mode should be at least 110 kg. The partners return the bar to its original position. Training in this case is more tiring and leads to a greater accumulation of decay products in the muscles.

A variation of the above example of muscle work in an inferior mode will be the execution of the approach to failure with a near-limit weight, after which the athlete repeats the exercise 2-3 more times with the help of partners who help to raise the projectile to its original position. Lowering the weight is twice as slow as lifting, which is associated with increased energy expenditure and causes the maximum load of working muscles.

The exercise can be performed in overcoming mode; at the same time, despite the complete exhaustion of the trainee's strength, the partner helps to repeat the exercise 2-3 more times with a full range of motion (lowering and raising the apparatus).

J. Hartmann and H. Thünnemann consider several more ways to perform the exercise in a dynamic mode. If the athlete has completed the approach to failure and there is no partner nearby who can help in repeating the exercise in an inferior or overcoming mode, it can be continued "fraudulently". To do this, additional muscle groups should be connected, increasing the speed of passage of weight in places of movement with a low torque. The resulting inertial forces will allow you to pass through the "critical points" with a large moment of rotation. For example, when flexing and extending the arms in a prone position, you can use a high initial acceleration of the trunk, with pull-ups - swinging, with a bench press - lifting the pelvis. But

where at the beginning of the movement it is not possible to achieve the initial acceleration, this method is unsuitable (lifting the trunk from a horizontal position). When performing exercises "fraudulently", you should be especially careful not to get injured, especially when working with apparatus that are above the head, trunk.

This method can be implemented by changing the angles in the joints and thereby reducing the moments of rotation, i.e., the applied forces. Performing the raising and lowering of the legs in the hanging on straight arms and reaching the limit, the practitioner is able to repeat this exercise several more times, bending the legs at the hip and knee joints. Bringing and spreading his arms to failure through the sides, the athlete repeats the reduction due to strong bending of the arms (decrease in the torque), and dilution with almost straightened arms (2-3 times), performing work of an inferior nature. In foreign literature, the described method of increasing the volume of work is called "cheating".

A partial implementation method is known, in which the athlete, having reached the limit, repeats the exercise 2-3 more times, but with a limited range of motion.

Of interest is the isokinetic method, characterized by the fact that exercises are performed with extreme or near-limiting weights, with the use of training devices that allow movement in a wide speed range, with the manifestation of maximum or close efforts in any phase of movement and even in various repetitions. separate approach.

Due to the peculiarities of the isokinetic regime with resistance can vary depending on the actual capabilities of the muscles in each phase of the movement. The speed of movement of biolinks should not exceed 45-60º in 1 second, while in natural movements it is much higher. This is very important, since strength exercises in isokinetic mode on modern simulators allow changing the speed of movement of bio links from 0 to 200 ° and more in one second.

Exercises performed in this way contribute more to an increase in strength and to a lesser extent - to muscle mass, and therefore are considered very "tough". Beginner athletes should not use them, and physically prepared athletes should use them very carefully, after a sufficiently complete recovery from previous effects on the body.

The considered modes of performance of strength exercises refer to the dynamic mode of muscle work,

at which the stress of the latter is associated with multiple changes in their length. However, isometric (static) modes are also known, which are based on the maximum muscular tension lasting 5-6 s without any movement of the athlete and / or the apparatus and making it possible to purposefully accentuate and prolong the moment of tension. In a lesson, these exercises should not exceed 5-10 minutes (the maximum application of efforts to the barbell with obviously overweight weight).

Static exercises selectively affect various muscle groups, emphasizing the moment of effort in one or another position of the links of the motor apparatus. However, isometric training is less likely to increase muscle mass than dynamic training, and therefore is not particularly popular with bodybuilders, but can be applied in other types of athleticism, especially in athletic gymnastics, due to the availability of funds.

The desire to combine the strengths of isometric and dynamic load modes in one method led to the emergence of combined "dynamo-static" exercises. They can be considered as an additional tool in the strength training of an athlete. As an example, characterizing such exercises, we can call squats with a barbell on the chest or shoulders with a dosed delay in intermediate positions. In these exercises, overcoming, static and yielding modes of muscle tensions can be presented in various versions, passing into each other. The success of classes is facilitated by the use of training devices in the educational process.

A peculiar variant of the combination of dynamic and static modes of muscle work is observed when exercises with the maximum amplitude are performed to failure. When the athlete cannot perform the exercise even partially, it should be repeated 1-2 times in a static mode, the duration of the tension is 6-10 s (for example, when lifting the body from a prone position).

The use of generally accepted methods of sports training in athletic training should be based on specific target settings for each trainee, taking into account age, gender, level of physical development and health.

The effectiveness of this or that method largely depends on the level of preparedness of the trainees. So, exercises with overcoming resistances of 50-65% of the maximum will have a positive effect on increasing

the increase in muscle diameter in beginners and none in highly qualified athletes. Therefore, beginners and trained athletes should use this or that method in a strictly differentiated manner.

Of course, the listed methods and related modes of muscle work make it possible to develop muscle strength to a greater extent and to a lesser extent increase muscle mass, although both are the goals of training in certain types of athleticism. Nevertheless, we consider it necessary to consider methods that have found application exclusively in bodybuilding, which is characterized by a strict specificity of training for the development of "powerful and powerful" muscles.

One of the bodybuilding methods is "bodybuilding" aimed at correcting defects and improving the physique due to selective hypertrophy of certain muscle groups, reducing subcutaneous fat and its deposits in the fat depot. In this case, the muscles acquire specific qualities associated with morphological changes: the number of muscle fibers increases, the access to them of nutrients and the yield of metabolic products improve. It is believed that the muscle "built" through "bodybuilding" has a broader set of qualities than those developed by other strength training systems. Apparently, only a narrow range of weights used in the system of strength training and aimed at developing various qualities - from maximum strength to general endurance, to the greatest extent develops all the qualities in the complex. On the other hand, the methodological direction of "bodybuilding" involves work in the zone of large and moderately heavy weights, allowing you to perform several movements (usually 6-12). In each approach, the exercise is performed to failure. Repeated maximum loads on the same group are carried out in the super-recovery phase after the previous one. A variety of methodological techniques are used to activate blood circulation, enhance the intensity of metabolic processes leading to muscle growth. That is, a change in the impact of an external load on the occupant (the magnitude of the burden or counterweight, the form of the exercise, etc.) allows the athlete to keep as far as possible in the zone of optimal developmental load in conditions of increasing fatigue. This type of work contributes to the transition from the general development of strength qualities to a rational increase in muscle mass. For example, a traditional endurance workout might consist of a series of 10

sets of 10 reps with body weight. At the same time, for a trained athlete, some of the first approaches - suppose the first five - will not have a developmental character, and only in the final movements of the subsequent approaches (the last two pull-ups in the sixth, three in the seventh, four in the eighth, etc.) the training effect of the task being performed will appear. The same series, but built "for bodybuilding", will look like this: the first two approaches in pull-ups - with additional weights, allowing you to do the exercise 10 times to failure (10 RM), the next two approaches - with less additional weights, but also to failure, and so on until the approach with its own weight with the use of a counterweight (partner's help) completes the training task.

For successful completion of work in the final approaches, you can change the form of movement (in the proposed example, change the grip). In this case, the magnitude of the burden should increase, since some of the new muscle fibers are included in the work. Thus, as a result of the application of this method, the effectiveness of strength training is significantly increased - not 20, but 70-80% of the work will be developing.

The "bodybuilding" training system is characterized by the fact that many exercises are performed while lying and standing at different angles of inclination. Individual parts of the body are relieved of tension and the load on the spine, cardiovascular and respiratory systems is reduced. At the same time, prerequisites are created for focusing attention and concentrating efforts on a detailed all-round study of individual muscle groups.

The load parameters take into account the decrease in working capacity, the onset of fatigue and are on the verge of this state of the organism. The more accurately this state is established, the greater the effect of this training. Beginning athletes do not use extreme weights all the time, like those who are committed to the strength direction of athleticism, but only when the need arises.

The amount of weights and the number of repetitions in bodybuilding are established based on the following three principles:

1. A small number of repetitions (5-6) with relatively large weights (to develop and increase the volume of muscles and the whole body).
2. Average number of repetitions (8-10) with moderate burden (for overall muscle development).
3. Large number of repetitions (15 or more) with

relatively small weights (to remove body fat, develop muscle relief and increase muscle endurance).

Training "bodybuilding" can be represented as follows: external load - fatigue - decreased performance - load correction.

However, experienced athletes allow themselves a load of a slightly different nature.

So, the American athlete Troy Zucolotto at the beginning of the workout does two warm-up approaches with light weights, which allows you to bring the number of repetitions to 20. Then, increasing the weight of the weights, he makes 3-4 approaches with 8 repetitions and, finally, sets such a weight that the exercise can perform only with the help of a partner: two sets of 4-5 reps.

Bodybuilders use a technique based on a combination of two exercises, each of which is aimed at the specific development of a certain muscle group, and the approaches are performed without rest (the principle of "superset"). In this case, an effective increase in muscle mass and strength occurs. With the help of a superset, stimulation of working muscles increases, blood circulation in them increases, and the functioning of the nervous system that controls this part of the body improves.

However, the superset can only be used by experienced athletes. As an example, let's call the following exercises: lifting the barbell for biceps - press the bar with a narrow grip (biceps-triceps); press the bar with a wide grip - pulling the bar to the chest in the slope (chest-back); squats with a barbell on the shoulders - flexion of the legs in a special device (leg extensors-flexors), etc.

There is also a known version of the bodybuilding method called "flash": muscles work for a long period of time with short rest intervals. The resulting stress conditions are thought to contribute to effective gains in strength and muscle mass. In one lesson, you should not work out more than three muscle groups.

Thus, in athleticism, both generally accepted methods of sports training and specific “bodybuilding” methods, some of which we have described, can be successfully used.

If in most modern sports - powerlifting, arm wrestling, kettlebell lifting, weightlifting, etc. - voluminous and intense work of a strength nature, performed using a variety of weights, simulators and equipment, is aimed at

increasing the level of maximum strength, strength endurance and explosive strength, then in bodybuilding (bodybuilding), first of all, they increase muscle mass, which is the most important indicator of the effectiveness of training athletes. Unlike weightlifters, they do not need special explosive strength and are not limited to such tough categories.

We have considered the most common in practice

sports training methods of development of proper power abilities and their constituent modes of muscle work. The use of this or that method should strictly take into account the age and individual characteristics of the trainees, the level of their physical development and fitness, as well as the target setting for health improvement, body correction in athletic gymnastics, or the achievement of a certain sports result in one of the types of sports athleticism.

GUNS AND EXERCISES

To develop muscle groups and improve health, you can use a wide variety of shells and devices: dumbbells, rubber shock absorbers and resistance bands, barbells, barbell discs, weighted cuffs and belts, weights, block devices with weights or counterweights, wall bars, gymnastic bars and parallel bars , simulators and devices of regional and local impact on the muscular apparatus of those involved, etc. Many different subjects for training can be conditionally divided into three groups:

— block and lever devices (simulators) of various structural complexity, as well as devices that allow isolated and more purposeful loading of muscles in the process of performing exercises (simulators "Biceps", "Triceps", "Roman chair", hook-machine for squats, crossbar, etc.);

— shells for multi-round training of those involved - a barbell, dumbbells, weights, resistance bands, etc .;

— equipment necessary for the correct and effective performance of exercises with weights - benches, barbell racks and squat racks, etc.

Trainers. A person has been consciously striving for a long time to create conditions that simulate various types of activity, including sports. A variety of technical teaching aids are being developed and used, including simulators and training devices and adaptations designed to educate and improve motor, professional and applied skills and abilities, develop physical qualities, as well as medical rehabilitation (mechanotherapy). This broad definition expresses the content of the concept of a simulator (from English to train - to teach, train).

The founder of simulator building by right of count
is Jonas Gustav Wilhelm Zander, who in 1865 in Stockholm opened the world's first institute to restore

lesion of the functions of damaged muscles and joints. Devices for strengthening the shoulder girdle, legs, and back began to spread rather quickly from Sweden to Baden-Baden, Paris, London, Petersburg and other cities where the Zander institutes were based. These devices were built on the principle of a two-arm lever. One shoulder served as a point of application of forces, on the other was a load, moving which you can set various loads. This is how the first training devices appeared that made it possible to strengthen the muscular apparatus. Many of Zander's devices are the forefathers of today's sleek, compact, simplest, and computer-developed mechanisms for physical improvement and health promotion. Zander himself used his own inventions until the last years of his active life and died at the age of 85.

Exercise machines differ in weight, dimensions, design features and functional purpose. FROM with the help of some (treadmill, bicycle and rowing machines), you can successfully develop general, high-speed, speed-power endurance, and with the help of others (power equipment for the development of various muscle groups - the shoulder girdle, abs, hips, etc.) - develop dynamic strength, flexibility.

Due to the versatility in changing the load, amplitude, pace and rhythm of movement, the same devices can be successfully used both in training athletes of various qualifications and to improve the health of people who are not related to big sports. It is important to clearly define the purpose of training on the simulator and use exercises that are appropriate for the age and fitness of each student.

The simulators allow creating artificial conditions for performing exercises with limiting the likelihood of the occurrence of erroneous, incorrect motor actions. The improved exercise acquires the required properties both in terms of its internal and external structural characteristics. Simulators for mass physical education also create artificial conditions for performing exercises. These devices are used to improve the physical fitness of all segments of the population.

Training centers using simulators are being created at industrial enterprises and institutions, as well as in recreation areas. The simulators do not require large areas, they attract with their novelty, appearance, and allow precise dosage of the load.

The use of simulators in classes with children will help

it increases their motor activity, develops motor abilities faster. The use of simulators is especially effective in training children suffering from overweight. They are more willing to work out on simulators than on the usual gymnastic apparatus.

Modern athletic training is inconceivable without a set of special training devices of various designs.

Of particular interest are simulators and devices for strengthening individual muscle groups in standardized and variable conditions; their constructive implementation involves equipment for exercises, consisting of several parts (bars, bars, ladders, etc.); devices with variable weight, with rotating parts, compressing and stretching springs; devices with overcoming resistance, for exercises of individual parts of the body (shoulders, legs, feet, arms); training complexes "Hercules", universal simulators for the development of pectoral muscles, leg strength, back and others.

In recent years, in athletic gymnastics, for training in a variable mode, simulators are increasingly used in which resistance is changed using levers and eccentrics. A combination is also possible, based on the use of eccentrics and levers, the length of which changes in the direction of travel. The design features of such simulators imply the performance of exercises with an exceptionally large amplitude, thus maximizing the stretching of the working muscles in the inferior part of the work. This is important for two reasons: firstly, pre-well-stretched muscles are capable of a higher manifestation of strength qualities; secondly, good preconditions are created for the simultaneous manifestation of strength qualities and flexibility, for "working out" the muscles in the entire range of motion.

The disadvantages of such structures include cumbersome bone, difficulty in manufacturing, inability to perform various exercises on one simulator - each is designed for almost one or two.

Specialized simulators allow you to change the value of external resistance directly during the exercise. And this change in individual sections of the movement contributes to a different manifestation of strength and speed. An increase in resistance in some areas leads to the creation of a force accent, and a decrease in the speed increases. So in the process of performing the exercise, the manifestation of the components of the power of movement (strength and speed) is regulated. At the same time, the variables

resistance modes promote variable manifestation of motor characteristics, which counteracts the formation of a bone motor stereotype.

Thanks to the development of science and technology, the designs of modern training devices have changed significantly. You can often find simulators equipped with microprocessors with a computer output, which provide urgent information about the athlete's condition and, at the same time, set a strictly metered physical load. However, the relevance of the simplest constructions, attracting the attention of a huge army of athletes and athletes due to their accessibility, efficiency and reliability, has not lost their relevance.

Consider a brief

the technical characteristics of some athletic training equipment and the exercises performed on them.

Upper Sleep Trainer

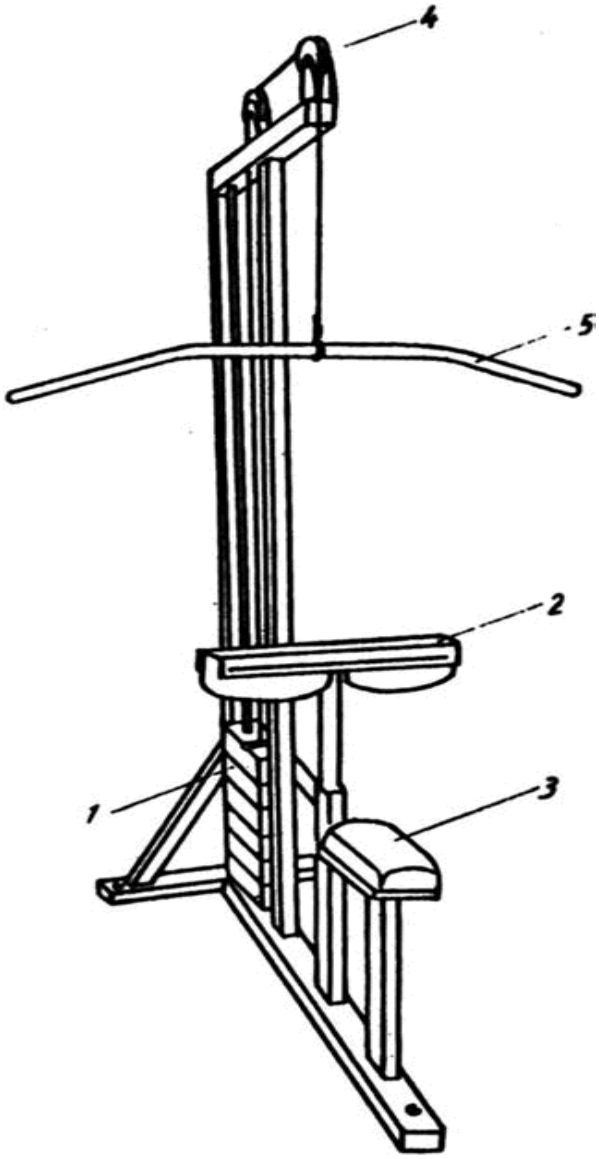


Fig 3. Trainer for the development of back muscles

us - trapezius, latissimus muscles of the back, muscle lifting the scapula, rhomboid, etc. - (Fig. 3) has a set of weights 1 to create a metered load, support for legs 2, seat 3, block device 4 with a curved wide rod 5 ...

Exercises:

1. Standing with your back to the machine, holding the block rod

devices in arms straightened up. Flexion of the arms at the elbow joints with fixed elbows.

2. Standing, the block device rod is in the hands, the elbows are pressed to the body. The grip is narrow. Extension of the arms down. The elbows are motionless.

3. Sitting. Pull the rod of the block device to the back of the head. The grip is wide.

4. Standing, the rod of the block device in bent arms. Straightening the arms down (pulling down on the block).

5. Standing, the rod of the block device in straight hands. Down-pull with straight arms.

6. Sitting, the rod of the block device in bent arms. Reverse Grip Rows.

7. The same, with a grip from above.

Exercise machine "Crossbar (Fig. 4) is a device that exerts a training effect on the muscles of the arms, back, abdomen. It consists of a crossbar 1 with a variable length, a set of weights 2 and a block system 3, which facilitates the weight of the athlete when performing pull-ups. floor and wall with the help of pads 4. The block system in conjunction with the rods 5 makes it possible to perform exercises 1-8.

A simplified version of the considered device, calculated for the installation of a crossbeam 1 using grips 2 on a gymnastic wall, is shown in Fig. five.

Counterweights on a block device are introduced into the design of the simulator in order to make it possible to perform a number of useful exercises for beginner athletes. At the same time, pulling up with a wide grip is a rather difficult exercise for experienced athletes, requiring significant straining and high energy consumption.

Exercises:

8. Hanging on the bar. Top grip medium (wide, narrow). Pulling up until the chest touches the bar.

9. Also. Bottom grip.

10. The same, but the exercise is facilitated by using a counterweight.

11. The same, but a weight is attached to the belt.

12. Hanging on the bar. Raising your legs to the bar.

13. Hanging on the bar. Pulling the knees to the chest.

14. Hanging on the bar. Pulling up until the back of the head touches the bar. The grip is wide.

15. Hanging sideways. Pulling up on the bar until the chest touches it.

"Desk" (Fig. 6) is a device for the development of biceps. The design is quite simple: it consists

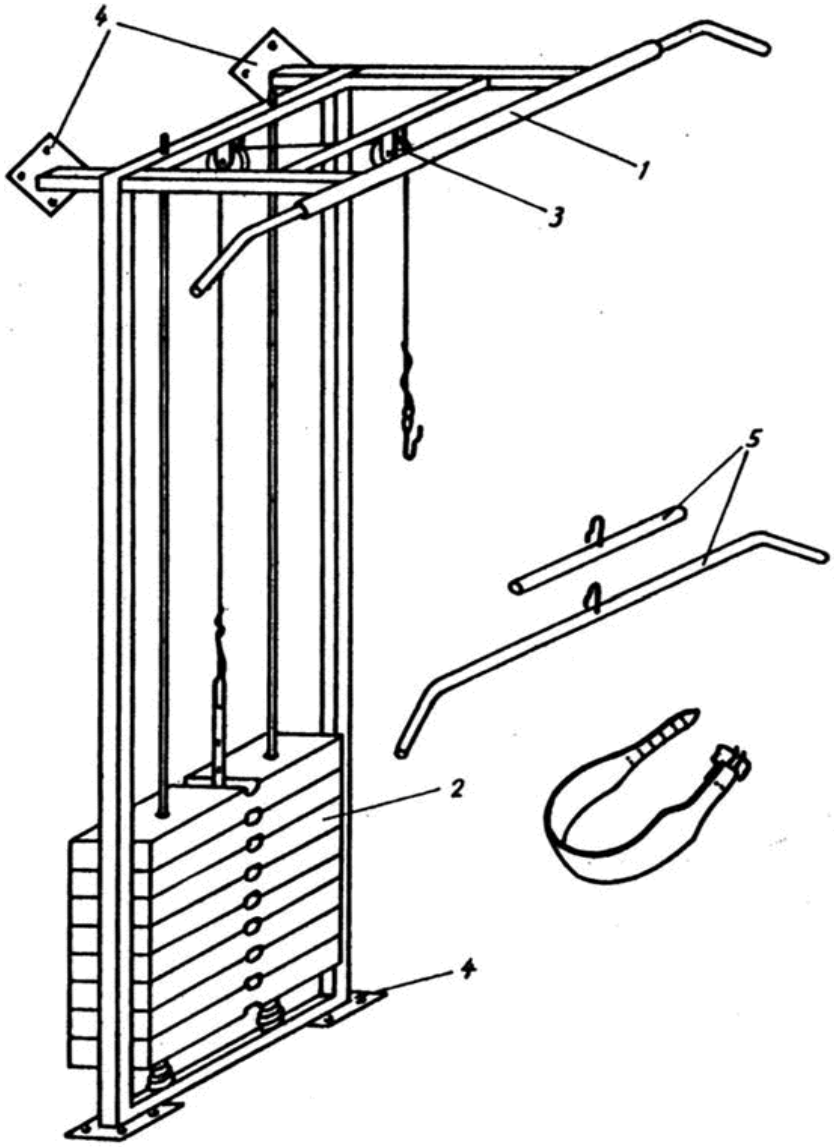
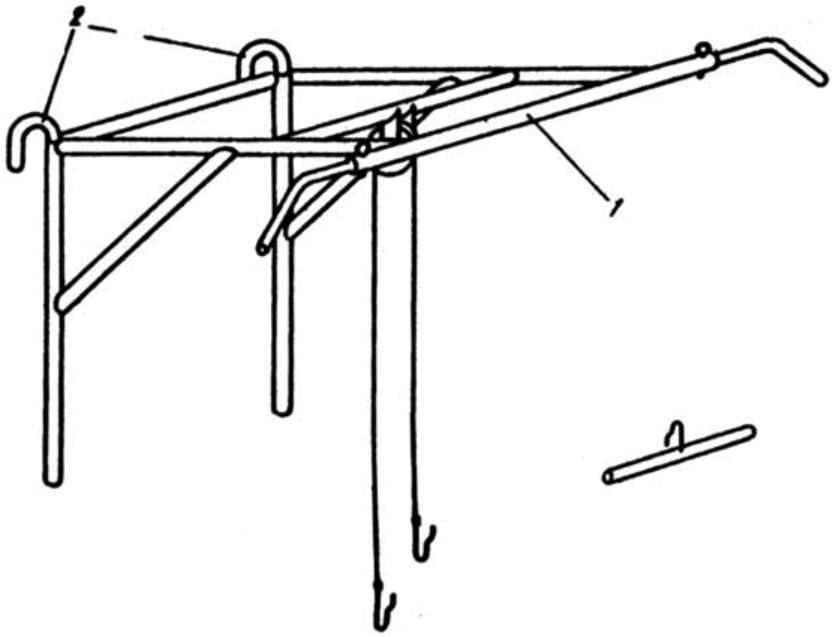


Fig 4. Exercise machine "Crossbar"



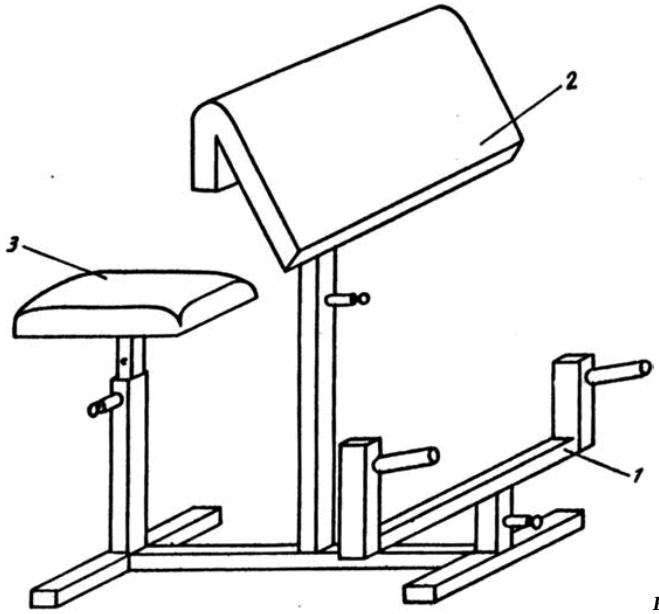


Figure: 5. Simplified version of the "Crossbeam"

Fig 6. "School desk"

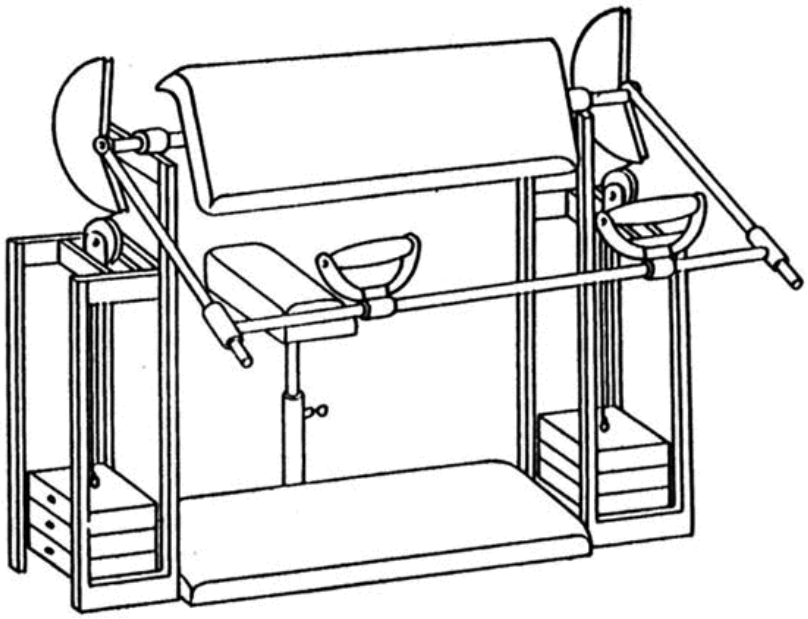


Fig 7. Exercise machine "Desk" with a block-lever element

from rack 1 for the bar, support 2 for the torso and arms and seat 3. All these units have movable telescopic joints for installation at the required level; The torso and arm rest changes the angle of the working surface.

Exercises:

16. Sitting at the "desk", in the hands of the barbell with a bottom grip. Flexion and extension of the arms.

17. The same, with a grip from above.

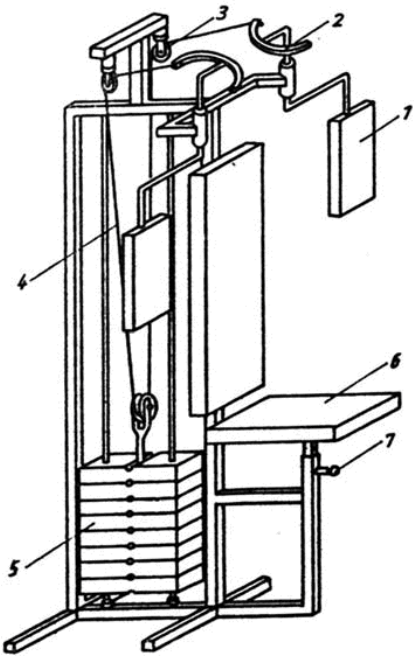
A different effect of the exercise on the biceps can be obtained by using a barbell with a curved bar, a block device rod as a weight, and also by complicating the training device to the level of a simulator by introducing a block-lever mechanism with an adjustable load value (Fig. 7).

Chest and Shoulder Block Trainer

belt (Fig. 8) develops the deltoid major and minor muscles of the chest. It consists of armrests 1, which, due to the lever mechanism 2, blocks 3, cable 4 and weights 5, when bringing the arms bent at the elbows together, affect the deltoid, large and small muscles of the chest. Seat 6 is installed at the required level using the retainer 7.

An exercise:

18. Sitting with arms spread apart and bent at the elbows



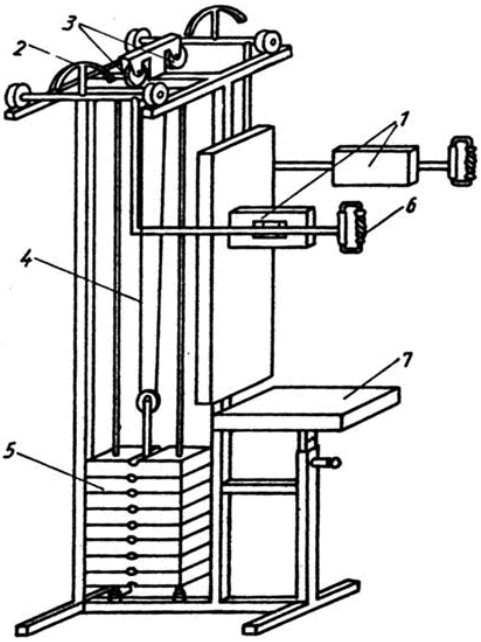


Figure: 8. Trainer for the muscles of the chest and shoulder girdle

Figure: 9. Exercise machine for deltoid muscles

at right angles. The forearms are completely resting on the armrests. Reduction and separation of hands.

Block-lever trainer for the development of deltoids muscle (Fig. 9) by construction resembles previous trainer and has armrests *1*which from via the linkage mechanism 2, block kov 3, rope 4 and weights 5, when the arms are bent at the elbows, affect the muscles of the shoulder girdle. For convenience, the projectile is equipped with 6 handles and 7 denier with a variable mounting height.

An exercise:

19. Sitting, grip the handles with bent elbows. Breeding and bringing hands together through the sides up. Block tren jer with stops is uses for the development of muscles of the arms, back. It includes stops 1, a weights cassette 2, a system of blocks 3. The structure is attached to the wall and the floor with pads 4. It is used for developed muscles of the arms and back (Fig. 10).

Exercises:

20. Flexion and extension of the arms in support.
21. The same, but with the counterweight (through the upper block).

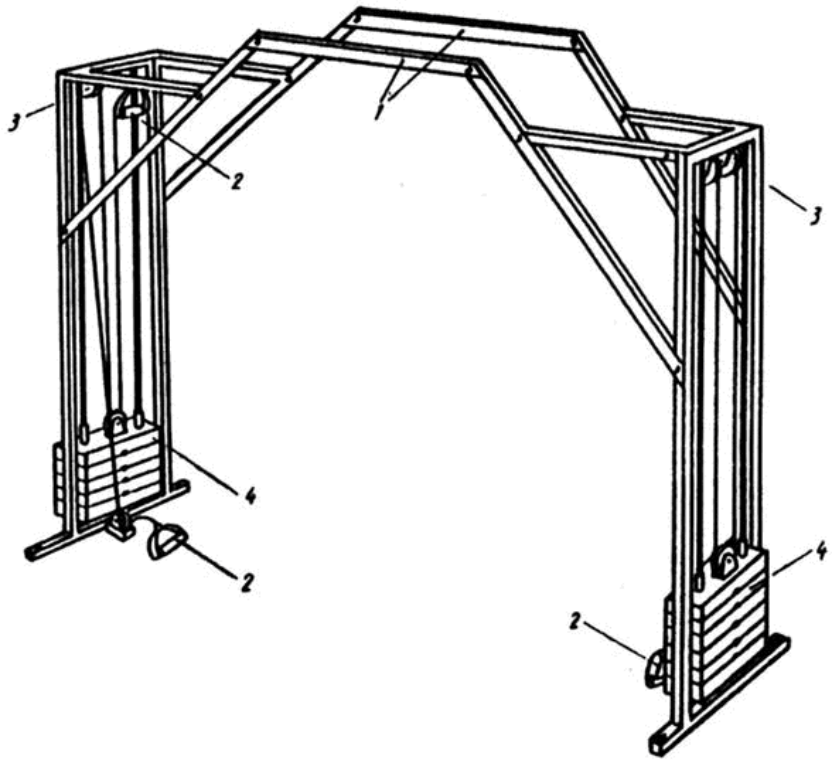


Figure: 11. Exercise machine for the muscles of the upper shoulder girdle, chest and abdomen

22. The same, but with weights (through the lower block).

Weights due to the upper block can be used as a counterweight to facilitate the exercise by beginner athletes, and due to the lower block - to increase the external load for experienced athletes.

The upper and lower block systems in combination with the 5 rod increase the number of exercises (1-7).

The block collapsible projectile for the muscles of the shoulder girdle, chest and abdomen (Fig. 11) consists of a frame 1, four handles 2, connected through blocks 3 with weights 4.

If necessary, the handles can be replaced with

rod or holder for the lower extremities, which significantly expands the application of the simulator. The exercises performed with its help are characterized by a wide range of motion. By using this machine in combination with a horizontal bench and a tilt bench, you can significantly increase the amount of exercise.

Exercises:

23. Standing, the arms of the upper block device are in arms extended to the sides. Lowering straight arms down.

24. I. p. - the same. Flexion of the arms at the elbow joints with fixed elbows. Putting brushes behind the head.

25. I. p. - the same. Flexion of the arms at the elbow joints with fixed elbows. Bringing the brushes to the chest.

26. Standing, the arms of the upper block device in front of the chest in bent arms. Straightening the arms downward with the hands turned outward.

27. I. p. - the same. Torso bends forward.

28. Standing in an inclination, the arms of the upper block device are in arms extended to the sides. Slowly lowering straight arms down through the sides.

29. Standing in an inclination, the arms of the upper block device in front of the chest in bent arms. Straighten your arms down.

30. Standing, the handle of the upper right block device is in front of the chest in a bent left hand, the left handle is in the right. Breeding hands to the sides.

31. Standing, the arms of the lower block device are in arms extended downward. Raising straight arms through the sides up. Expand the brushes outward.

32. I. p. - the same. Bending the arms towards the chest.

33. Standing, the arms of the lower block device are behind the head in bent arms. Straightening the arms up with fixed elbows.

34. Standing, the handle of the lower right block device is in the left arm extended downward, the left handle is in the right. Breeding straight arms to the sides.

35. Standing with your back to the block device, the cable of the block device is attached to the foot by means of a soft coupling. Swing your foot forward.

36. The same, but facing the device. Swing your leg back.

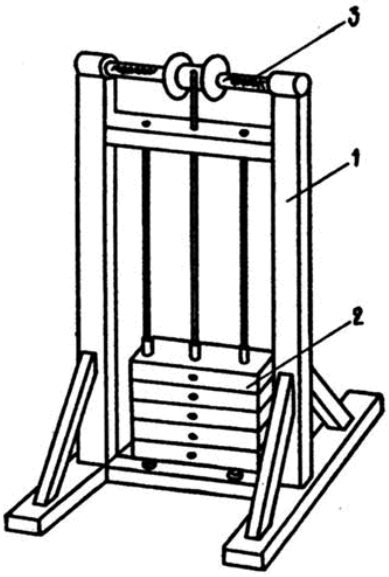
"Strengthener" (Fig. 12) is designed to develop the muscles of the forearm. It consists of a frame 1, weights 2 with a variable load, a shaft 3, rotating which the athlete develops the main muscles of the hand and forearm.

The work of muscles on the simulator is carried out in an inferior and overcoming mode.

Exercises:

37. Standing, grip from above. Rotation of the shaft away from you (clockwise) alternately with each hand.

38. The same, but the rotation of the shaft towards you (counterclockwise). Grip on top (bottom).



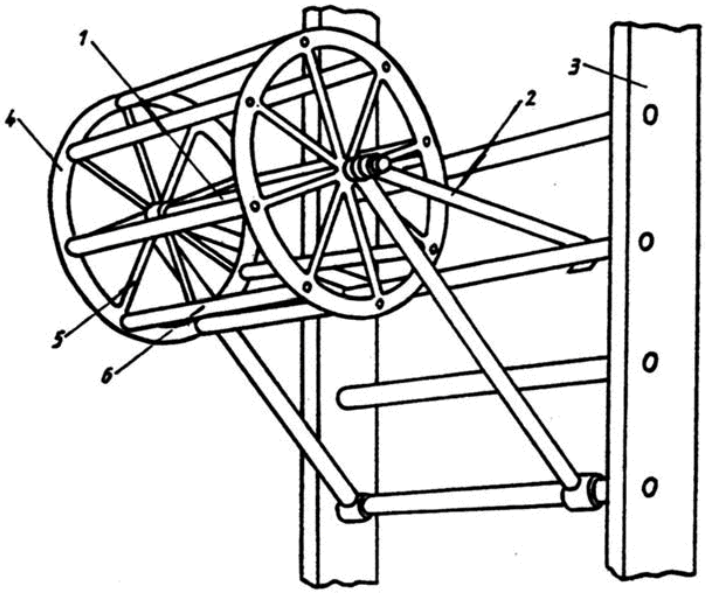


Figure: 12. Exercise machine "Strengthener"

Figure: 13. Dynamic lever

The dynamic arm (Fig. 13) is a device for the development of the muscles of the forearms, and in particular the phalanges of the fingers.

In addition, the exercises performed on it have a great regenerative effect, having a beneficial effect on the spinal column.

The projectile consists of a drum freely rotating on an axis 1, installed with the help of supporting elements 2 on a gymnastic wall 3. The drum consists of two wheels 4 with spokes 5 and crossbars 6, located at the same distance from each other.

Exercises:

39. Hanging on the hand, sequential interception of the bars located in front of the athlete.
40. The same, but the over-grasp of the bars located above the athlete from behind.
41. The same, but the practitioner is in the hanging position lying down.

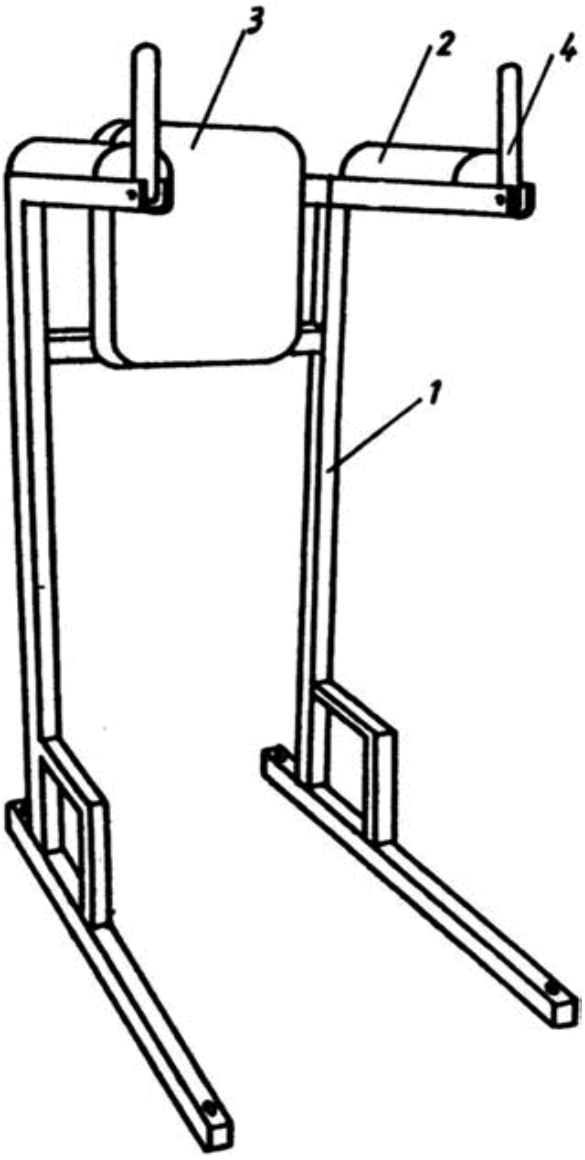


Figure: 14. Training device "Ppess"

Training device "Press" (fig. 14) before

prescribed for the development of the abdominal muscles. The structure includes a base 1, armrests 2 and a back 3, as well as handles 4 for hand grip. The handles brought to a horizontal position turn into stops for performing flexion and extension of the arms in the support.

Exercises:

42. I. p. - hanging in support on the forearms. Raising straight legs 90º.

43. The same, with weights on the legs.

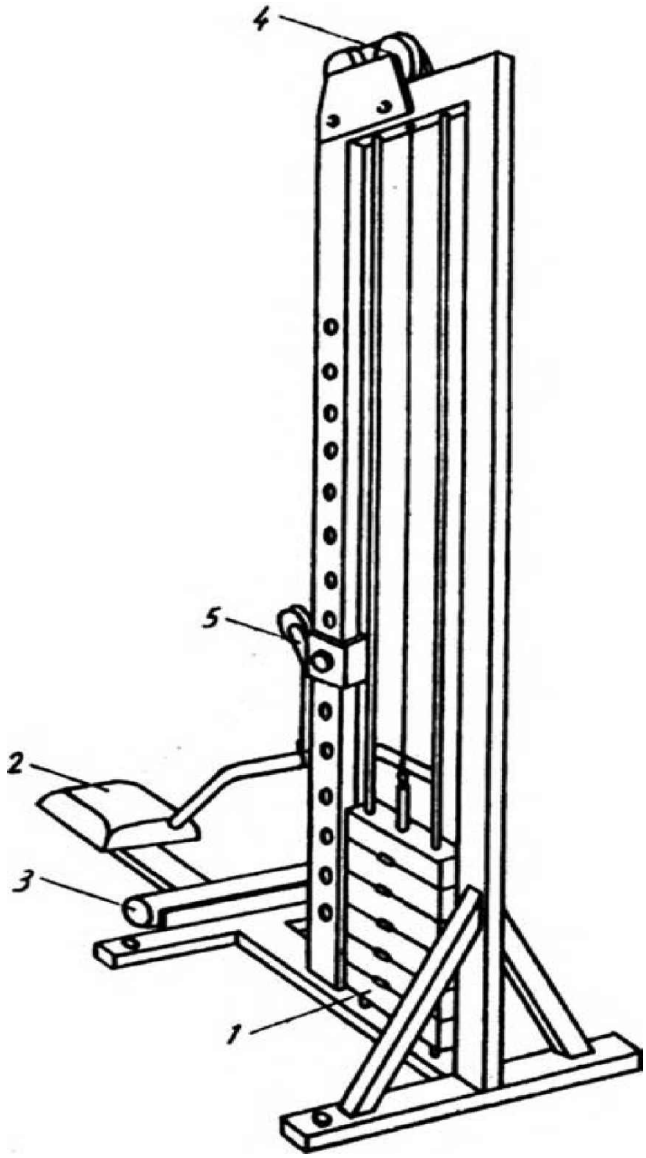


Figure: 15. Exercise machine "Lower hoists"

44. I. p. - the same, pulling the knees to the chest.

45. The same, but with a weakness.

The exercise machine "Lower hoists" (Fig. 15) is intended for the development of the back muscles (the broadest, large and small round, deltoid, biceps and triceps), as well as abdominal muscles (on the external and internal oblique abdomen).

Consists of a set of weights 1, seat *2* and a support 3 for the legs, a system of block devices 4 connecting weights with the rod, and the block 5 closest to the stem can move along a vertical guide, changing the angle of impact on the athlete.

Exercises:

46. Sitting, the rod of the block device in straight hands. Flexion and extension of the arms (frontal pull with a wide grip on top of the rod).

47. The same, but with a reverse grip.

48. The same, but with a medium (narrow) grip.

49. I. p. - the same. Extension of the trunk.

50. Standing, the rod of the block device in straight hands.
Flexion and extension of the arms.

Abdominal development training device

the press and back is called the "Roman chair". As is known from legends, it was used by Roman gladiators. The modern design is a welded frame (fig. 16) with

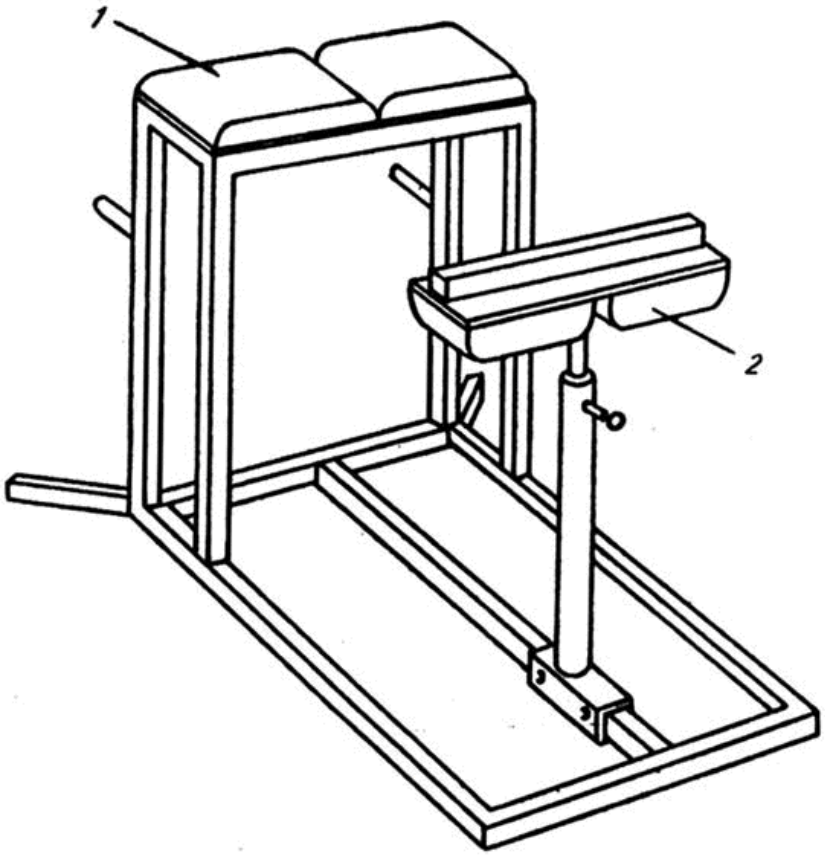


Figure: 16. Training device "Roman chair"

narrow seat 1 and support 2 for securing the feet. Sitting on a chair puts additional stress on the abdominal muscles as the buttocks are outside the seat. When performing exercises, reverse of the hips, twisting of the waist are possible.

A kind of "Roman chair" is a device

shown in fig. 17, which also has a stop 1 and a lock 2 for changing the height of the stop, and the narrow seat is replaced by a slightly elongated support 3, which allows less prepared athletes to perform the exercise, leaning on the back of the thigh and buttocks.

Exercises.

51. Sitting on the "Roman chair", put your hands behind your head. Unbending, turn the body to one side, then to the other side by 90º.

52. Sitting on the "Roman chair", hands behind the head.

Slow motion for 20-30 s to straighten

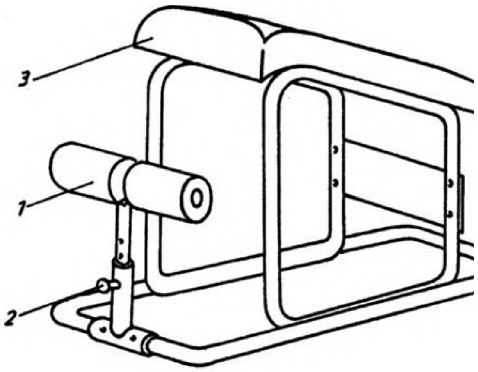


Figure: 17. A kind of "Roman chair"

to a horizontal position, then tilt for 10-15 s.

53. Sitting on the "Roman chair", fix the feet, strongly expanding the heels to the sides (to increase the load on the inner thigh), arms forward. When unbending, lower your chin to your chest, stretching the muscles on the back of your neck.

54. Lying on the right thigh on the "Roman chair", fix the legs, hands behind the head. Extension of the body and return to the starting position. The same - on the left thigh.

In all exercises on the Roman Chair simulator, you can increase the load by using dumbbells, barbell pancakes, and weighted arm cuffs. Exercises contribute to the correction of posture, affect the vestibular apparatus. After exercising on the simulator, it is recommended to lie on your back, arms behind your head or to the sides to raise your legs to a right angle (do not lift your pelvis off the floor).

The trainer for the development of leg strength "Hack Machine" (Fig. 18) has a carriage moving along the guides 1, which is fixed at the required height using the handle 2. The load is dosed by installing standard discs from the bar to the bar 3. Pillow 4 ensures the correct position spine of the athlete and prevents injury.

Exercises:

55. Standing in the bar, squats.
56. The same, half-squats.
57. Standing in the machine, lifting to the forefoot. Inclined trainer for the development of leg strength (Fig. 19).

The carriage 1 with weights installed on the bar 2 is fixed by the athlete at the required height using the handle 3 by turning it to a vertical position. The platform 4 serves to apply force by the legs of the athlete lying with his back on the pillow 5, which can change the angle of inclination using the device 6. During exercise on this simulator, there is no effect of the load on the spine.

An exercise:

58. Lying in the machine, bending and straightening the legs.

Lever simulators for the development of the front and back surfaces of the thigh in the sitting and lying positions are shown in Fig. 20, 21. Support rollers 1 are installed on the levers *2*having an axis of rotation 3. The loading elements of the shells are the disks from the bar 4, the installation feature of which distinguishes the designs of the simulators presented. Bench 5 is designed to create conditions for sitting and lying exercises.

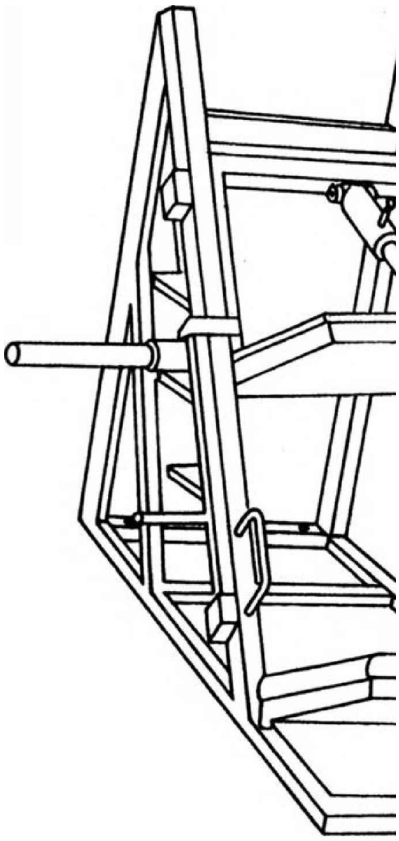


Figure: 19. Incline trainer for development leg strength

Exercises:

59. Sitting, the legs are bent and rest under the weight rollers of the lever device. Straightening the legs.

60. Lying on the chest, legs straight, part of the calf

the muscles in the area of the Achilles tendon are brought under the weight rollers of the lever device. Leg curl.

Block-lever trainer for the development of muscles of the back thigh surface (Fig. 22). The main structural elements are the support rollers 1, the lever 2, which, using a telescopic connection 3, can change the level of the support rollers connected through

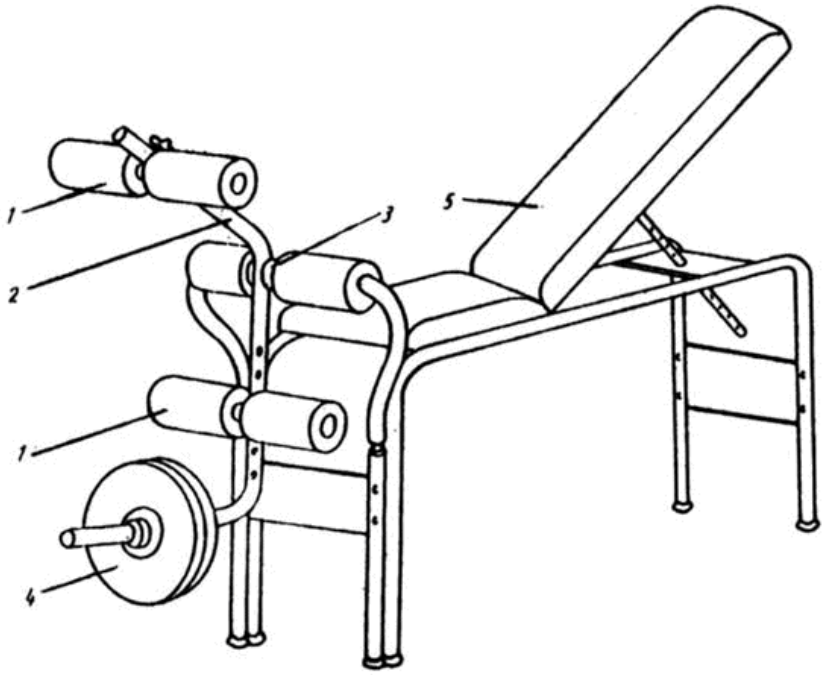


Fig 20. Lever trainer

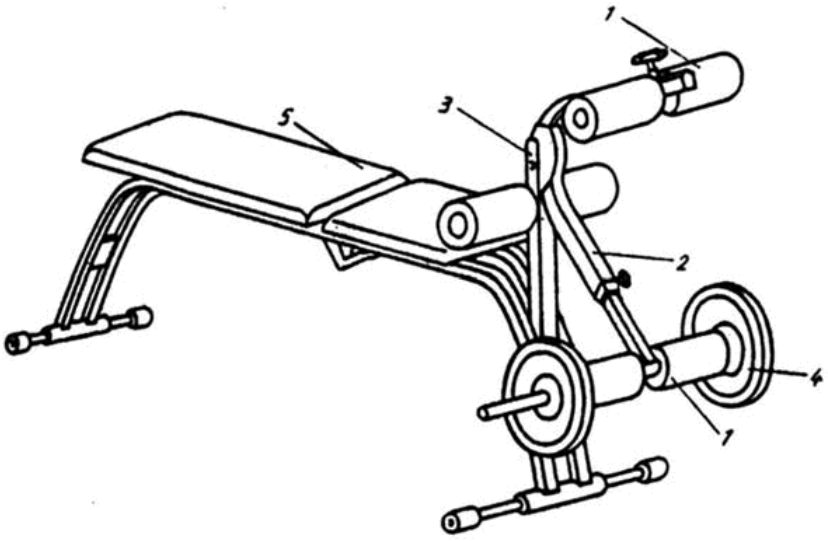


Figure: 21. Lever trainer

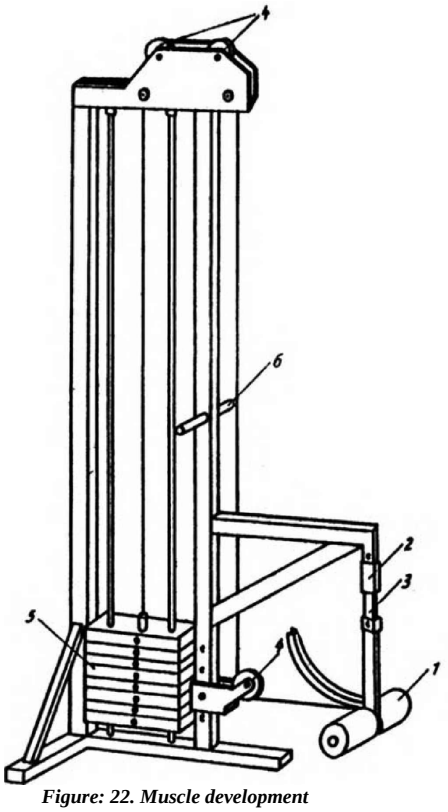


Figure: 22. Muscle development machine back of the thigh

blocks 4 with weights 5. Handles 6 are used to maintain a steady state of the athlete.

An exercise:

61. While standing, the back of the surface of the right thigh is pressed against the support roller. Flexion of the right leg at the knee joint. Change of legs.

Block-lever simulator (fig. 23) develops
bottom and back muscle groups of the lower leg. It includes shoulder pads 1, handles 2, mounted on lever 3, which is connected with weights 5 by means of a block system 4.

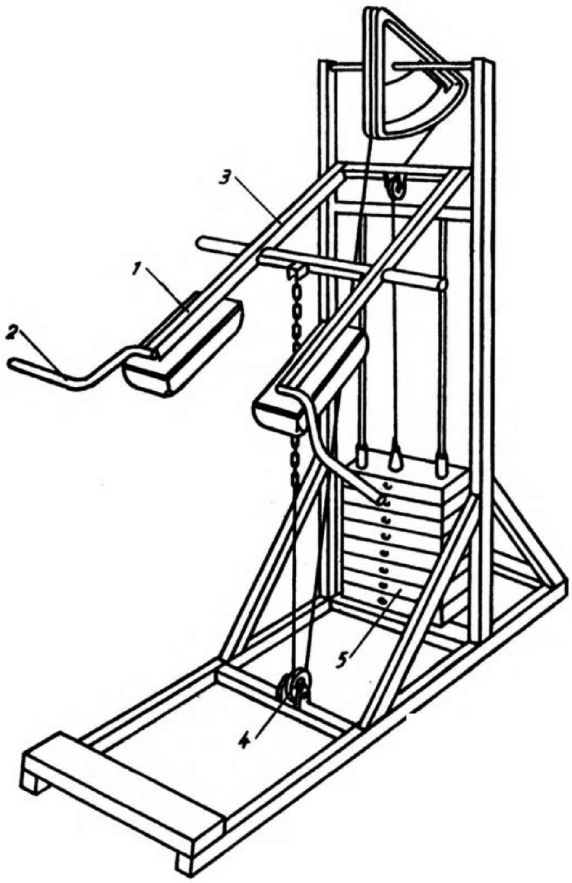


Figure: 23. Block-lever trainer for the development of calf muscles

Exercises:

62. Standing in the machine, straightening the legs with lifting to the toes.

63. The same, the socks are turned outward (for impact on the inside of the gastrocnemius muscle).

64. The same, the socks are turned inward (to influence on the outside of the gastrocnemius muscle).

For maximum muscle stretch, it is recommended perform the exercise while standing on a bar or an inclined board (lowering the heels).

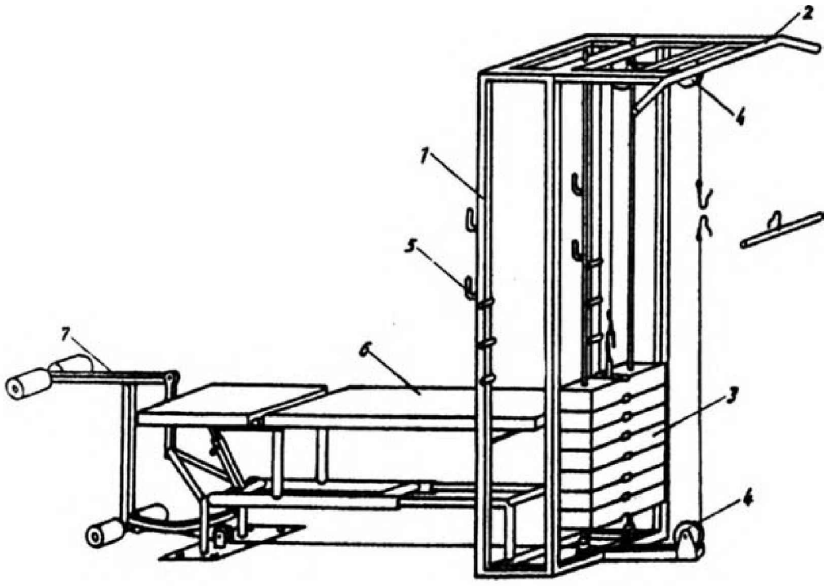


Figure: 24. Universal simulator

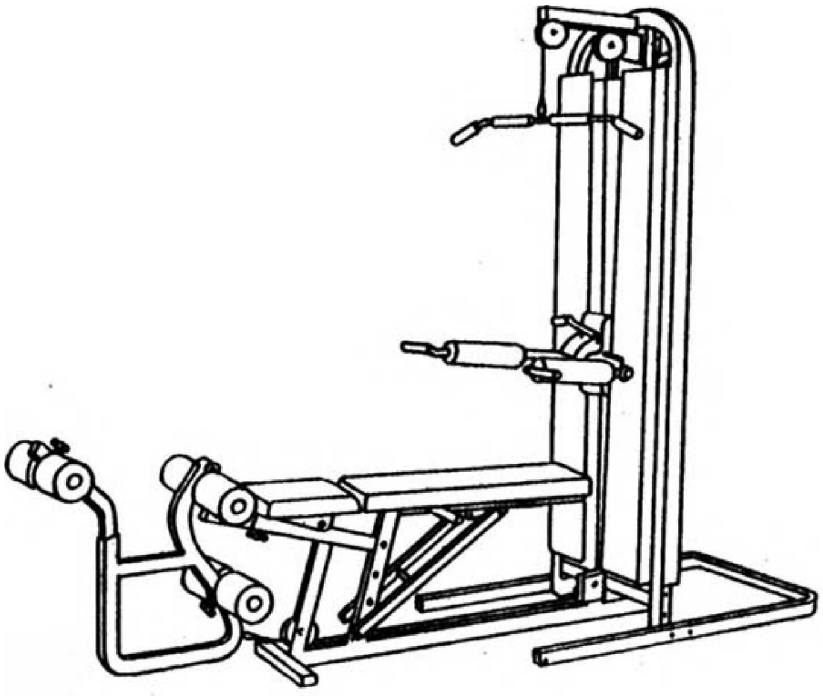


Figure: 23. Universal simulator

To develop the strength of various muscle groups, universal simulators are widely used. In fig. 24 shows a welded structure consisting of a vertical frame 1, in the upper part of which there is an elongated crossbar 2. Weights 3 with an adjustable weight installed inside the frame, due to the block system 4, make it possible to facilitate or complicate the conditions for performing a pull-up on the crossbar.

Frame with 5 brackets for fixing the bar and
the adjacent bench 6 allows you to perform lying exercises with a barbell and dumbbells. The bench is supplemented with a block-lever device 7 for flexion-extension of the legs in a sitting and lying position. It can be transformed into an incline bench, moreover, with a different incline angle, for exercises with various weights in a sitting incline position.

Another version of the universal simulator is shown in Fig. 25. Exercises for practicing on these apparatus have been described above.

On the training device "Universal Bench" (Fig. 26), exercises with various weights are performed, being in a sitting position, in an incline,

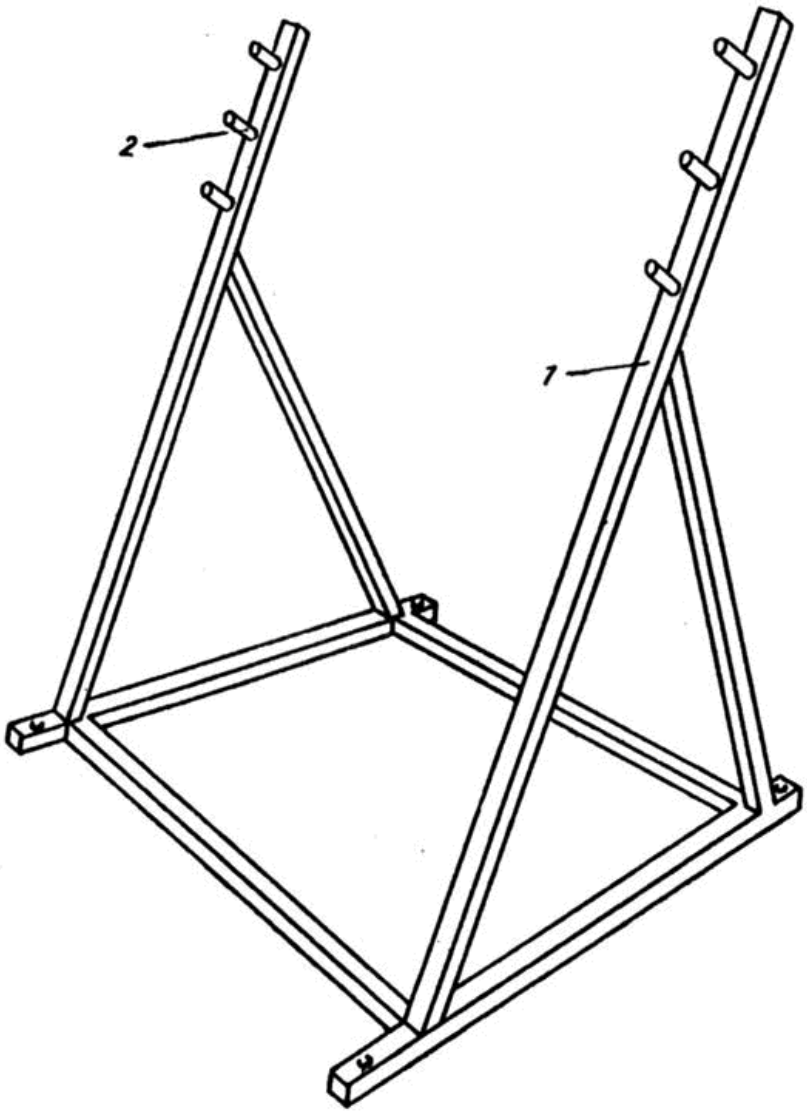


Fig. 27. Rod stand

lying down. The "Bench" can be used in combination with other training devices and simulators. Backrest 1 and seat 2 can be adjusted in different positions using the lock 3.

For effective performance of various exercises with a bar as an aid, racks of various designs are widely used. In fig. 27 shows a variant of the simplest design, consisting of a base 1 and pins 2 for installing a barbell. It is used in combination with a universal bench.

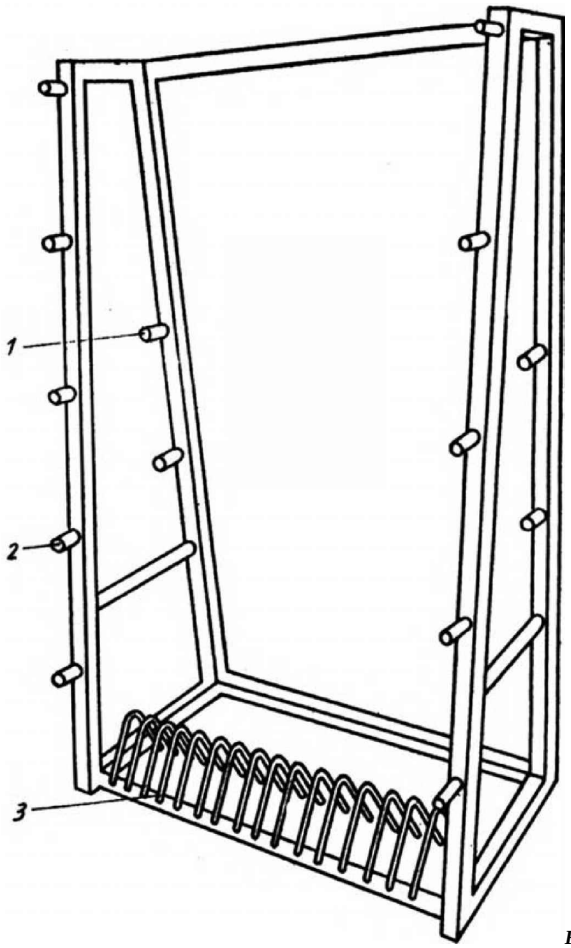


Figure 28. Rack for boom and discs

To store the bar, a rack is used, which is a frame with pins 1 and 2 for placing the bars from the bar. Disks are installed in cells 3 (Fig. 28).

Barbell. Strength development of large muscle groups promotes the barbell, which is also part of various strength training equipment and devices.

The bar consists of a neck weighing 20 kg, two locks 2.5 kg each and a set of discs of various diameters and weights:

20 kg (4 pcs.), 15 (2), 12.5 (2), 10 (2), 5 (2), 2.5 (2),
1.25 (2), 0.5 (4), 0.1 (4), 0.05 (2). The total weight of the bar with a set of discs is 200 kg. At the 1976 Olympics, 50 kg discs were used in order to conveniently attach large competition weights to the bar. The shell can be made independently. The 1350 mm long neck is made of a 28 mm diameter metal rod of any steel grade. At a distance of 175 mm from each end, two steel rings with a diameter of 65–70 and a thickness of 35–40 mm are put on, tightly fixed with steel pins. Bar discs are cut from sheet steel 10-16 mm thick. A disc with a diameter of 300 mm (two required) weighs 6-9 kg, 260 mm (about ten) - 5 kg. It is desirable to have two discs with a diameter of 240 mm (about
2.5 kg). A hole with a diameter of 28.5 mm is drilled or burned out in the center of each disc. Dimensions of clamping sleeves: diameter 65-70, width 75, thread diameter for the stopper 14-16 mm. All rod parts must be thoroughly cleaned without leaving sharp corners and notches. Discs can be coated with oil or nitro paint.

For a versatile study of the flexors and extensors of the arms, a barbell with a curved bar is widely used. In each lesson, a barbell with large weights (130-150 kg) is used for basic exercises (bench press, squats, deadlift) and small barbells weighing 50-60 kg are necessary for workouts hands. The last can to make with a short neck.

Basic Barbell Exercises

For the deltoid, small and large round muscles:

1. Standing, barbell on chest, grip shoulder-width apart, legs slightly apart. Smooth barbell press.
2. Standing with the bar in lowered hands. Rod rod to chin. The grip is narrow.
3. Standing with the bar in lowered hands. Raising straight arms to a horizontal position.
4. Sitting with the barbell in your hands on your chest (behind your head). Barbell bench press. The grip is medium (wide).
5. Lying on an incline bench at an angle of 30-45 degrees. Press the bar with a medium grip.
6. Standing in an incline, the bar is in the lowered hands, the grip is wide. Row of the bar to the chest.

For biceps:

7. Standing, the bar is in the hands down, the grip is medium, the palms are facing forward. Raise the barbell for biceps, do not deflect the body.

8. Standing, leaning forward. Bending the arms with the bar to the chest in a narrow grip, knees slightly bent.

9. Sitting, barbell in hands, elbows on special stand at chest level. Flexion of the arms.

10. Standing with your back resting on an inclined board at an angle of 45 °. Lifting the bar.

11. Standing in a slope, bar in hands, elbows rest on the knees. Biceps curl.

For triceps:

12. "French press". Standing with the bar in bent arms behind the head. Without changing the position of the elbows, extension of the arms in the elbow joints.

13. "French press" of the barbell lying.

14. Lying on your back, barbell in hands, bar at forehead level. The grip is narrow. Extension of the arms at the elbow joints.

For the muscles of the forearms:

15. Sitting with the bar in your hands, your forearms rest on your hips. Flexion-extension of the arms at the wrists.

16. The same, but opening the palms and letting the barbell roll to the phalanges of the fingers.

17. Standing, taking the barbell with an average grip, palms away from you. Lifting the bar for biceps.

For chest muscles:

18. Lying on a horizontal bench. Barbell bench press. Medium grip (narrow, wide).

19. Lying on an incline bench, head up. Bench press barbell. Medium grip (narrow, wide).

20. Lying, barbell on supports (machine), bar 10-15 cm above the chest, grip slightly wider than average. Straightening your arms, squeeze the bar up. For pectoral muscles and extensors of the arms.

21. Lying on an incline bench, head down. Bench press rods. The grip is average.

For back muscles:

22. "Deadlift". Standing in a slope, taking the bar with a "raznokhob" (one palm to itself, the other from itself). Without bending your knees, straighten due to the strength of the back muscles, lifting the barbell off the floor. Can be performed from skirtings (small elevations).

23. Standing forward, knees straight. Rod rod to the chest.

24. Standing tilted forward, barbell pull (weights at the ends), the other end is fixed.

25. Standing with a barbell on your shoulders. Torso bends forward.

26. Standing in an incline, pull the bar to the stomach. The grip is wide.

27. Standing, feet shoulder-width apart, barbell at hips

lowered hands. Without bending your arms, raise your shoulders up, take them back and lower them down.

When working with a barbell, the back should be bent, since otherwise the load is concentrated on the edges of the intervertebral discs, which can lead to injury, and with a straight and bent back, it is evenly distributed over the entire surface of the discs.

For the muscles of the thigh and lower leg:

28. Standing, the bar is on the shoulders behind the head. Sit down, back straight.

29. Standing, the bar is on the shoulders behind the head. Inhale, step back with the left, while the right leg bends at the knee. Perform four deep, springy wiggles up and down. Exhaling gradually - get up.

30. Standing legs apart, spreading the feet, holding the barbell on the chest with your hands crossed (grip with a brush at the opposite shoulder). Squats, straightening the back, on the whole foot (up to an angle of 85 ° at the knee joint). For the muscles of the legs, pelvis and lower back.

31. Standing on a stand, securing with a special karabi

rope or chain with one end for the crossbar of the wall bars, and the other for the belt (weightlifter's belt) Having deviated from the vertical axis by 30º and picking up a barbell, perform squats (modified version of Gakkenschmidt's seda).

32. Standing, socks on the bar, barbell on the shoulders. Calf Raises.

33. Standing with your heels on a block or on an inclined board. Squats with a barbell on the shoulders behind the head.

34. Standing with your heels on a block or an inclined board. Sit-ups with a barbell on the chest.

35. Standing with one foot in front and the other behind. Spring squats with a barbell on the shoulders ("split").

36. From a standing position, squats with a bar in outstretched arms at the level of the buttocks (Gakkenschmidt's sed).

37. Standing barbell squat

located in outstretched arms between the legs.

38. Standing, the bar is on the shoulders behind the head. Jumping out.

39. The legs are bent at the knees at right angles, the body is tilted forward, the back is straight, the chest is raised, the feet are shoulder-width apart under the bar. The grip is wide, arms are straight, palms on top (weightlifting start). Straightening the legs and torso at the same time, followed by bending the arms and lifting to the socks, raise the bar to chest level. Perform the movement with a gradually increasing acceleration until the legs and trunk are fully extended. Keep your elbows over the bar. The bar should

move vertically, possibly closer to the body. For the muscles of the legs, back, shoulder girdle and flexors of the arms.

40. I. p. - the same, medium grip, palms on top or with a different grip. At the same time unbending the leg and torso, straighten to an upright position and take your shoulders back. Do not bend your arms. For the muscles of the legs and back.

41. Standing, the bar is on the shoulders behind the head. Bending leg to a right angle, lower into a squat on the entire foot. Keep your back straight, chest raised. To limit the back seat, place a bench of the appropriate height.

42. Standing, the bar is on the shoulders behind the head. Walking with alternating legs and fixing the position of the "scissors". Do not tilt the body forward. For the muscles of the legs and gluteal muscles.

43. Leaning the toe of one leg on the bench, the barbell on the knee, under the bar there is a soft lining. Rise on the toe. Alternating with each leg.

44. Sitting, kneeling barbell, soft under the bar lining, toes on a bar or inclined board. Calf Raises. There are short pauses in the extreme upper and lower positions.

Bodybuilders place great emphasis on the barbell squat because this exercise, involving multiple and most powerful muscle groups, is a great way to stimulate overall muscle development, strength and weight gain.

It is mistakenly believed that squats with a barbell on the shoulders negatively affect the condition of the musculoskeletal system of athletes, especially in the area of the knee joint. Research by American scientists refutes this opinion. Powerlifting athletes (27 people) and highly qualified weightlifters (28) trained intensively in squats with a large load. The final analysis of the state of the musculoskeletal system did not reveal any negative changes in any athlete.

What's more, barbell squats in combination with breathing exercises have been found to increase chest volume.

Performing exercises with significant weights, it is necessary to breathe with a delay: shallow breath - holding the breath - squatting - standing up - exhale at the end of getting up. You should hold your breath in order to achieve maximum power work (when straining) and create "support" for the spinal column, which is experiencing significant physical exertion.

It is recommended to squat with a barbell immediately after the total

warm-ups, since when performing this exercise, not only the muscles of the thighs work.

The optimal weight is one with which you can sit down no more than ten times. In this case, the most acceptable option for building leg training will be to perform 3-5 sets of 8-10 repetitions (for muscle mass growth) or 4-8 sets of 4-6 repetitions (for the predominant growth of muscle strength).

Rest between exercises depends on individual peculiarities of students and the nature of the previous load (from 1-2 to 3-5 minutes).

Dumbbells. Dumbbells have long been considered a universal and affordable means of developing strength. Even on a mosaic of thousands of years ago, scientists discovered an image of a girl with dumbbells in her hands.

At the beginning of the 20th century, the famous Russian athlete Evgeny Sandov designed dumbbells, consisting of two belts with springs between them. Squeezing the handles to overcome the resistance of the springs causes additional volitional muscle tension.

The domestic industry produces dumbbells with a different set of weights: from 0.5 to 30-35 kg. In athletic gymnastics, long (up to 40 cm) collapsible dumbbells with varying weight (from 5 to 40 kg) have become widespread.

You can train with dumbbells 4-5 times a week for 35-40 minutes. The exercises are performed in a specific sequence: for the flexor and extensor muscles of the forearms, the muscles of the shoulder girdle, the extensors of the trunk, the extensors and flexors of the lower leg, the abdominal muscles, the flexors and extensors of the foot.

All movements are performed with full amplitude. You should breathe evenly. Inhalation usually coincides with the expansion of the chest and extension of the trunk. Movements with maximum tension are performed with half-breath.

Basic dumbbell exercises

For the deltoid, small and large round muscles:

1. Sitting, dumbbells in bent arms at shoulder level. Alternate or simultaneous bench press.
2. Sitting, dumbbells in slightly bent arms in front of the chest.

Breeding hands to the sides.

3. Sitting, dumbbells in lowered hands. Raising the arms to the sides to shoulder level.
4. Standing in a slope, dumbbells in hand. Breeding hands to the sides.

5. Standing, dumbbells in lowered hands. Raising straight arms to a horizontal position in front of you.

6. The same, but raising the arms through the sides.

7. Standing, legs apart, arms bent, dumbbells at the shoulders. Straighten your left arm forward while turning your torso to the right. Repeat with right hand.

8. Standing, dumbbells in hands, palms inward. Raise straight arms forward to shoulder level, spread apart, lift up, lower through the sides. Warm up exercise.

9. Bending over, dumbbells in lowered hands. Slowly spread straight arms to the sides as high as possible, lower. Do not bend your elbows.

10. Lying on your side on the bench. Raising a dumbbell in front of you from the bottom up.

For biceps:

11. Standing, dumbbells in hand. Alternate flexion of the arms. The palms are facing forward.

12. Standing with your back on an inclined board, in the hands of a dumbbell. Alternate flexion of the arms.

13. The same, but lying on an incline bench.

14. Sitting with your elbow resting on the inner thigh, or standing with your foot on a bench. Lifting a dumbbell (alternately with each hand).

For triceps:

15. Standing (sitting), dumbbells in bent arms. Alternating or simultaneous straightening of the arms up.

16. Standing (sitting, lying), dumbbells in bent arms behind the head. Extension of arms ("French press").

17. Lying on your back, dumbbells in bent arms at forehead level. Extension of the arms at the elbow joints.

For chest muscles:

18. Standing, legs apart, dumbbells in straight arms overhead. Lean forward, lower straight arms freely, do not bend your legs - exhale, straighten - inhale.

19. Standing, dumbbells in lowered hands. Lifting straight arms forward and up.

20. Lying on a horizontal bench with your back, arms with dumbbells along the body. Raise your arms forward and up and lower your head.

21. Lying on a horizontal bench with your back, head suspended, dumbbells in straight arms in front of your chest. Taking a deep breath and raising the chest as high as possible, lower your straight arms back behind your head, raise your arms - exhale.

22. Lying on a horizontal bench with your back, dumbbells in your hands. Breeding hands to the sides.

23. Lying on a horizontal bench with your back, dumbbells in

bent arms in front of the chest. Dumbbell press (simultaneous or alternating).

24. Lying on the floor, dumbbells in arms outstretched along the body. Sit down with your hands up. For the muscles of the chest and abdomen.

For back muscles:

25. Standing forward tilted. Row dumbbells to the shoulder alternately with each hand. Do not slouch your back.

26. Standing, dumbbells in bent arms in front of the chest. Torso bends forward.

27. Standing in an inclination, dumbbells in lowered hands. Without changing the position of the body, spreading the arms to the sides to a horizontal level.

28. Standing, leg shoulder width apart, dumbbells at the hips in lowered hands. Without bending your arms, raise your shoulders up, take them back and lower them down.

29. Lying with your hips on a bench, face down, your torso in weight, your feet fixed, dumbbells at the back of your head. Flexion and extension of the trunk at an even pace.

30. Lying on the floor, face down, arms with dumbbells to the sides. Raise your torso above the floor, pulling your head back, arching your back and simultaneously pulling your straight arms back.

For the muscles of the thigh, lower leg:

31. Standing, dumbbells in bent arms at the shoulders. Deep squats.

32. Standing, feet together, hands with dumbbells down. Sit on your toes, raise your hands forward.

33. Sitting on a chair. Straighten your legs with dumbbells attached to them.

34. Standing on a bench, dumbbells in lowered hands.

Squat until the dumbbells touch the floor. Do not tilt the body, keep your back straight.

35. Standing, dumbbells in outstretched arms. Holding the dumbbells on straight arms, sit down, trying not to lift your heels off the floor.

36. Standing with a dumbbell in the right hand at the shoulder, the left hand rests on the back of the chair. Sit down on your right, left leg and extend your left arm forward. The back is straight, the chest is raised, the toe is pulled. Get up without pause. Repeat on the left leg.

37. Standing on a dais with your left foot, a dumbbell is attached to the right foot. Flexion and extension of the right leg at a steady pace. Repeat 10 times and change legs.

38. Standing toe with the right leg on a dais (a bar 10 cm high), a dumbbell in the right hand at the shoulder, left

the leg is bent or freely lowered. Rise as high as possible on the toe, descend, lowering the heel as low as possible. You can hold onto the support with your left hand.

39. Standing with light dumbbells. Jumping: legs apart - arms to the sides.

Resistance bands and rubber buffers are enough

are widely used by amateurs of physical culture and athletes. It is known that stretching the expander has become an independent sport in a number of countries. In England, a national federation for stretching steel springs ("string pulling") arose, championships are held, records are recorded. According to the rules of the competition, in each weight category, the participant is invited to perform three attempts. For example, powerlifting consists of pushing with the right hand up, squeezing with the left to the side and stretching the expander with both hands in front of the chest. Steel springs correspond to the standards - the elasticity of each is recorded with high accuracy in the technical passport, which makes it possible to accurately determine the total load if several springs are put on the expander.

For each exercise, the following is selected

the number of springs at which the last repetition is performed with difficulty - "to failure".

The expander should be stretched vigorously, with full amplitude, smoothly moving from muscle contraction to an inferior muscle mode.

In our opinion, those involved in athletic gymnastics have recently unreasonably reduced interest in this affordable, simple and easy-to-use apparatus, although the wave-like nature of the impact of the load on the body has been transferred to a number of constructively complex and expensive simulators.

An adequate load for the expander is provided by rubber cords, tapes, harnesses. Their disadvantages include the impossibility of accurate dosing of the load. Regulate it

straightening is carried out by increasing the tape or rope twice, three times or more, as well as by changing the length when winding around a brush. In its original position, the shock absorber should be slightly stretched.

Exercises with shock absorbers are recommended for both beginners and experienced athletes - in the warm-up, the main part of the lesson, as well as in rest pauses.

Resistance bands are designed to strengthen the muscles of the arms, legs, abdomen and back. The effort developed during exercise varies depending on the set resistance. Expanders are widely used: cylindrical, "Differential", spring, block, cyst, friction, etc.

Basic exercises with an expander:

For the deltoid muscles:

1. Standing, legs apart, expander in arms extended forward. Spread your arms to the sides, trying not to bend.

2. Standing on one handle of the expander, take the other with lowered hands. Pull the handle of the expander along the body to the level of the chin and gently lower it.

For biceps:

3. Standing with your right foot on one handle of the expander, take the other in your right hand, palm out. Bend your arm, press your fist to your shoulder, smoothly straighten it.

4. The same, changing the position of the arms and legs.

For triceps:

5. Standing, the expander behind the back, the left hand is lowered and pressed to the hip, the right hand is bent, the hand is at the shoulder. Without moving the left hand, bend the right upward, hold for 1-2 seconds and smoothly return to its original position.

6. Standing, expander behind his back in bent arms. Straightening your arms to the sides, return them to their original position.

For the muscles of the forearms:

7. Squeezing and unclenching the fingers with a wrist expander.

For chest muscles:

8. Standing, holding the handrail with your left hand, in the right handle of the expander attached to the right at chest level. Bringing the right hand to the left shoulder and the left to the right.

9. Standing legs apart, expander in straightened arms above the head, palms out. Breeding straight arms to the sides.

For leg muscles:

10. Lying on your back, hook the handle of the expander, fixed with the other handle at the level of the pelvis, with your leg bent at the knee. Straighten and slowly bend your leg. Repeat by changing legs.

Main exercises with shock absorbers:

For the deltoid, small and large round muscles:

1. Standing with legs apart in the middle of the shock absorber, keeping the ends in lowered hands. Raise straight arms forward and up above your head - gently lower.

2. The same, raising straight arms through the sides up.

3. The same, raising your arms forward "and lowering through the sides.

4. Standing, shock absorber in arms straightened forward with a grip shoulder-width apart. Spread straight arms to the sides
in front of the chest - inhale, reduce - exhale.

5. Standing with the shock absorber in front of you, the left hand is lowered and pressed to the hip, the right is extended forward. The cushion is easily tensioned. Raise your right hand as high as possible, smoothly return to its original position. Repeat by changing the position of the hands.

6. Standing legs apart, shock absorber in straightened arms
over your head. Breeding straight arms to the sides.

7. Standing facing the shock absorber, fixed on the wall at head level, taking its ends in arms, outstretched
forward. Lowering your arms down, take them back without bending your torso.

For biceps:

8. Standing in the middle of the shock absorber, holding the ends in lowered hands, palms out. Flexion and extension of the arms (simultaneous and alternate).

9. I. p. - the same, palms inward. Pulling up the projectile until the hands touch the chin ("standing pull").

For triceps:

10. Standing in the middle of the shock, holding the ends in bent arms, palms outward, elbows up. Simultaneous and alternate straightening of the arms up. Keep the elbows high and motionless.

11. Standing, shock absorber behind your back in bent arms.
Extension and flexion of the arms at a uniform pace.

12. Standing, the ends of the shock absorber fixed to the ceiling are in your hands. Leaning forward, straighten your arms down.

13. The same, squatting with the arms extended down.

For the press:

14. Standing with your back to the shock absorber, fixed at the waist level and tied at both ends to the foot of your right leg. Swing your right leg forward. The same, changing the leg.

15. Standing with your back to the shock absorber attached to

the wall, take its ends in hands, bent in front of the chest. Torso turns, bending forward, left and right.

For back muscles:

16. Standing facing a shock absorber fixed at floor level and tied at both ends to the foot of the right foot. Swing your right leg back. The same with the other leg.

17. Standing facing the shock absorber, fixed on the wall at head level, taking its ends in hands. Leaning back, bend your arms to your chest, bending and pulling your head back.

METHODOLOGY OF ORGANIZATION AND CONDUCTING ATHLETIC TRAINING

Athletic training is a set of activities and training tasks performed to improve health, increase strength and mass of muscle groups. The system of internal (an athlete's readiness to achieve a certain result) and external (means, methods and conditions of an athlete's training) factors allows to successfully solve the main tasks of the training process. For this purpose, a variety of means of training and recovery after sports loads, specialized nutrition, organization of a general regimen in accordance with the conditions of labor and sports activities of those involved are widely used.

An athlete's preparation includes training, competition, out-of-training and out-of-competition factors that complement training and competition, enhance their effect or accelerate recovery processes after exertion.

Athletic training is successfully carried out using equipment that is installed on sports grounds, in apartments, gyms of enterprises, universities, schools, preschool institutions. With their help, it is possible to control the main parameters of the body's vital activity - by the number of steps, pace, rhythm, the amount of effort developed, etc.

The main source of increasing strength abilities is an increase in muscle strength. The indicators that determine the manifestation of endurance depend on the mass of muscle tissue: maximum oxygen consumption, maximum oxygen debt, total energy capacity. Consequently, rationally performed strength work directly affects the increase in strength and muscle mass and indirectly determines the increase in energy capabilities necessary for the manifestation of speed and special endurance of both athletes and representatives of a number of professions.

Athleticism can be used for sports and recreational purposes, applying various methodological approaches to organizing and conducting the training process.

The effectiveness of athletic training depends on the equipment of the places of training and equipment of the trainees, the time of training, their preliminary preparation, the peculiarities of the structure of the educational and training process, the contingent, etc.

Let's consider the basic methodological and organizational requirements for the educational process.

Site preparation and equipment. When equipping training complexes in special premises at the housing office, in schools, secondary specialized educational institutions, universities, in production, on collective and state farms, it is necessary to choose equipment that will help to a greater extent to solve health problems. These simulators and training devices can be purchased in stores or ordered directly (individually or as a set) from production cooperatives or made in-house.

The hall should be warm, well-ventilated and protected from drafts. Clothing is comfortable, does not restrict movement, easily absorbs moisture. On the feet are sports slippers, but you can practice barefoot. It is advisable to use wristbands - elastic cuffs worn on the wrists and protecting the ligaments from sprains.

Time of the classes. On the basis of the conducted studies, the features of fluctuations in muscle tone during the day among weightlifters were revealed. The two main periods of increased muscle activity correspond to the time intervals from 11 to 15 and from 18 to 21 hours.

The study of the daily rhythm of electrical activity and muscle strength also revealed the unequal nature of the dynamics after the action of an equivalent physical load on the body, performed at different times of the day. The period from 2 pm to 6 pm is characterized by a decrease in muscle activity. These results should be taken into account when planning the conduct of training sessions on athleticism.

The number of training days per week is from two to four, and one of the classes is best done on a weekend, when there is nowhere to rush and you can work out calmly and effectively.

Preliminary preparation stage. Before starting regular exercises with weights, it is necessary to undergo two- or three-week preliminary training, 3-4 times a week performing exercises with the simplest

devices: gymnastic folder, expander, medicine ball, dumbbells, etc. The correct selection, quantity, dosage of exercises should ensure their all-round effect, creating the necessary motor basis, strengthening the muscular apparatus, preparing the respiratory and cardiovascular systems for more significant loads, generating the need for regular exercise.

The organization of training on apparatus should be appropriate to meet a number of methodological requirements. The trainees should be divided into subgroups of 2-3 people with similar strength capabilities and using approximately equal weights. They provide reliable mutual insurance if necessary. During classes, you need to exclude extraneous conversations, limit the impact of external stimuli: noise, disorderly walking, etc. Discipline and concentration of attention is an important factor in the quality organization and conduct of classes and the prevention of injuries.

Warm up. To exercise with weights on simulators and the barbell should be started by doing a warm-up before each workout, using various cyclic exercises and well-known sets of exercises from general physical fitness, performed, if possible, to music. The pace of movement is average, the duration of the warm-up is 5-10 minutes, until slight perspiration and a feeling of warmth throughout the body.

The warm-up can include exercises that would prepare the functional system of the body, the muscular and ligamentous apparatus for volumetric load, and create a positive psychological mood for the training process.

The list of exercises recommended for inclusion in the warm-up:

1. Hanging on the bar, reverse hips to the right and left.
2. Standing, turning the body to the sides.
3. Standing at the Swedish wall, alternate swinging legs.
4. Jumping in place alternately on each leg.
5. Sitting on the floor, bending forward to the knees.
6. Sitting on the floor, keeping your hands under the knee bends, raising your legs as much as possible.
7. Lying on your back, hands behind your head. Bend your legs pressing the knees to the chest, then lift up and gently lower to the starting position.
8. Lying on the floor, raise your legs behind your head.
9. Standing feet shoulder width apart, hands on the waist. Smooth tilts left and right. When bending to the right over the head, the left hand, to the left - the right.

Main part. In the main part of the lesson, strive to tune yourself to the correct execution of exercises, to imagine the mechanism of their effect on the body, to achieve a state of maximum concentration on motor actions.

In training, it is necessary to use equipment that affects different muscle groups. It is recommended to start your workout with energy-intensive and effective exercises that affect the largest muscle groups: the muscles of the chest, back. Then they sequentially begin to perform movements that develop the muscles of the arms, deltoid, lats, and other muscle groups. In conclusion, pull-ups, hangs, swing movements, and flexibility exercises are good for recovery.

Each exercise is recommended to be performed on average in three approaches.

You need to breathe without delay. When squatting, lifting the legs up and bending forward, exhale through the mouth, when lowering the bar (dumbbells) to the chest with the bench press, inhale through the nose. It is recommended to compress the lips into a tube and, as it were, with resistance, exhale the air in a thin stream.

It is important to be able to dose the load depending on age, sex, health status, physical fitness, type of work activity, individual characteristics of the organism and a number of environmental factors (temperature and humidity).

Athletes with different body types -
ectomorphs (with a short torso, long arms and legs, a narrow tight cage and a small amount of fat), mesomorphs (with a large chest, elongated torso, significant strength) and endomorphs (with soft muscles, short neck, wide hips and a large amount of fat) should approach training purely individually in order to achieve the desired effect and not damage the state of health.

Depending on what part of the entire muscle mass of the body is involved in movement, they distinguish: global muscle work (more than 2/3), regional (from 1/3 to 2/3) and local (less than 1/3).

Knowing which muscles predominantly provide motor activity, you can select from a variety of physical exercises those that contribute to the development of specific muscles.

In this case, you should clearly understand what is meant
is performed under basic and isolating types of exercises. The first include movements with weights, impact

affecting large muscle groups (bench press, squats with a barbell on the shoulders, deadlift) of one or more parts of the body, the second - exercises that affect mainly one muscle group (bench press, etc.). A common isolation exercise for the muscles of the thigh is straightening the legs on a barbell, in which the quadriceps are isolated. Squatting with a barbell, work out the quadriceps along with the buttocks, hamstrings, lower and upper back muscles. Thus, basic exercises contribute to an increase in muscle mass and growth of strength, and isolating exercises - the formation and study of muscle details, which is inherent mainly in athletes of a high level of preparedness.

In one series, consisting of several approaches, exercises should be present that provide impact on muscle groups located close to each other, for example, exercises for flexors and extensors of the arms can be included. Another series is for the pectoral and deltoid muscles, the third is for the muscles of the back and legs, and the fourth is for the rectus and oblique muscles of the abdomen.

It is recommended to include up to 12 exercises in the training complex: 4 - for the muscles of the shoulder girdle, 3 - for the chest, 3 - for the back and 2 - for the abdomen. Developing the muscles of the legs, in separate weekly sessions, specialized complexes are introduced with 5-6 repetitions of 15-18 times. Beginner athletes in the first 1-2 months should exclude these exercises, replacing them with jogging on days free from training. Since the development of the leg muscles is an individual process, each athlete follows his own specific path.

An example of the sequence of execution
exercises: bench press or squats with a barbell on the shoulders; pull-ups from various starting positions on the bar and push-ups on the uneven bars; working out the lats and long muscles of the back due to all kinds of bends and traction of the abdominal muscles. Usually, the complex is designed so as to work all the muscles from top to bottom: shoulders, back, legs, abdomen, or in one workout they affect the upper body, on the other - the lower one.

Exercises for the abdominal muscles should be done in
in the middle or at the end of the session, as they require a lot of physical and functional stress.

Rest intervals between sets should be sufficient to restore breathing and heart rate; the approximate duration is 2-4 minutes. It is advisable to fill them with calm exercises in motion - breathing, walking with shaking limbs, light rubbing, massaging tired muscles and mentally doing the exercise.

An example of a set of exercises for the muscles of the upper body:

1. Standing, press the bar from the chest.
2. Raising arms through the sides up (dumbbells, barbell discs).
3. Pulling up on the bar until it touches the back of the head with a lump, a wide grip.
4. The same, until the chest touches the bar.
5. Standing, lifting the bar to the biceps, medium grip.
6. Pull-up on the crossbar (for biceps), a narrow grip.
7. Flexion and extension of the arms in support on the uneven bars (for triceps).
8. Lying on a horizontal bench, bench press.
9. Sitting at a 45 ° angle, press the bar, wide grip.
10. Standing, lowering the barbell behind the head, without bending the elbows, that is, triceps ("French") press, narrow grip.

A variant of the complex with the predominant development of the strength of the muscles of the lower extremities:

1. Standing, turns to the sides with a light (30-40 kg) barbell on the shoulders.
2. Squats with a barbell on the shoulders (a bar 3-5 cm high under the heels).
3. Standing in a "split", a barbell weighing up to 30 kg on the shoulders behind the head. Springy wiggle.
4. Sitting on a high bench, alternating straightening legs at the knees, dumbbells tied to the feet.
5. Lying with your chest on a bench, lowering your legs back with dumbbells tied to your feet.
6. Lying down, raising the legs to an angle of 180 ° with dumbbells tied to the feet.
7. Sitting on an incline bench, holding a 10-15 kg disk behind the head, lifting the body.
8. Standing on the bench, weights in lowered hands. Squat until the kettlebells touch the floor. Do not tilt the body, keep your back straight.
9. Squats on one leg.
10. Standing in a floor squat with a light barbell (20-30 kg) on the shoulders, jumping out.

Complexes of exercises for general impact:

Complex A

1. Lying on a horizontal bench, press the bar with a wide grip.
2. Pulling up on the bar until it touches the back of the head lump, wide grip.
3. Flexion and extension of the arms in support on the uneven bars.
4. Bend forward with knees straight. Row of the bar to the chest.
5. Sitting on the floor, the pull of the block device rod to belt.
6. From a forward bend, straighten the torso with a barbell, holding it in arms outstretched downward (deadlift).
7. From a prone position on an inclined board with your head down, legs secured. Raising the torso until the chest touches the knees (possible with weights in the hands).
8. Sitting with a barbell on your shoulders - turns your torso.
9. Standing bent over, lifting on toes with a partner on the back.
10. Lying on your chest on a machine bench, leg flexion (with weight or resistance).
11. Squat with a barbell on the shoulders.

Complex B

1. Sitting with dumbbells in hand. Alternate or simultaneous dumbbell press.
2. Standing with the bar in lowered hands. Rod rod to chin, narrow grip.
3. Sitting with the bar in your hands, your forearms rest on your hips. Flexion and extension of the arms at the wrists.
4. Standing, holding the block device stem. Flexion of the arms.
5. "French press" barbell standing.
6. Sitting on the "Roman chair". Raising the trunk with the obligatory turn of the hips.
7. Lying on an inclined board. Raising your legs up.
8. Standing tilted. Row of the bar to the stomach, wide grip.
9. Standing with your heels on a block or an inclined board. Sit-ups with a barbell on the chest.
10. Standing with one foot in front and the other behind. Spring squats with a barbell on the shoulders ("scissors").
11. Lying on your back on a bench. Straighten your knees with weight.

The famous American bodybuilder Arnold Schwarze Negger believes that success in training depends more on a strong-willed attitude to the work ahead, on the quality of the exercises, and not on their choice. It offers a set of 10 exercises designed to target major muscle groups. Each is performed in three sets of 8-10 repetitions at 30-second intervals:

1. Lying down, press the bar with a wide grip with a lowering until the bar touches the chest at the level of the nipples. When lowering the bar, inhale, when squeezing out, exhale. The principle of increasing weight from batch to batch is used. In the first sets, 8 reps, in the last - 6 (for the pectoral muscles).

2. Wide grip pull-ups on the bar until the chin is over the bar. Go down slowly while inhaling. 10 reps, with extra weight 6-8 (lats and entire shoulder girdle).

3. Sitting, press the bar with a grip 13 cm wider than the shoulders.
It is possible to do it while standing, however, while sitting, the athlete experiences less stress on the lower back (for the development of the muscles of the anterior delta).

4. Lifting the bar for biceps, grip shoulder-width apart. Keep your elbows stationary so that the load on the biceps does not decrease. The weight of the bar is such that after the fifth repetition it was difficult to lift it (for the development of the muscles of the arms).

5. Standing, slowly lowering the barbell behind the head and returning the triceps force to its original position ("French press"). The distance between the arms is about 25 cm. The forearms are kept stationary as close to the head as possible. If the elbows diverge, reduce the weight of the weights (for triceps).

6. Squats with a barbell on the shoulders, heels on a bar or incline. Keep your back upright. When lowering, take a deep breath, while lifting, exhale.

7. Lying on the machine - bending the legs, then slowly lowering. Raise the heels as high as possible (for the muscles of the back of the thigh).

8. Standing, raising on parallel toes. The weight of the weights allows you to perform 5 series of 15 repetitions (for the muscles of the lower leg).

9. Lying on an incline bench, raising the torso. The legs are bent at the knees (for the abdominal muscles).

10. Sitting on a bench with a narrow grip on the bar, elbows together.
Flexion of the wrists (for the muscles of the forearm).

When compiling complexes, you should take into account the number of workouts per week.

If the training experience of those engaged in less than six months, in one lesson to increase the muscle mass of the arms, it is enough to use 4-5 trips for biceps and 5-6 for triceps, and if up to a year, then you can perform 6-8 and 7-9 approaches - that is, in the first year the load increases due to the increase in the number of approaches. In the future, it is recommended to build it up at the expense of more "hard", concentrated work, and bring each approach "to failure."

Based on these exemplary complexes, depending on the level of fitness, sports equipment, well-being, it is possible to compose the most suitable one. At the same time, in any complexes, regardless of physique, age and training experience, it is imperative to include such traditional exercises as standing barbell press, squats with a barbell on the shoulders, lifting dumbbells through the sides up, bending forward with a barbell on the shoulders , bench press and deadlift. These very difficult exercises are done with extreme weights.

In the process of athletic training, the trainer and the trainee must exercise strict control over the technique, since even with a slight change in the kinematics of the movement, additional muscles are involved in it, and the effect on the trainees changes.

Final part. At the end of the lesson, you need to calm down, do pleasant, accessible and simple exercises for stretching and relaxation.

After your workout, be sure to shower and rub your body vigorously with a hard towel.

Athletic gymnastics for middle-aged and elderly people. The following facts make it clear that athleticism promotes healthy longevity. Albert Backle is over 60 years old. He lives in the Seychelles and, constantly participating in the "Mr. Olympia" tournament, he is among the twenty best professional cultists! The 60-year-old coach of the German national bodybuilding team Walter Klock, constantly exercising, looks like a 40-year-old. There are many such examples.

Specially selected general developmental exercises with weights cause positive morphological and functional and mental changes in the body, promote muscle growth, increase strength endurance, increase efficiency, and active life longevity.

The exercises performed should be simple in structure and coordination, allowing you to breathe freely, deeply and rhythmically. Exercises of a fast-strength nature with extreme loads and static stress should be avoided. The main principles of training should be versatility, individual approach and especially gradualness in the implementation of the program of strength exercises.

The first classes are carried out without weights, with the use of a variety of general developmental exercises. Then, in the absence of contraindications, if the practitioner does not feel unpleasant sensations, you can proceed to exercises with light weights of 3 and 5 kg, barbell discs of 5, 10, 15 and 20 kg, on simulators, with pood weights. Classes end with various general developmental exercises with and without weights, torso tilts, circular movements, relaxation and breathing exercises.

Basic strength exercises make up from 50-60 to 90-100 percent of the total training loads. The most accessible for older people is the bench press from a lying position with a wide, medium and narrow grip. Stable position of the body and elementary structure of movement allow rhythmically breathing, horizontal position facilitates the work of the cardiovascular system and improves blood supply to the lungs and brain. In the first months of training, people suffering from hypertension perform the exercise with a slight inclination of the bench so that the head is higher than the legs. Gradually, the slope decreases, and in the fourth or fifth month, the bar must be squeezed out of a horizontal position. This exercise contributes to the development of the chest, overall health improvement, creates favorable conditions for the normal functioning of internal organs.

You should start with a weight of 40-50 percent of the maximum that the trainee is able to overcome. This weight is lifted 10-15-20 times, then brought to 70-80 percent of the maximum. There are cases when elderly people successfully worked with extreme weights 2-3 times a month without harm to health. In any case, it is recommended to gradually increase the weight of the projectile to 50, 60, 70, 80% of the maximum and also gradually "descend" down - 80, 70, 60, 50%. At the same time, the number of repetitions also changes - 6, 10, 20, 30.

For those who are physically poorly prepared, you can recommend lifting 5 kg weights and discs

of various weights, as well as lifting discs from a prone position. Depending on the readiness, they perform 5-6 approaches (at the beginning and end of the lesson) and lift the discs 10, 15, 20 kg 20, 15, 10 times. These recommendations are given by the Bulgarian scientist P. Dobrev in the book "Strength, Health, Longevity" and seem to be too "tough" for this contingent of those involved. Unfortunately, we do not have our own experience in the strength training of elderly people.

Athletic gymnastics for women. When engaging in strength exercises, a number of morpho-functional features should be taken into account, since the limbs in women are shorter, and the spine is longer than in men. With relatively strong muscles of the legs and abdominal muscles, the muscles of the arms and shoulder girdle are poorly developed. The density and size of the bones in women is less, and the mobility in the joints and the spine, the elasticity of the ligaments and muscles is higher than in men. Lung capacity is lower, the heart is smaller, and the rhythm of breathing and heart rate is more frequent. Women have a longer period of recovery of pulse and arterial blood pressure after physical exertion, and a higher level of these parameters at rest. The nervous system is characterized by great reactivity and excitability.

Women tend to be smaller and lighter than men. They are

they reach the peak of their power capabilities 2-4 years earlier. The absolute weight of muscles in women is on average lower - 23 kg (in men - 35 kg), in percentage terms, the proportion of muscles in the total body weight is 30–35% (in men - 42–47%). The strength of women, on average, is 60-80% of the strength of men, and among those engaged in strength training, these differences are even more significant.

Rational athletic training, which takes into account the characteristics of the female body, has a positive effect on improving health and developing vital motor qualities.

In classes with girls and women, the weight of the shells should be much less, and the increase in the volume and intensity of the loads should be smoother than that of men. The selection of exercises and their effects on muscle groups differ slightly from the general rules for using resistance exercises. It should be borne in mind that women, performing strength exercises, usually do not strive to develop maximum muscle strength, but care about improving overall physical fitness, strengthening health, harmonious physical development, and achieving beautiful forms.

Special simulators in combination with dumbbells,

barbell and dynamic exercises (sports and outdoor games, aerobics) help transform the figure, get rid of excess weight.

To combat excess weight, it is necessary to perform energy-intensive exercises: walking, running, swimming, cycling, etc. Local reduction of body fat occurs as a result of stretching exercises. Stretch muscles reduce the amount of adipose tissue, and thus reduce the total mass of a particular part of the body - for example, when bending forward and backward. Exercises are performed both of a dynamic and a static nature - the stronger the muscle tension, the better the result. The combination of stretching with athletic exercises - strength training with cyclic aerobics - also leads to high results. After a 10-minute warm-up, dance movements are performed, which are periodically replaced by 3-4 strength exercises, each of which lasts for 50 seconds (as a circuit training), after which the dance aerobics continues (2-3 minutes), the power complex is re-connected, etc. At the same time, the cardiovascular and muscular systems are trained, and during the whole lesson a high intensity of the load is maintained. Nevertheless, this technique requires students to adhere to a rather strict training regime, for which a certain preliminary preparation is required.

Another variant of combining aerobics with strength-oriented exercises is as follows: in the middle of a rhythmic gymnastics lesson, a break of 15-20 minutes is taken, which is filled with strength exercises on simulators, performed in accordance with individual fitness.

Beginners in athletic gymnastics are offered the following set of exercises:

1. Standing, turning the head left and right - 10-15 in each direction. Perform smoothly, 3 x 15 times.
2. Lying on a horizontal bench with dumbbells or a barbell - press, 3 x 6 times.
3. Sitting, without back support, lifting dumbbells for biceps, 3 x 6 times.
4. Standing, lifting dumbbells from the shoulder, 3 x 9 times.
5. Lying on a horizontal bench, head at the edge of the plane. Smoothly lower your arms with dumbbells behind your head, while bending them at the elbows ("pull-over"), 3 x 10 times.
6. Standing, feet shoulder-width apart, toes are deployed, under the heels a bar up to 5 cm high, in hands raised up

bar from the bar. Exhale - sit down with a full amplitude, do not bend your back. The exercise can be performed with dumbbells. 6 x 6 - 15 times.

7. Standing, the bar is on the shoulders behind the head. Semi-squats, 3 x 15 times.
8. Sitting on a bench, the bar is on the shoulders behind the head. Half bends forward, 3 x 8 times.
9. Standing, feet shoulder-width apart, dumbbells at the hips. Smooth turns of the body to the right and left, 3 x 5 - 12 times.
10. Standing, holding dumbbells (disc from the bar) with a mass 2.5 - 5 kg overhead. Rotating the torso clockwise and counterclockwise 6 - 7 x 5 times.
11. Standing, holding the dumbbells in the hands down. Alternate toe lifts with each foot, 3 x 15 times.
12. Lying on the floor, raising straight legs up behind the head at an average pace, 3 x 8 - 12 times.

Intensive training on simulators, with dumbbells, barbell, various significant weights are recommended 2-4 times a week, at the same time, in the afternoon, 1.5-2 hours after eating. Women should do the exercises in three sets of different repetitions. Those who want to lose weight repeat them 25-30 times, increase muscle volume - 8-10 times, strengthen muscles - 10-12 times. Athletic gymnastics for teenagers, boys and girls. Strength development in adolescents is heavily dependent on growth hormones and sex hormones. They have a significant effect on metabolism. Testosterone is a muscle growth stimulant. During puberty, the production of sex hormones increases significantly, therefore, the most favorable for the development of strength in girls is 11-13 years old, and in boys - 13-15 years. when muscles can account for up to 30% of body weight and differ little in their properties from the muscles of an adult. It is recommended to include large training loads in classes with strict control over the state of the cardiovascular system, musculoskeletal apparatus and only then, when puberty occurs.

In classes with adolescents, the principle of a gradual increase in loads should be strictly taken into account, which is implemented in preliminary general physical training aimed at the all-round development of strength. In athletic training, it is recommended to use weights that do not exceed 50-60% of the maximum strength, so that the child can perform the exercise 15-20 times, using a different circle of exercises.

Exercises that have a direct effect on the spine should be avoided. It is necessary to strive to create in adolescents a "muscle corset" that protects and supports the trunk. You cannot focus them on the maximum development of power capabilities.

In athletic training for young men and women, the exercises should be consistent with the training objectives, and in sports, the specialization of the young athlete. The assigned loads should not be monotonous, prolonged and extreme, capable of leading to injury. Thus, excessive loads on the triceps during puberty can lead to displacement of the olecranon of the humerus, and unilateral strength training can interfere with the development of muscle elasticity. Unreasonable use of special competitive exercises sometimes causes deformation of the spine and bones.

When engaged in athletic gymnastics, adolescents and young men should observe the general principles of the optimal organization of training for adults. The main focus should be on strengthening your back and abdominal muscles, including flexibility exercises in your workout. When exercising with a barbell, it is important to avoid deep squats and keep your back straight. Talk to your doctor before starting regular athletic gymnastics.

Athletic gymnastics for children. Strength exercises with preschool children strengthen their health, promote accelerated growth and development, and develop the correct posture. Being engaged in athletic gymnastics, children become vigorous and energetic, enduring and strong, agile and fast. They carry the load well, but it should be constantly remembered that it should be increased gradually and consistently, and the effect of exercise on the growing body should remain constant. At the same time, it is necessary to take into account the age and level of physical development (in contrast to the disorganized and often monotonous motor activity). The total duration of one lesson is different for each age. For children under two years old, it is 8-10 minutes, from two to three - up to 15-20, for older children - up to 30-40. To prevent fatigue, change your starting positions (sitting, standing, lying) and movements more often, alternating with rest pauses. As weights, you can use dumbbells, sticks, a ball, clubs, bags with a load, etc. It is necessary to correctly and clearly explain to the child the procedure for performing

exercises. Classes are useful with an open window, barefoot.

When choosing exercises, it is important to remember that children For 3-6 years, the spinal column is very sensitive to deforming influences, and skeletal muscles are characterized by poor development of tendons, fasciae, and ligaments. By the age of six, the child, as a rule, has well-developed large muscles of the trunk and limbs, but small muscles, especially the hands, are weak. Exercises should be chosen in such a way that the load is feasible and affects various muscle groups, first of all, it proportionally develops the flexors and extensors of the trunk; pay special attention to the development of the balance function.

In the process of purposeful exercises with weights, in combination with outdoor games, children acquire the ability to control their movements, differentiate muscle efforts, which means that they develop the ability to perform exercises with different amplitudes and in different modes, which children can change according to the task teacher.

It is necessary to gradually move from relatively simple exercises, performed with a low amplitude and at a slow pace at 3-4 years of age, to more complex in coordination, with an adjustable amplitude and with a variable tempo at an older age. Weights for children 3-6 years old are rather symbolic and are intended to a greater extent to affect the hard and slowly developing muscles of the hands, especially the flexors of the hand.

Safety engineering. When doing strength training, you must adhere to the following guidelines:

1. Carefully select the weight of the weights in each new exercise, having previously studied and mastered the technique of its implementation with a light projectile.

2. Avoid frequent stress on the spine during one lesson, use a special weightlifting belt, at the end of the workout, unload the spine in the hanging on the handle, crossbar.

3. When working at maximum weight, strap or tarp rods must be worn around the wrist to grip the bar.

Contraindications to weight training:

— clinically severe circulatory failure;

— exacerbation of chronic coronary insufficiency;

— myocardial infarction less than 12 months old;

— aneurysm of the heart and aorta;

- the threat of thromboembolic complications;

— the threat of bleeding (cavernous pulmonary tuberculosis, gastric ulcer and duodenal ulcer with a history of bleeding, cirrhosis of the liver);

— organic diseases of the nervous system with impairment of its functions;

—blood diseases;

—malignant neoplasms;

— gallstone and urolithiasis with frequent painful attacks;

—Acute inflammatory kidney disease;

—myocarditis of any etiology;

— most heart defects - both congenital (three hells, tetrad, pentad of Fallot, atrial and interventricular septal defects, non-closure of the Batall duct, coarctation of the aorta, stenosis of the aortic opening, stenosis of the opening of the pulmonary trunk, etc.), and acquired (mitral stenosis, mitral disease, insufficiency of the aortic valve, stenosis of the aortic opening, insufficiency of the tricuspid valve, stenosis of the right atrioventricular opening);

—acute infectious diseases and their exacerbations;

— sinus tachycardia with a heart rate of more than 100 per minute;

— severe disturbances in the rhythm of cardiac activity and conduction;

—hypertrophy of the heart due to persistent high blood pressure;

— the appearance of rhythm and conduction disturbances, angina pectoris, a decrease in blood pressure with little physical exertion;

— pulmonary insufficiency with a decrease in the vital capacity of the lungs by 50% or more of the proper value;

—pregnancy over 22 weeks;

—obesity III-IV degree;

— significant myopia with changes in the fundus;

—diabetes mellitus in severe form. Relative contraindications:

— sinus tachycardia with a heart rate of 90-100 per minute;

—violation of heart rhythm and conduction;

—some types of heart defects;

—recent internal bleeding;

—chronic inflammatory kidney disease;

— high blood pressure that does not decrease with treatment;

— chronic respiratory diseases with lower

a decrease in the vital capacity of the lungs by 30-35% of the proper value;

—violation of menstrual function;

—diabetes mellitus of moderate severity;

— obliterating endarteritis, causing pain on movement;

—chronic arthritis in the acute stage.

With relative contraindications, you need to do it carefully, carefully monitor your health and be sure to periodically consult a doctor.

About the dangers of anabolic steroids. In bodybuilding, like in no other sport, not only experienced but also novice athletes are trying to use anabolic steroids to accelerate the growth of strength and muscle mass. According to the available literature data, during a random check of Moscow bodybuilders, 20 percent of those examined in the body were found to have anabolics, which indicates the reluctance of athletes to realize the danger of their destructive effect on the cardiovascular system, liver, kidneys, endocrine glands, leading to heart attack, cancer , infertility, impotence, etc. In women, in addition, there is atrophy of the breast, hair growth on the face and body. Anyone who takes anabolic steroids experiences premature aging, all sorts of mental disorders (irritability, moral depression) appear.

Methodology for calculating training loads. Choose the optimal training weight for weights is not easy for athletes. It is known that the most effective method in the development of strength is the method of repeated efforts with weights from 6 to 10 RM (RM - repeated maximum), at which a rational ratio between the growth of strength and muscle mass is achieved. In this case, the weight of the weights should be approximately 80%. However, it is not always possible or desirable to determine the maximum weight as it can cause injury. Sometimes the student does not have the necessary equipment. Moreover, in some exercises - pull-ups in the hanging on a crossbar with weights (or counterweight), squats with a barbell - the working weight of the barbell, weights or counterweight cannot be calculated as a percentage at all. Therefore, in most cases, the training weight is set conditionally.

We have spread the method of determining weights, based on the fact that an athlete can perform eight repetitions with a barbell of a specific mass (without breaking the technique). In this case, it is possible to increase the load by 2.5 kg, while the weight of the burden remains

constant until, in all approaches, eight repetitions are freely performed again. Then the weight of the projectile is increased again, and the whole cycle is repeated.

The problem under consideration can be successfully solved by performing a mathematical calculation according to the methodology proposed by the authors based on the results of a single testing of athletes. The weight of the burden during testing is chosen arbitrarily, and the worker can be calculated for any given number of repetitions by calculating all possible combinations of the weight of the burden and the number of repetitions in one approach for a given level of fitness.

It was experimentally established that in the range from 1 to 50 repetitions, the relationship between the possible number of repetitions in one approach and the ratio of the maximum force to the one actually developed at a given load is a linear value. The calculation of the coefficients of the direct and inverse regression equations gave the following values: a = -31.93, b = 33.16 for the direct and c = 0.965, d = 0.03 for the opposite.

Without going into the details of mathematical operations, we will use several examples to show the effectiveness of the methodology for calculating the most important parameters of the training load (weight of weights and the number of repetitions), depending on the level of physical fitness of the trainees. This operation can be conveniently performed using a programmable microcalculator (for example, MK-61) according to our programs. The calculation is performed according to the instructions, and the program operators are entered line by line from left to right.

Bar weight calculation, with which you can perform the required number of repetitions for the case when its movement is not accompanied by the movement of significant parts of the body (bench press lying down, sitting, lifting biceps, etc.).

Let's say the student has performed a 40 kg barbell press 12 times. It is required to determine the weight of the bar with which he will perform this exercise 10 times.

To do this, we will use program I.

Program 1 PxD x PxS + PxO PxD x PxS + Px1 x ↔ + C / P BP OO

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of program I);
3. Switch to automatic operation mode (F, AUT);

4. Clear command counter (B / O);

5. Enter the regression coefficients (0.965, x PS, 0.03, HPA);

6. Enter the value of the number of repetitions during testing into register O (12, xPO), and then the value of the weight of the bar with which the test was carried out, into register I (40, xPI);

7. Enter the number of required repetitions of the barbell lifts and start the calculator to the count (10, S / P). After the end of the counting, the barbell weight of interest (42 kg) will appear on the calculator indicator;

8. To calculate new values, go to step 6.

Calculation of the possible number of barbell lifts.

Suppose, for the same practitioner, it is required to calculate the maximum possible number of barbell lifts of a certain weight, for example, 35 kg.

Program 2 B ↑ P x D x xP4 ↔ PxS x PxO PxD x PxS + Px1 x ↔ - Px 4 + S / P BP 00

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of program 2);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);

5. Enter the regression coefficients (0.965, xПС, 0.03, xПД);

6. Enter the digital value of the number of repetitions during testing into register O (12, x PO), and then the value of the weight of the bar with which the test was carried out into register 1 (40, xP1);

7. Enter the value of the weight of the bar with which it is supposed to work, and start the calculator on the count (35, S / P). At the end of counting, the indicator of the calculator will show a value corresponding to the number of possible repetitions of lifting a barbell weighing 35 kg (18 times);

8. To calculate the number of lifts a barbell of a different weight, go to step 7, and to perform the calculation for a new practitioner - to step 6.

When pulling up on the bar without weights, with weights or with a counterweight, when bending and extending the arms in support on the uneven bars in similar conditions, a certain difficulty is the selection of the required optimal weight of the weights or counterweight, as well as calculating the number of pull-ups with a given weight or counterweight (the number of times).

Calculation of the required counterweight. For example, it is required to determine what the weight of the counterweight should be so that a 60 kg person, who is able to pull up with his own weight 7 times, can pull up 10 times in one approach.

Program 3 B ↑ PCD x

PxS + xP4 ↔ PxO ↔ -
PxD x Px1 x Px4 ÷ S / P BP OO

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 3);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);
5. Enter the regression coefficients (0.965, x PS, 0.03, HPA);
6. Enter the value of the number of pull-ups with own weight into the register O (7, xPO), and then the weight of the practitioner into the register I (60, xP1);
7. Enter the required number of pull-ups with weights or counterweight (10, S / P). At the end of the counting, the counterweight value (-4 kg) will appear on the calculator indicator;
8. To calculate the mass of the counterweight with a new number of pull-ups for the same person, go to step 7;
9. For a similar calculation of the mass of the counterweight from another practitioner, go to step 6.

Thus, the mass of the counterweight should be -4 kg (the "minus" sign indicates that conditions that facilitate the performance of pull-ups are necessary for the successful solution of the motor task).

Determination of the possible number of pull-ups. Let's assume that we are interested in the number of pull-ups that the same person doing with a 5 kg weights can do.

Program 4 Px1 + PHO

PCD x PxS + Px1 x PVC
x ↔ + PxA + S / P BP 00

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 4);
3. Switch to automatic operation mode (F, AUT);

4. Clear command counter (B / O);

5. Enter regression coefficients (-31.93, hPA, 33.16, hPV, 0.965, hPS, 0.03, hPD)[1];

6. Enter the true number of pull-ups with own weight into the register O (7, xPO), the value of the weight of the practitioner into the register I (60, xP1);

7. Enter the weight of the load or counterweight (5, S / P). At the end of the counting, the calculator indicator will display the required number of pull-ups (4);

8. With a new value of weights, go to step 7;

9. When changing the student, go to step 6.

If it is necessary to select the weight of the counterweight for a beginner who can never pull up on the bar or perform flexion and extension of the arms in support on the uneven bars, a test is carried out to determine the minimum weight of the counterweight, with which a single exercise is possible.

Calculation of the required counterweight. What should be the weight of the counterweight, with which a person weighing 80 kg can pull himself up 10 times in one approach, if with a counterweight of 10 kg he pulls up 1 time?

Program 5 PxD x PxS + PxO Px1 + ↔ ÷ Px1 - S / P BP OO

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 5);
3. Switch to automatic operation mode (F, AUT);
4. Clear program counter (B / O);
5. Enter the regression coefficients (0.965, xПС, 0.03, xПД);
6. Enter the value of the weight of the counterweight, with which the exerciser was able to perform one pull-up, into register 0 (-10, xPO), the weight of the exerciser into register I (80, xP1);
7. Enter the desired number of pull-ups (10, S / P).

At the end of the calculation, the required value of the counterweight mass (-25) will appear on the calculator indicator;

8. To calculate the mass of the counterweight with a new number of pull-ups for the same person, go to step 7;
9. To carry out the calculation with another student, return to paragraph 6.

Calculation of the possible number of pull-ups... How many

[1] A negative number is entered by typing its absolute value followed by entering a negative sign using the "I — I" key.

How many times will this student be able to pull himself up using a counterweight weighing -20 kg?

Program 6 PxI + PHO
PxI + PxVx ↔ ÷ PxA
+ S / P BP OO

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 6);
3. Switch to automatic operation mode (F, AUT);
4. Clear program counter (B / O);
5. Enter the regression coefficients (-31.93, x PA, 33.16, x PV);
6. Enter the weight of the counterweight, with which the student was able to pull himself up once, into register O (-10, x PO), the weight of the student - into register I (80, x PI);
7. Enter the weight of the counterweight with which you can perform the required number of pull-ups (-20, S / P). At the end of counting, the required number of pull-ups will appear on the calculator indicator (7);
8. With a new value of the counterweight, go to step 7;
9. When calculating with another student, return to point 6.

Calculation of the required weight of the burden for squats with a barbell. Let's say that a person doing 80 kg during testing did 5 squats with a barbell weighing 60 kg. How much will he do 10 squats in one set?

7 PxA Program - xP4
PHO PCD x PxS + PVC x
xp6 Px3 Px1 Fxy xP5 Px2 + Px6 x Px4
+ Px5 - S / P BP OO

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 7);
3. Switch to automatic operation mode (F, AUT);
4. Clear program counter (B / O);
5. Enter the regression coefficients (-31.93, hPA, 33.16, hPV, 0.965, hPS, 0.03, hPD);
6. Enter the number of squats performed when

testing in register O (5, x PO), the weight of the student - in register I (80, xΠI), the weight of the bar with which

testing was carried out - in register 2 (60, xΠ2), constant 0.667 - in register 3 (0.667, xΠ3);

7. Enter the planned number of squats (10) and start the calculator into the account (S / P). At the end of the count, the required weight of the bar will appear on the calculator indicator (51);

8. With the new number of squats, go to step 7.

9. When calculating with another student - return to point 6.

Calculation of the possible number of barbell squats. How do you know how many repetitions of squats a person can perform in one approach with a 65 kg barbell?

```
                                                  Program 8 xP6          Px3          Px1
      FxY       xP5          Px6          +          xP4          PHO
PCD   x    PxS   +  Px2   Px5  + PVC x    x Px4
÷  PxA + S / P BP OO
```

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 8);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);
5. Enter the regression coefficients (-33.93, x PA, 33.16, hPV, 0.965, hPS, 0.03, hPD).
6. Enter the number of squats performed by the student during testing into register O (5, x PO), the weight of the student - into register I (80, xΠI), the weight of the bar with which the test was carried out, into register 2 (60, xΠ2), constant 0.667 - to register 3 (0.667, hPZ);
7. Enter the specified bar weight and start the calculator on the account (65, S / P). At the end of the count, the calculator indicator will show the number of possible squats with a given weight (3);
8. With a new value for the weight of the bar, go to step 7;
9. When changing the student - return to point 6.

Methodology for calculating the number of sessions required to achieve the desired level of strength readiness.

The increase in strength during targeted strength training has a pronounced exponential dependence on the number of training sessions and can be described by the formula

$$Y = axb + c$$

where Y is the magnitude of the force; x - number of training

classes; a, b, c - empirical parameters (coefficients).

Empirical parameters a, b, c depend on a number of factors: the individual characteristics of the trainees (age, body constitution, morphological characteristics, health, mental state, etc.), organization and methodology of the training process.

If we find the values of the coefficients a, b, c for a specific person (or a group of trainees), then it is possible with a high degree of reliability to calculate the number of trainings required to achieve the desired level of strength development.

It should be remembered that the establishment of an empirical formula makes sense, provided that only one methodology (training system) is constantly used for the development of strength, classes are conducted without long breaks, a normal diet and rest regimen of the trainees is organized, and a constant (at least 1 time in week) control over the development of strength, and the total number of classes conducted is at least 30.

Consider a specific example of the construction method
the mathematical model of the training process. Suppose that practitioner B trained 4 times a week, and every fifth workout, a 10RM was measured in the bench press. As a result of regular testing, a time series was obtained, reflecting the empirical dependence of strength (in our example, it is 10 PM) on the number of training sessions.

x	2	7	12	17	22	27	32	37	42
Y	35	40	45	50	50	55	57.5	60	60

where x is the number of the training session in which the testing was carried out, and Y is the result shown in the bench press.

Using the values of this time series, plot them a graph of the dependence Y (x) (Fig. 29).

Using this graph, we determine the value of the coefficient
For this, on the graph we find three points with abscissas x1, x2, and $x3 = \sqrt{x1\ x2}$ and ordinates, respectively, Y1, Y2 and Y3 (points x1 and x2 are chosen
arbitrarily).

Suppose, in our example, x1 = 7, x2 = 37, $x3 = \sqrt{7 \cdot 37} = 16$, then we get Y1 = 40, Y2 = 60, Y3 = 48.

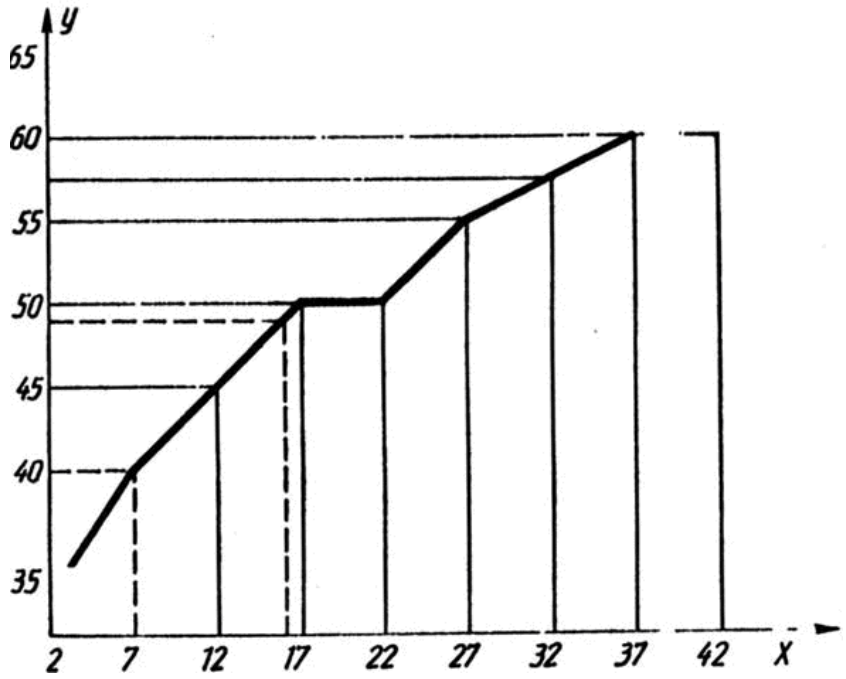


Figure: 29. Graph of dependence Y (x)

Coefficient C is calculated using the following formula:

$$C = \frac{Y_1 Y_2 - Y_3^2}{Y_1 + Y_2 - 2Y_3} = \frac{40 \cdot 60 - 48^2}{40 + 60 - 96} = 24$$

To calculate the coefficients a and b, we turn to the help of a programmable microcalculator (for example, MK-61), for which, based on mathematical formulas, the composition

Lena program 9.

x	2	7	12	17	22	27	32	37	42
YC	ele	six	21	26	26	31	33	3	36

Due to the fact that this program finds the values of the coefficients a and b for the dependence Y = aXb, and the exponential dependence of the growth of strength on the number of workouts performed is described by the expression Y = aXb + C, then, naturally, aXb should be equal to Y - C , i.e., it is necessary to first transform the time series by subtracting from each value of Y the value of the obtained value of the coefficient C:

Program 9

```
    x PO x P7 O x P3 xP4 x P5 x P6 x P7 PxO - I + S / P xP1 Fln          HPV          Px3
+          xP3          PVC
Fx2 Px4  + xP4  Nh7 C / P xP2   Fln  xP9  Px5
+  xP5  PVC  Px9  x  Px6  +  xp6  FLO  07
Px3  Px5    x      Nh7     Px6 x    -     Px3  Fx2           Nh7 Px4
x          -                ÷                HPV          Px5          Px3
PxVx          - Px7          +          Fex          hpa          C / P          PVC          C / P
```

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 9);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);
5. Enter data in the following order: N, S / P, X_1, S / P, Y_1, S / P, X_2, S / P, Y_2, S / P, ... X_n, S / P, Y_n, S / P. For our example, the following takes place: 9, S / P, 2, S / P, 11, S / P, 7, S / P, 16, S / P, etc .;

N is the number of pairs of values X, Y;

6. After entering all the X and Y values, the value of the coefficient a will appear on the calculator indicator. To obtain the coefficient b, press the Px, B keys.

In our example, a = 7.808; b = 0.411.

$$X = \sqrt[0,411]{\frac{Y - 24}{7,808}}$$ Then the mathematical model of the studied training process will take the form: Y = 7.808 X0.411 + 24, whence

Using the above mathematical model of the training process for student B, you can find answers to the following questions:

1. What will be the 10RM level in this exercise
for this practitioner through n workouts?

2. How many training sessions do you need to reach the planned 10RM value in this exercise?

For example, what is the value of 10RM for Exercise B after 50, 60, and 70 workouts?

Substituting the formula Y = 7.808 X0.411 + 24
the corresponding values of X, we obtain with X = 50, Y = 63 kg, with X = 60, Y = 66 kg, with X = 70, Y = 68.8 kg.

If you need to know how many training sessions
you need to spend to reach the level of 10 PM (say 65, 70 or 75 kg), you must use the formula

$$X = \sqrt[0,411]{\frac{Y - 24}{7,808}}$$

at Y = 65 kg X = 56.6 ~ 57 workouts at Y = 70 kg X = 74.8 ~ 75;
at Y = 75kg X = 96.2 ~ 96.

By using a programmable microcalculator, you can significantly facilitate the process of calculations according to the formula Y = aXb + C using program 10.

Program 10 V ↑ PxV ↔ FxU PxA x PxS + S / P

V / O

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 10);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);
5. Enter parameter a into register "A" (x PA), parameter b into register "B" (xPV), parameter c into register "C" (xPS).
6. Dial on keyboard value X. Press S / P key. At the end of the counting, the indicator will show the Y value expected in the X workout.
7. To find the Y value for other X values, go to step 6.
8. When making calculations for another practitioner go to step 5.

To calculate using the formula, we use program 11.

take advantage of

$$X = \sqrt[b]{\frac{Y - C}{a}}$$ Program 11

B ↑ PxS - PxA ÷ PVC FI / x ↔ Fxy C / P IN

Instructions:

1. Enter the programming mode (F, PRG);
2. Enter the program (according to the text of the program 11);
3. Switch to automatic operation mode (F, AUT);
4. Clear command counter (B / O);
5. Enter parameters a into register "A" (xPA), parameter b into register "B" (xPV), parameter c into register "C" (xPS);
6. Dial on keyboard value Y. Press S / P key. At the end of the counting, the indicator will display the X value, at which the required Y value will probably be reached;

7. To find the X values at which other Y values will be reached, go to step 6;

8. When making calculations for another student, go to step 5.

The performed correlation analysis between the actual values of 10 PM and the values obtained analytically revealed a high correlation relationship (0.992). At the same time, the coefficient of determination (D = 0.9922 • 100% = 98.4) indicates that the mathematical model found by us describes the relationship between 10 PM and the number of training sessions according to this technique by 98.4%. If testing is carried out regularly under the same conditions and there are no errors in the calculations, the derived mathematical formula reflects the course of the training process quite accurately. In our practical work, the coefficient of determination did not fall below 90%.

Thus, using the empirical formula Y =

= aXb + C, it is possible to carry out extrapolation, that is, to predict the growth of strength when choosing new training methods, to calculate the required number of trainings according to the method used to achieve the planned result, to carry out an individual approach to each student, to solve educational -training process, on a scientific basis to plan, set long-term goals and objectives for strength training.

SELF-CONTROL
AND MEDICAL CONTROL

Being engaged in athletic training, it is necessary to regularly keep a systematic and detailed record of the physical activity performed in order to monitor the body's reaction, to maintain them at the most optimal level without harm to health. In magazines or workbooks, the following are recorded: the magnitude of the weights, the number of approaches, remarks on the technique, pulse reactions.

When performing self-control, they are marked as
ejective (with the help of devices) and subjective (mood, well-being, etc.) indicators that are recorded in the observation diary.

Physical condition, i.e. readiness to perform muscular activity, is characterized by the state of human health, his physique, functional capabilities of the organism, and physical fitness. Physical development should be understood as a complex of morphological features of the structure of the body, its size, as well as the functional capabilities of the body. During self-monitoring, morphological parameters are determined - height, weight, circumference of the chest and limbs, fat folds are measured, as well as some functional indicators - vital capacity of the lungs and muscle strength.

For a rough estimate of body weight (mass),
use the Brock-Brugsch formula, according to which the normal weight of people with a height of 155-165 cm is calculated by subtracting 100 from the height. With a height of 166-175 cm deduct 105, with 176-185-100. Women need to have a slightly lower weight. At the same time, in persons exercising with weights, the weight, as a rule, exceeds the proper norms.

Kvetel proposed an index for a comprehensive assessment of weight and height indicators - the ratio of body weight (in grams) to height (in centimeters). For men, its average value is 345-410 g / cm, for women - 320-385.

People with well-developed muscles may have higher scores.

Athleticism helps to increase the circumference of the chest. This indicator is measured in three phases: during calm breathing (during pause), maximum inspiration and maximum expiration. The measuring tape on the back should run under the lower corners of the shoulder blades, in front - along the lower edge of the nipple circles in men and over the breast gland in women. During the measurement at maximum inhalation, do not strain the muscles and raise the shoulders, and when exhaling - slouch. The development of the chest is judged by its excursion - the difference between the size of the circumference during inhalation and exhalation.

To assess the proportionality of the development of the chest, the Erisman index can be used, which is calculated by subtracting from the indicator of the circumference of the chest, obtained when measuring it in a calm state (in a pause), a value equal to half the height. For adult men, its average value is +3 - +6, for women -
-1.5 - +2.

The strength of the physique can be calculated using the Pignet formula. It is defined as the difference between standing height, the sum of the weight and the chest circumference measured during the expiratory phase:

Height (cm) - weight (kg) + chest circumference when exhaling (cm).

If adults have a Pignet indicator less than 10, they have a strong physique; 10-20 is good; 21-25 - average; 26-35 - weak; 36 or more is very weak.

Somatoscopy (external examination of the body) is performed in front of a mirror, starting from the front, continuing from the side and from the back. Posture will be considered good if the head and torso are on the same vertical, the shoulders are deployed, slightly lowered and located at the same level, the chest is raised and protrudes forward, the abdomen is slightly pulled in, the shoulder blades are symmetrical and do not stand out, and the legs are straight at the joints. Special strength exercises help to develop the correct posture.

Fat deposition is assessed using a caliper or
sliding compass along the thickness of the skin-fat fold in men in the abdomen opposite the navel, retreating
5 cm from the midline; in women - in the back area at the lower angle of the scapula. If the thickness of the skin and fat folds is 1 cm, fat deposition is considered small, 1-2 - medium, 3 or more - large.

To calculate the average size of the skin and fat folds, eight folds are measured: in the back area at the lower angle of the scapula; chest at the level of the fourth rib

along the axillary edge (not measured in women); abdomen at the level of the navel, stepping back 5 centimeters to the right; on the front and back of the shoulder, approximately in its middle; on the inner surface of the forearm; on the front of the thigh, slightly below the groin fold; on the back of the lower leg in the calf of the leg muscle. Then the obtained data are summed up and divided by 16. This figure fairly objectively characterizes the dynamics of fat mass. If the size of the skin and fat folds remained unchanged for some time, but the circumference of the shoulder, thigh, and lower leg increased, there was an increase in muscle mass, which indirectly indicates an increase in strength, since muscle strength is proportional to their cross section.

Increase in body weight due to an increase in fat

a component up to 10% above the norm is considered a pre-obesity condition. Obesity is already a disease. There are four degrees of it: in the first, the body weight exceeds the norm by 10-29, the second - 30-40, the third - 50-90, the fourth - by 100% or more.

Changes in the indices of physical development under the influence of regular physical culture and sports activities allows one to judge how correctly the loads are dosed, taking into account the age of those involved. As the organism grows and develops, the indicators of physical development increase rather quickly, and in old and senile age their decrease is observed. If, under the influence of exercise, this tendency slows down or stops, it means that training has a positive effect.

A mood is considered good when a person feels self-confident, calm, cheerful, satisfactory - in an insufficient emotional state, unsatisfactory - confused, depressed, depressed.

The state of health is considered good if the athlete experiences a feeling of vigor, strength, desire to train; satisfactory - with a little lethargy, fatigue; bad - when there is a pronounced weakness, decreased performance, depression, unpleasant pain in the muscles, headaches. In the self-control diary, it is necessary to indicate when performing (or after) what exercises pain appears, their strength, duration, etc. If pain occurs in the region of the heart, you should consult a doctor. After the lesson, as a rule, fatigue sets in, and if it passes quickly, the load was small, after 2-3 hours - medium. If fatigue persists for a day and

more - the loads were large. Therefore, you can start the next lesson only after having completely rested, otherwise overwork may occur and the desire to train will disappear.

The desire to study in the diary is characterized by the words "big", "indifferent", "no desire".

Objective assessment of the effect of physical activity on an organism can be given only when taking into account a set of indicators characterizing the state of the main functional systems: respiratory, cardiovascular and nervous.

Athleticism by doing straining exercises helps to increase the strength of the muscles that provide the respiratory process (intercostal muscles, diaphragm), and improve ventilation of the lungs during exercise. In a well-trained athlete, it is carried out most rationally by increasing the vital capacity of the lungs (VC) and the respiratory rate (10-16 per minute), and with a strong reduction in the duration of the respiratory cycle.

The proper value of VC can be calculated by the formula Ludwig:

for men = 40 x height (cm) + 30 x weight (kg) - 4400; for women = 40 x height (cm) + 10 x weight (kg) - 3800.

The VC level is established using a spirometer and characterizes the functional capabilities of the respiratory system.

$\frac{\text{жел(мл)}}{\text{вес(кг)}}$. Knowing the value of VC and its own weight, you can calculate vital index:

If this indicator in men is less than 60, and in women less than 50 ml / kg, there is a lack of VC or overweight.

When conducting self-monitoring of the respiratory system, it is important to have an understanding of simple, accessible and sufficiently informative tests.

The test with holding the breath while inhaling (Stange test) is that the athlete in a sitting position, taking a deep breath and exhaling, repeats the inhalation (about 80% of the maximum), closes his mouth and pinches his nose with his fingers, and holds his breath. A delay time of 60-90 seconds or more indicates good preparedness, if the delay duration is lower, fatigue and overtraining began.

Genchi's test consists in holding the breath after exhalation. For trained athletes, this indicator is 40-60 seconds.

Serkin's test consists of three phases. First, the time of holding the breath while inhaling in a sitting position is determined, then after 20 squats in 30 seconds, followed by rest (1 min) and holding the breath while inhaling in a sitting position is repeated. For trained individuals, after the first measurement, a time of 60 or more seconds is considered good, after the second - 30 or more, the third - more than 60.

A significant reduction in the time taken to perform the test indicates a deterioration in the function of respiration, blood circulation and nervous system. With regular and rationally structured physical training, the duration of the breath hold should increase.

Pulse rate provides important information about the state of the cardiovascular system, which can be calculated on the carotid, temporal, or radial arteries at the base of the thumb just above the wrist joint. Pulse is a fairly accurate indicator of the body's response to exercise. So, if on the next day after classes there is an increase in heart rate in combination with poor health, sleep disturbance, lack of desire to exercise, this indicates
about fatigue of the body or the onset of the disease.

The dynamics of the organism's adaptability to physical activity can be judged by the data obtained using the simplest test.

After 3-5 minutes of rest, perform 20 squats
in 30 seconds (squatting - arms forward, standing up - down). Then the pulse rate is determined in 10-second intervals, and as soon as 3-4 identical values of the pulse rate are obtained, 20 squats are performed again. After that, in a sitting position, the pulse is counted in 10-second intervals for 3 minutes. If the pulse recovers by the end of the first minute, the adaptability to the load is excellent, on the second - good, on the third - satisfactory, and if the pulse has not recovered within three minutes - unsatisfactory.

Blood pressure (BP) is an indicator of the functioning of the cardiovascular system and is measured using a sphygmomanometer. The procedure for measuring blood pressure consists in the fact that a rubber cuff is attached to the shoulder 3-4 cm above the elbow bend. Then, with the help of a rubber bulb, air is pumped into it, a phonendoscope is installed on the ulnar artery (in the area of the elbow bend). When air is released from the cuff, the pressure in it decreases, and when blood enters the brachial artery, the first pulse tone is heard. Having fixed the level on the sphygmomanometer scale

pressure, we get the value of the maximum systolic pressure. Continuing to gradually reduce the level of pressure in the cuff, we will detect the disappearance of pulse tones and, by the level of this pressure, we will determine the minimum diastolic blood pressure. When measuring blood pressure, one should be guided only by sound tones, not paying attention to fluctuations in the mercury column. Sometimes when the pressure in the cuff drops to zero, shocks are heard, which is explained by a decrease in vascular tone.

Athletes with large muscle mass should take into account that the volume of the forearm can affect the value of blood pressure. It is noticed that the values of blood pressure, measured by direct (the sensor is inserted directly into the artery) and indirect methods, coincide with a shoulder circumference of 27-30 cm; with a larger circumference, the auditory method gives overestimated figures, with a smaller one - underestimated.

Blood pressure is mainly influenced by height and weight. Besides
In addition, age, heart rate, nutrition, engaging in a particular sport, etc. The pressure can change during the day, so it is measured at the same time. Normally, systolic pressure fluctuates within 10-15 mm Hg, diastolic - 5-10. In athletes, increased blood pressure occurs more often than in those who do not go in for sports, which can be explained by high physical and emotional stress during sports activities.

There is no consensus among scientists about the range of blood pressure norms for individuals with different motor activity.

It has been established that sex differences are insignificantly reflected in the value of blood pressure, while the influence of age is traced quite clearly. The relationship between blood pressure and age can be described by the equations:

Systolic BP = 1.7 x age + 83 (1)
Diastolic BP = 1.6 x age + 42 (2)
Systolic BP = 0.4 x age + 109 (3)
Diastolic BP = 0.3 x age + 67 (4)

Equations (1) and (2) correspond to persons 7-20, and (3) and (4) - 20-80 years (age is expressed in years, blood pressure - in millimeters of mercury).

Of particular interest in athleticism is the control over changes in muscle strength, carried out using dynamometers of various designs.

Using a hand dynamometer, determine the strength of the muscles of the hand, taking the arm to the side. Two measurements are taken on each hand, the best result is recorded.

A more objective indicator is the relative value of muscle strength, since the increase in strength during training is closely related to the increase in body weight and

muscle mass. For example, to determine the relative value of hand force, the dynamo meter reading (in kg) must be multiplied by 100 and divided by the athlete's body weight. For untrained men this figure is 60-70, for women - 45-50%.

In the same way, the relative strength of the backfire is calculated. If it turns out to be less than 170%, it should be considered low, from 170 to 200 - below average, 200-230 - average, 230-250 - above average, more than 260 - high.

An increase in relative strength indices indicates an increase in muscle strength and, as a rule, an increase in the percentage of muscle mass.

The development of the musculature of the shoulder can be established by measuring the circumference of the shoulder first with a freely hanging arm, then with a horizontally raised, tense and bent elbow (in both cases, the largest circumference is measured).

You can evaluate the data obtained by the ratio: Difference of both shoulder circumferences x 100

Straightened arm circumference

The value of the ratio less than 5 indicates insufficient development of the musculature of the shoulder, its obesity; a value in the range of 6-12 is typical for normally developed muscles; a figure above 12 indicates a strong development of the musculature of the shoulder.

In the absence of a dynamometer, it is possible to accurately determine the value of strength endurance by performing pull-ups, flexion and extension of the arms in support (on the uneven bars, from the floor) and other exercises. The results obtained should be recorded in a diary, and then, for example, once every 2-3 months, repeat the procedure, observing the growth of the strength of the arms, legs and shoulder girdle.

The level of development of strength qualities is often judged by the results of performing competitive or training exercises. Maximum strength corresponds to the greatest weight that an athlete can lift in a technically relatively simple movement (for example, a bench press).

For this purpose, use complex coordination movement (barbell jerk) is impractical, since the result in them largely depends on technical skill.

When assessing muscle strength during self-control, one should remember that it depends on age, sex, weight, type of training impact, degree of fatigue, etc. Strength indicators change during the day: the lowest value is observed in the morning, and the highest in the middle

day. Decrease in strength takes place in case of malaise, violation of the regime, deterioration of mood, etc. It occurs after 40-50 years, especially among those who are not engaged in physical education.

Systematic self-observation allows creative

to relate to training, a healthy lifestyle, rationally and effectively use physical culture to maintain and strengthen health, increase efficiency.

RECOVERY TOOLS

In the process of intense muscular activity, as a result of increased energy metabolism and intensification of the excretion of metabolic products, significant changes occur in the internal environment of the body, characterized by a state of fatigue - a temporary decrease in working capacity. This is a kind of protective function of the body. With different muscular activity due to individual characteristics and the level of preparedness, the leading link in the development of fatigue can be any organ (or function), the capabilities of which do not correspond to the presented load.

Resistance exercises put the body in difficult conditions, when it is necessary to use the most effective restorative means to combat fatigue. At the same time, in the diverse range of measures that increase the efficiency of rest after strenuous exertion, physiotherapeutic and medico-biological means of recovery are of great importance: massage, thermal and water procedures, nutrition, vitaminization, etc.

The means of recovery help to relieve general and local fatigue, to replenish energy resources as quickly as possible, and to enhance protein synthesis. They also help to restore the functions of regulatory mechanisms, activate and stimulate recovery.

Despite the widespread use of most of the restorative agents, in the practice of athleticism there has not yet been a clear idea of their effect associated with the optimization of restorative processes. Therefore, athletes and coaches use methodological recommendations from a variety of sports and other areas of human activity.

MASSAGE

Massage is a system of methods of dosed mechanical action on the body in the form of friction, pressure, vibration, which helps to maintain muscle tone, prepare the body for physical exertion, relieve fatigue, and restore working capacity as soon as possible after exertion. Under the influence of massage, fatigue disappears much faster than with passive rest or thermal procedures.

The positive effect of massage on the nervous, muscular and circulatory systems, skin, ligamentous apparatus has been established. For example, its effect on the ligamentous-articular apparatus is manifested in improving the elasticity of tissues, enhancing its blood circulation, contributing to an increase in mobility in the joints, and protection from injury. In athletes, with increased work of any joints, with a large mechanical load on them, microtraumas sometimes occur in the form of wrinkling of the articular bag, changes in the contents of the joint, and as a result, there is a decrease in the range of motion, swelling of the joint, pain when trying to move. In such cases, massage serves as an indispensable tool to help restore the normal function of the joint.

The main massage techniques include: stroking, squeezing, kneading, shaking, rubbing, shock techniques, vibration, movement.

Stroking is a technique performed with the entire surface of the palm firmly on the skin. The hand should be relaxed, and the movements should be calm, rhythmic, with a slight glide of the hand over the skin. The most common types of stroking are straight-line, alternating (when alone arm ends the movement, the other is moved crosswise over it and repeats the same action), zigzag, combined (one hand makes a zigzag movement - the other is straight), concentric (in the area of large joints).

When stroking, vasodilation occurs, congestion is eliminated, the tone of the skin muscle fibers is activated, and at the same time - relaxation of the entire musculature.

Squeezing actively affects superficial and deep tissues. The main techniques of the execution technique include transverse squeezing, produced by the tubercle of the thumb and the thumb of the hand, set across the massaged area, the thumb is pressed against the index finger, and the rest are slightly bent; squeezing

the base of two palms, which are located on the massaged area next to or one slightly in front of the other and move along several areas; squeezing the edge of the palm or brush across the massaged area (fingers are relaxed and slightly bent); squeeze girth, performed on the limb with hands, whose fingers are facing each other (can be performed with twisting of the muscles, thanks to the movement of the hands towards each other); squeezing with one hand, produced by the base of the palm and the bump of the thumb, by means of rectilinear sliding pressure along the massaged area.

This technique should be performed slowly, with the limit relaxation of the massaged muscles, without painful sensations.

Squeezing enhances lymph flow, helps to eliminate congestion and edema, improves skin and muscle tone, and improves their nutrition.

The next massage technique is various types of times minania - ordinary, double ring, double neck, gabled, longitudinal, etc.

Ordinary kneading is performed with fingers, tightly grasping the muscle and pulling it away from the bone bed. Four fingers rotate in a circular motion, moving along the muscles. At the same time, the large one creates an emphasis that tends towards the other four fingers. The muscle should experience alternating pressure from both sides.

Double ring kneading is performed with brushes, with thumbs set across the muscles, at a distance of the width of the palm. Pulling up the massaged muscle, they move with each hand, as in ordinary kneading. The movement is carried out continuously along the entire length of the muscle from the bottom up, with straight fingers, smoothly, without jerking and twisting the muscles.

A double bar is performed in the same way as a single bar kneading, but to enhance the impact, one brush is applied to the other. This technique is especially effective on large muscles: gluteal muscles, thigh muscles, latissimus dorsi muscle.

Pincer kneading is used to massage flat muscles that cannot be pulled off, raised from the bone bed, in its original position, it looks like stroking. The pads of the fingers are connected in a semicircular line, reminiscent of the shape of the forceps, are installed on the muscle and make a circular motion, pressing it.

Longitudinal kneading is performed on long muscles with two hands - with thumb pads, applied over the muscle at a distance of 3-4 cm from each other. Four fingers squeeze the muscle from below in the direction of the thumb in front, after which the other hand moves forward, repeating the same movements until the muscle is passed along its entire length.

Kneading has a significant effect on the muscles, increasing their contractile ability, increasing the mobility of the ligamentous apparatus, helping to increase blood circulation, metabolism, and reduce muscle fatigue.

Various types of rubbing are used: rectilinear (with the whole palm, with the pads of the fingers, both with weighted down by the second hand and without weights); circular (with the pads of the fingers, circular movements are made in the direction away from themselves with support on the thumb when they rub four fingers, or four when rubbing the thumb); rectilinear and circular with pads and bumps of the thumbs (with two hands on the knee and ankle joints and the Achilles tendon); direct linear rubbing with forceps (with the help of one hand, set over the joint in the form of an arch and sliding up, massaging the outer side of the joint with the thumb, and the inner side with four); zigzag (on the back - with the base of the palm, starting above the waist, moving along the back, and on the joints - with the pads of all fingers); comb-like (with one, two hands,

During rubbing, movements of the masseur's hands in the direction

Lena along the lymphatic vessels, fingers take a more vertical position to the massaged area. For better tissue relaxation, rubbing is combined with stroking. In one session, you should use the types of rubbing that correspond to the target setting of the massage, the place of its implementation, the time allotted for the procedure, the state of the athlete's body.

With the help of rubbing, you can quickly warm up the desired area of the body, improve mobility in the joint.

In sports and therapeutic massage, active movements are widely used, performed by willpower without the participation of external forces; movements with resistance provided by the person being massaged or massaged; passive movements performed under the influence of external force - for example, bending the legs with the arms in a

joint. These types of massage have a positive effect on muscles, ligaments, joints.

When performing passive movements and movements with resistance, it is necessary to take into account the shape of the joint and the axis along which movements are possible in it, so as not to cause pain in the person being massaged. The use of the technique should begin with active movements. All exercises should be performed slowly and evenly, and the load should correspond to the capabilities of the person being massaged. Muscles and ligaments should be carefully prepared to movements in this joint.

Percussion techniques - tapping, patting and chopping - have a wide effect on the body.

Beating is done with fingers, half squeezed in fists, while the hands are turned inward at a distance of 3-5 cm from each other. The blow is applied with a slightly retracted little finger, with both two and one hand.

Patting is done with fingers clenched into a fist, but the hand, in contrast to tapping, is turned with fingers down. There should be space between the fingers and the palm to cushion the blow.

Chopping is performed with the little finger of an outstretched hand with relaxed and open fingers. Hands should move quickly and rhythmically, striking at a frequency of 180-300 per minute. The strength of the blows is determined by the number of levers taking part in the movement: in light blows, only the hand is involved, in energetic blows, the whole hand. Chopping is done along the muscle fibers. All percussion techniques are recommended to be performed alternately with two hands. The hands should be placed as close to each other as possible, at a distance of up to 5 cm.

Percussive techniques increase blood flow to the massaged area, improving tissue nutrition, increasing the contractile force of muscle fibers, increasing their tone.

Percussion techniques are performed only on relaxed large muscle groups. On those who are tired after great physical exertion, they cannot be used.

Recently, thanks to special devices, an effective method of massage - vibration - has become widespread.

Manual vibration consists in the transmission of the massaged part of the body to oscillatory movements of the maximum frequency performed by the tips of one, two or all fingers, and sometimes with the palm or fist. When vibrating with one or two fingers, they are set perpendicular to the massaged area or laid horizontally. On large muscle groups, vibration is carried out

with all fingers clenched into a fist, or palm. Apparatus vibration massage uses devices for general (simultaneous massage of the whole body) and local (massage of certain parts of the body) vibration - EMA-2M, "Tonus," Sport, etc. They can be used both for massage and for self-massage.

Vibration massage is performed lying, sitting, standing at maximum relaxation of the muscles of the massaged, using stationary (a vibrating tip or vibrator is on one part of the body for 2-4 seconds, and then moves to another) and sliding (the vibrating element moves without tearing off the skin of the massaged area from the periphery to the center) methods.

Vibration massage should be started by applying a slight pressure with a prefix on the fabric, then it is increased, and at the end it is again reduced. The attachment must move at a constant speed, smoothly, without jerking or sudden changes in pressure.

During vibration massage, it is not recommended to lubricate massaged part of the body with oil, rubbing, creams, as the massage will be less effective.

The physiological effect of vibration on the body depends on the frequency, amplitude and duration of vibrational movements. Under the influence of vibration, metabolic processes are accelerated, tissue nutrition improves, the excitability of the neuromuscular apparatus decreases, fatigue is relieved, and recovery processes in tissues proceed faster.

In addition to the listed techniques, athletes engaged in athleticism can use mechanical massagers of various designs: a treadmill, a gymnastic stick-massager, a tape-massager, etc. jets on land, hand-held under water.

Research conducted over four years with the participation of 340 highly qualified athletes. Under the influence of a three-minute hydromassage, the tension tone of the gastrocnemius muscles decreased by 5-6 myotomes (without massage, the muscle condition does not change), and after another two hours the muscle tissue returned to normal (without massage it occurs after 6-8 hours).

However, immediately after significant physical exertion, hydromassage should be carried out carefully, acting on the body with a stream of water through the water, which reduces the force of the stream and affects the entire body.

For both beginners and experienced athletes, in the rest mode, an effective remedy for recovery should be used - self-massage, using the technique of some of the techniques discussed above.

the following main muscle groups are massaged. Self-massage of the neck is performed while sitting or standing, stroking, squeezing (transverse, with the edge of the palm), kneading with the fingertips, rubbing (along the spinal column and in the places where muscles attach to the occipital bone).

The shoulder girdle is massaged while sitting. After stroking on the shoulder, squeeze, ordinary kneading is done.

When massaging the shoulder and elbow joints, rubbing is used - pincer-shaped, rectilinear and circular, and then movements are performed.

The outer surface of the forearm is first stroked, then squeezed with the edge of the palm, kneaded (with the pads of four fingers, phalanges of the fingers bent into a fist, with the edge of the palm), and on the inner surface of the forearm, an additional ordinary kneading is performed.

Self-massage of the breast is carried out while sitting, crossing the legs, and on the raised thigh - hand; lying on your back (a roller under your head); standing (free hand down). After stroking with a palm tightly pressed against the pectoral muscle, squeezing (upward to the axillary fossa), kneading (ordinary, phalanges of fingers clenched in fists), rubbing (rectilinear, zigzag, spiral and circular pads with fingers) follows.

When massaging the latissimus muscles of the back, take the initial sitting position, crossing the legs, the hand on the massaged side - on the thigh; with the other hand, all sorts of techniques are performed.

Self-massage of the abdomen is performed in a supine position, the leg is bent at the knee joints. The following techniques are used: stroking (clockwise) and kneading (ordinary, double circular, with the base of the palm). The pelvic area is massaged while standing on one leg, the other (from the massaged side) is laid aside and relaxed. Apply stroking (from the hip up), squeezing, kneading: ordinary, with the base of the palm, with a fist.

When self-massage of the front surface of the thigh, take a sitting position with legs straight. Stroking (with two hands and combined), squeezing (transverse, with the edge of the palm), kneading (ordinary, double bar, double ring, longitudinal

howling), rubbing (rectilinear, zigzag in a round shape with the crests of fingers clenched into a fist), percussion techniques and stroking.

On the back of the thigh, self-massage is also done while sitting, with a bent massaged leg, using stroking, squeezing and kneading.

In the same starting position, the gastrocnemius muscle is massaged, stroking with two hands, squeezing, kneading (ordinary, double bar, double circular).

Self-massage of the foot and ankle joint is performed while sitting on a chair or on the floor. Rubbing is used on the ankle joint (gabled in the pads of four fingers), and on the back of the foot - stroking with two hands, rubbing (rectilinear, zig zagging, circular with the pads of the thumbs and four fingers with one hand and with weights).

Self-massage can be private (5-8) or general (8-12 minutes). Recommended sequence of massage: thigh, lower leg, foot, chest, neck, arms, back, abdomen, pelvic area.

Acupressure. In the complex of therapeutic and prophylactic effects on the human body, reflexotherapy methods are widely used, including acupressure - mechanical action with fingers or devices on strictly defined areas of the body where acupuncture points are located (from the Latin words acus
- needle, punctura - injection); on the surface of the body there are more than 1500, and in practice 100-150 are used.

Even in ancient Chinese medicine, rotational movements of the finger in the area of the so-called vital points were used, performed simultaneously with manual massage, therapeutic nutrition, herbal medicines, gymnastic exercises, and respiratory gymnastics.

According to modern biology, dots mean looser connective tissue, the fibers of which are arranged in a mesh. They have a little more bodies and flasks that act as receptors, they have small groups of mast cells that affect metabolism by releasing active substances. In this regard, the impact points absorb more oxygen and emit stronger infrared radiation, are more sensitive to pressure and have their own electrical status. The diameter of a point in a sleeping person decreases to 1 mm, after rest it reaches 1 cm.

According to oriental medicine, "vital energy" enters the body through acupuncture points (TA)

from the environment and circulates through the body, passing sequentially through all organs and making a complete circuit during the day. This position on the circulation of energy is consistent with research on biological rhythms, which are increasingly recognized in modern medicine and biology.

Anyone is able to correctly assess the functionality

the normal state of the neuromuscular apparatus, changing under the influence of physical and psychoemotional stress and, using acupressure, to achieve the desired effect. Applying the techniques of classical manual massage in combination with a point effect, it is possible to change the tone of the muscular system to a greater extent, to reduce the pain that occurs after significant physical exertion. It is believed that in sports practice, acupressure has been used since 1975, since the scientific substantiation of the feasibility of using this method to influence muscle tone.

Depending on the tasks, acupressure is used

for a targeted effect on TA of certain zones in order to reduce the muscle tone of tired muscle groups, improve the functional state of the neuromuscular apparatus and normalize the emotional background.

The main techniques of acupressure include

rotation ("zhu"), vibration ("zeng") and pressure ("qia"). Rotation is performed with the surface of the terminal phalanx of the second, third or first fingers of the hand (fingertips), less often with the back of the middle phalanges, the terminal phalanx of the first finger, the base of the palm and fist. Symmetrical points are processed simultaneously with two hands. This technique is conventionally divided into three phases:

1. Screwing in - placing a fingertip on the TA and then penetrating through smooth, slow rotational movements into body tissues (skin, subcutaneous tissue, muscles) to different depths depending on the location of the point. Slow circular movements are performed without sliding on the skin, but always with an increase in the pressure force directed perpendicularly to the treated body surface.

2. Cessation of rotational movements and delay

finger at depth with pressure.

3. Unscrewing - returning the finger to its original position in slow circular motions with decreasing pressure. At the end of the phase, the finger does not come off the massaged area, and a new intake cycle begins immediately.

The frequency of rotational movements is one per second. At a depth of pressure, there should be sensations of fullness, numbness and soreness.

The direction of rotational movements can be different, although it is believed that clockwise movements have a tonic effect, and against a calming effect.

When performing the technique, errors may occur: rough, painful rotations of a tense hand, causing pain; movements on the skin, not with the skin; injury to the skin with a fingernail; uneven pace of rotational movements; constant (small or large) force of pressure on the tissue.

Vibration is based on vibrational-tremulous movements of action on TA, produced by the pads of the finger or fingers, the palm, the elevation of the thumb or all fingers clenched into a fist - perpendicularly or at an acute angle to the TA. The massaging surface should adhere tightly to the massaged place, and the vibrational-tremulous movements are directed deep into the tissues with a constant or variable pressure force, then increasing, then decreasing, causing a feeling of bursting and pain.

Vibration is produced stably, that is, in one place, or labile - along the meridian (systems of invisible channels connecting TA, similar in therapeutic effects and reactions). It can be intermittent due to the separation of the masseur's hands from the massaged surface, causing separate vibrational and trembling shocks.

The vibration amplitude should be minimal, and frequency - equal to 160-200 oscillations per minute. Vibration can be combined with rotational movements, especially in the phase of holding at depth with pressure.

Typical errors are large amplitude and non-maximum rate of fluctuations.

The pressure is carried out mainly with the help of the thumb, and it is necessary to press on the point with the second phalanx, bending the finger, with a straightened hand. In addition to pressing with the thumb, other varieties are used: the second phalanges of the II-IV fingers, the eminence of the thumb, the edge or base of the palm, etc.

The pressure on the tissue can be constant or variable, increase or decrease, and the pressure force - from slightly variable to high, therefore, the provided sensations are also different - from a feeling of warmth and the appearance of redness to numbness.

The main mistake when performing pressure can be pressing the first phalanx of the finger, which leads to its injury.

When performing acupressure, three methods are used: strong, medium and weak.

Strong - inhibitory - has an analgesic effect (reduces muscle tone). Pressure is possible with a force to penetrate all tissues up to. skeletal system. The main techniques of acupressure are performed periodically for 20-30 seconds with increasing effort and 5-10 - with decreasing pressure on the TA. The total exposure time for each point is 5 minutes or more. The dosage guideline can be the appearance of a vasomotor reaction in the form of the disappearance of the pale spot after the cessation of pressure or the onset of muscle relaxation, which is felt with a massaging finger.

The middle method is relaxing. The pressure is produced with an effort that causes a feeling of bursting, numbness, aches. The frequency of movements is 10-20 seconds with an increase in efforts and 3-5 - with a decrease in the force of pressure on the point. The total exposure time for each point is 2-3 minutes. Possible dosage - until noticeable reddening of the skin at the massage site.

Weak - exciting - stimulating method

acting effect in hypotonic muscle condition. To achieve a stimulating effect, the finger, rotating, vibrating or pressing, deepens into the skin for 4-5 s, after which it is torn off the skin for 1-2 s. The duration of exposure at each point is on average 1 min. It is used with a complex of physiotherapy exercises.

Let us consider the anatomical and topographic localization of the recommended points for influencing muscle stimulation and relaxation (Fig. 30).

Neck area. Points of influence:

Fu-tu - in the neck region from the side in the center of the abdomen of the sternocleidomastoid muscle at the level of the line of the upper edge of the thyroid cartilage, drawn parallel to the clavicle (on the sternocleidomastoid and subcutaneous muscles of the neck).

Tyan-din - at the posterior edge of the sternocleidomastoid muscle at the level of the line of the lower edge of the thyroid cartilage, drawn parallel to the clavicle (on the pectoralis major, biceps shoulder and sternocleidomastoid muscles).

Feng chi - in the depression formed on top of the occipital bone, the medial-trapezius muscle, and lat

rally - the posterior edge of the sternocleidomastoid muscle (on the trapezius and sternocleidomastoid muscles).

Wan-gu - at the posterior-lower edge of the mastoid process

ka at the feng chi level (on the sternocleidomastoid muscle).

Feng Fu - on the midline between the occipital bone

and the first cervical vertebra at the feng chi level (to the trapezius muscle).

The area of the shoulder girdle and upper limbs.

Tszi-quan - in the anterior part of the armpit at the level of the apex of the axillary fold between the pectoralis major and biceps brachii (on the pectoralis major and biceps).

Chou-rong - in the second intercostal space in the area of the pectoralis major muscle (on the pectoralis major and minor).

Da-chzhui - in the middle of the distance between the spinous processes of the XII cervical and I thoracic vertebrae (on the muscles: trapezius, periosteal, lifting scapula and rhomboid).

Jian-yu - in the area of the shoulder joint between the head of the humerus and the acromial process of the scapula (on the deltoid muscle).

Jian-jin - on the highest part of the shoulder girdle at the level of the middle of the distance between jian-yu and da-chzhui (on the muscles: trapezius, periosteal and levator scapula).

Da-chu - at the level of the interspinous space of the I-II thoracic vertebrae (on the trapezius, rhomboid and deep back muscles).

Jian-chzhong-shu - in the middle of the distance between da-chzhui and jian-jin and at the level of da-chu (on the muscles: trapezius, lifting scapula and rhomboid).

Nao-shu - under the spine of the scapula at the place of its transition to the acromial end of the scapula (to the periosteal and infraspinatus muscles).

Jian-zhen - at the top of the axillary fold in the back with a freely lowered arm (on a large circular muscle).

Gao-huang - on the inner edge of the scapula at the level of the middle of the distance between the spinous processes of the IV-V thoracic vertebrae (on the trapezius muscle).

Ge-guan - on the inner edge of the lower corner of the scapula at the level of the interspinous space of the VII-VIII vertebrae (on the trapezius and latissimus muscles).

Bi-nao - in the place of attachment of the deltoid muscle to the tuberosity of the same name of the humerus (on the deltoid and triceps muscles of the shoulder).

Qu-chi - at the apex of the fold with the arm flexed as much as possible in the elbow joint (on the brachioradial muscle).

Shou-san-li - between the muscle groups of the anterior and posterior surface of the forearm into three transverse fingers

(II-IV) massaged distal to qu-chi (on the long radial extensor of the hand and brachioradialis muscle).

Wai-guan - in the middle between the ulna and radius, three transverse fingers (II — IV) proximal to the wrist joint (on the extensor of the fingers and the extensor of the little finger).

Yang-chi - in the area of the wrist joint between the dry veins of the common extensor of the fingers and the extensor of the little finger (on the extensor of the fingers and the extensor of the little finger).

He-gu - in the first interdigital space at the level of the apex of the skin fold with the given 1st finger at the elevation of the first interosseous muscle (on the muscles:
interosseous, leading the first toe, short flexor of the first toe).

Shao-hai - at the level of the elbow fold outward in
the ulnar side of the biceps tendon (on the brachialis muscle).

Chi-tsze - at the level of the ulnar fold outward to the radial side of the tendon of the biceps brachii muscle (to the brachial muscle).

Nei-guan - between the tendons of the long palmar muscle and the radial flexor of the hand into three transverse
finger (II-IV) proximal to the wrist joint (on the long palmar muscle, radial flexor of the hand).

Da-ling - between the tendons of the long palmar mouse
tsy and radial flexor of the hand at the level of the wrist joint (on the long palmar muscle and radial flexor of the hand).

Lao-gun - on the palmar surface between the III and IV metacarpal bones proximal to their heads (deep and superficial flexor of the fingers, vermiform muscles).

Shi-xuan - on the palmar surface at the tips of the terminal phalanges of all fingers (on the radial flexor of the hand).

The gluteal region and lower limbs:

Chzhi-shih - at the level of the interspinous space of the II-III lumbar vertebrae on the line drawn through the gao-guan (to the broadest muscle).

Zhi-bian - at the level of the entrance to the sacral canal on
a line drawn through gao-huan, ge-guan and chzhi-shi (to the gluteus maximus muscle).

Yin-men - in the middle of the back of the thigh between the long head of the biceps femoris and the semi-dry vein muscle (on the muscles: the biceps femoris and the semi-stranded muscle).

Cheng-jin - in the center of the largest diameter of the lower leg between the heads of the gastrocnemius muscle (on the triceps muscle of the lower leg).

Cheng Shan - at the point of convergence of the lower edges of the abdomen of the gastrocnemius muscle (on the triceps muscle of the leg).

Bi-guan - at the level of the perineum at the outer edge
tailor muscle, look for when throwing cross-legged (on muscles: quadriceps thigh and tailor).

Fu-tu - in the middle of the distance between the upper edge of the patella and the level of the perineum on the midline of the thigh (on the quadriceps muscle of the thigh).

Tszi-men - in the lower corner of the Scarp triangle between the inner edge of the medial vastus muscle and the anterior edge of the adductor longus of the thigh (to the long adductor muscle).

He-din - above the middle of the upper edge of the patella with the leg bent at the knee joint (on the quadriceps muscle of the thigh).

Du-bi - at the level of the lower edge of the patella, lateral to its ligament in the depression with the leg bent at the knee joint at an angle of 90º (to the quadriceps muscle of the thigh).

Yang-ling-chuan - at the point of attachment of the tendons
the long extensor of the toes and the long peroneal muscle forward and downward from the head of the fibula (to the peroneal muscle and the long extensor of the fingers). Yin-ling-chuan - behind the posterior edge of the tibia at the level of yang-ling-chuan (on the long extensor fingers).

Tszu-san-li - lateral to one transverse index finger massaged from the lower end of the tibial ridge (to the gastrocnemius muscle).

Jie-hsi - between the tendons of the long extensor of the thumb and the long extensor of the fingers at the level of the ankle joint (on the long extensor of the fingers into the long extensor of the first finger).

Qiu-xu - between the anterior-lower edge of the outer
the ankle and the lateral edge of the extensor longus of the toes (on the long extensor of the toes).

Chung-feng - in the depression between the anterior-lower edge
the medial ankle and the medial edge of the tendon of the anterior tibial muscle (on the anterior more tibial muscle).

Neitin - in the second interdigital interval of the transition of the body of the main phalanges to the base (on the long extensor of the fingers).

PROCEDURES

Thermal and water treatments (sauna, shower, various baths). Saunas (dry air) and Russian (steam) baths are widespread, differing from each other in the level of humidity and maximum air temperature. From time immemorial, the bath has been used as a means of hardening the body, dilating blood vessels, increasing efficiency, and accelerating recovery processes after hard physical work. The effect of the bath procedure is enhanced if combined with massage, since heat activates its physiological effects: the blood supply to muscles and joints improves, metabolic products are removed from the body faster.

By increasing metabolism and causing profuse sweating, the bath procedure leads to a decrease in body fat; it was found that gradual loss of 2-3 percent of weight does not affect health and performance. Dangerous is a sharp weight loss in a short time.

For quick recovery after exercise

it is recommended to stay in the sauna for 15-20 minutes, followed by a 10-15-minute massage, in the steam room, bath

- 7-10 with a 10-minute massage.

If the training took place with the maximum load, the visit to the bath must be rescheduled to the next day, and when such a load is to be the next day, the duration of an athlete's stay in a dry-air bath should not exceed 20 minutes, massage - 15, in a steam room - 10-14, massage - 10 ...

It is advisable to enter the sauna dry, and to enter the steam room of the Russian bath after pouring warm water over it. A hat is put on the head. It is useful to bathe while lying down, and it is even better if the legs are slightly raised.

After leaving the steam room, each time you should take a cold (13-15 ºC), and then a warm shower (37-39 ºC) and relax in the dressing room.

When combining the bath with massage, the hands and feet are massaged from the fingers upwards, the back - from the spine to the armpits, the chest from the sternum to the armpits, the stomach - clockwise. The following techniques are used: rubbing - with the pads of the fingers and the base of the palm; squeezing - wide rectilinear movements with strong pressure on the skin with the bump and pad of the thumb and the inner edge of the palm; kneading - fingers tightly grab the muscle, pull it off somewhat and make rotational movements, while sliding along the muscle.

Before the massage, the body should be lathered so that the masseur's hands glide better, but before kneading the soap should be washed off.

You can not go to the bathhouse and do massage on an empty stomach or after a heavy meal, as well as before bedtime. Those who have recently suffered an acute respiratory illness should refrain from visiting the bathhouse.

A peculiar kind of massage is whipping the body with a broom, which increases blood circulation in the skin, subcutaneous tissue, muscles, promotes more intense sweating and metabolism.

You should start steaming while lying on your stomach, with a light stroking with a broom from feet to head and hands. In the opposite direction - on the sides, thighs and heels. There should be three or four such cycles of movements. Then the stitching is performed: first, on the back with light "strokes" in all directions, then on the lower back, calf muscles and feet. The entire reception is designed for a short time, up to one minute. After it, stroking is performed.

They continue to steam while lying on their backs. The techniques and their sequence are the same. Then they roll over onto their stomach again.

The first two steps (stroking and stroking) should take up to two minutes. After that, you can start whipping, starting from the back and combining it with a broom compress. Slightly lifting the broom and capturing hot air, produce 2-3 light swipes on the muscles of the back. Then, raising the broom again, you should lower it on those parts of the body that you had previously taped, and the broom is turned and lowered with the hot side, which was facing up, pressing the compress with your hand for 2-3 seconds. The same does not interfere with doing the same on other points of the body. Such compresses are recommended for injuries, muscle pains caused by physical exertion. After the compress on the feet, the brooms are placed on the lower back, at the same time spreading them to the sides: to the head and feet. This "stretching" is carried out 4-5 times, after which the technique is repeated on the back of the body.

In addition, each broom has a specific effect: birch helps with pain, aching muscles

and joints after voluminous physical exertion, with a calming effect; oak prevents an excessive increase in blood pressure in the steam room, soothes the nervous system; a broom of linden leaves eliminates headache, conducts "soft" gymnastics for the kidneys, accelerates sweating, has an accelerating wound healing effect; brooms of rowan leaves and grass with tansy inflorescences enhance excitation processes in the nervous system; nettle promotes powerful local irritation that relieves inflammation. When using the steam room as a remedy, the body should gradually adapt to stay in it. The whole bath procedure should not exceed 2-2.5 hours, and the stay in the steam room - 30 minutes. For beginners, one call is enough no more than on 5-7 minutes. FROM every at once, increasing the duration of vaping by 1 minute, it is advisable to gradually switch to 2-4 times time up to 30 minutes.

BALANCED DIET

For athletes, nutrition is as important as training method. With a lack of protein in food, there is no gain in muscle mass and strength.

It is known that food should cover the daily energy expenditure at a ratio of proteins, fats and carbohydrates of 1: 0, 8: 4. Fats and carbohydrates are the main sources of energy. In this case, carbohydrates should consist of 65% of starch and 35% of simple sugars, and fats should be supplied to the body by 65-70% from animal fats and 30-35% from vegetable.

Of great importance in the nutrition of a person engaged in the development of strength are proteins used by the body as a building material for the constant renewal of structural tissue proteins and enzyme proteins. About 60% of the daily diet should be complete proteins of animal origin. There are many of them in meat, liver, milk, cottage cheese, cheeses, fish.

The body functions normally if the diet
enough minerals: phosphorus - 1.5-2.5 g, calcium - 1-1.75 g, iron - 20 mg, magnesium - 0.8 g.

In the spring-winter period, especially during the intensive period
training, vitamin deficiency often occurs, which can lead to a decrease in performance and inhibition of recovery processes, apathy. In this case, it is possible to recommend the use of vitamin preparations "Undevit" or "Dekamevit" in preventive doses. For the same purpose (as well as to replenish the mineral deficiency), consume as many vegetables and fruits as possible.

The general provisions outlined above are widely known. However, one has to face the fact that it is impossible to control either quantitatively or qualitatively the diet of athletes.

The main criterion for assessing the correctness of the diet can be the weight of the student. Measurement should be carried out in the same form before and after each workout, for which it is desirable to have a floor scale in the GPP hall. Proper strength training and balanced nutrition should lead to increased muscle mass and maintain or decrease the thickness of subcutaneous fat.

For indirect control over the diet, you can use weight-strength index:

$$I = \frac{\text{Bench Press Result} + \text{Deadlift Result}}{\text{The weight}}$$

If the index is constantly increasing, you are fine. If it remains unchanged or decreases for a long time, this indicates an imbalance or insufficient energy supply capacity, and, possibly, an inadequacy of physical activity to the athlete's capabilities. So, if the weight grows, and the index decreases or remains unchanged, weight is added mainly due to the "inactive components of body mass" - fat and connective tissue. In this case, it is useful to increase the energy intensity of the workouts, to increase their intensity, and if this is impossible due to poor fitness of the trainee or for other reasons, try to reduce the energy intensity of the diet, primarily by limiting the intake of fat. The index should be calculated and recorded in a diary weekly.

Weight-power index options can be:

$$I = \frac{\text{Bench Press Result} + \text{Squat Result}}{\text{The weight}};$$

$$I = \frac{\text{Bench Press Result} + \text{Squat Result} + \text{Result in lying deadlift}}{\text{The weight}};$$

$$I = \frac{\text{Bench Press Result} + \text{Squat Result} + \text{Result in pull-ups with maximum weight}}{\text{The weight}};$$

For a more visual representation of the measured data and indices, it is useful to maintain

graph, where on the abscissa axis mark the days of calculating the indices, and on the ordinate axis - the values of the index, weight and power indicators.

Some practical tips for correcting your diet nutrition. Usually, problems with it arise in two categories of trainees, the first of which is obese, the second - exhaustion. Let's start with the second one. Force loads should be given to this group with the whole caution, So as sharp an increase in energy consumption can lead to a deterioration in the general condition. If there are no chronic diseases in which power loads are prohibited (medical examination should be taken 2 times a year in a physical training dispensary), this category of trainees can continue to apply the developed method of strength training. However, special attention should be paid to nutritional issues. It is necessary to purposefully and persistently convince such exercise bars to eat more and better (they often have a reduced appetite, there is a negative nutritional attitude). It can be recommended to include in the daily diet "Enpit protein", intended for dietary nutrition of children and adults and containing in 100 g 44% protein, 13% - fat, 31.7 - carbohydrates, as well as minerals and vitamins. "Enpit protein" contains in one pack 400 g of dry matter. The course of admission can consist of 16 days (1 pack for 4 days). Repeated ones are prescribed as needed, focusing on the body's response.

In working with obese persons, the aim is to reduce the fatty components of body weight. This group can train fully and without restrictions. On non-workout days, it is helpful to include long-term, low-intensity exercise (slow jogging, free swimming, skiing, etc.). Of course, you should try to adjust the diet, reducing the total volume and calorie content, as well as the fat and carbohydrate components. To muffle the natural feeling of hunger, you need to eat more vegetables, which have a low calorie content per unit volume. In general, working with this category of persons requires a lot of persistence and consistency.

In athletic gymnastics for women, aimed at reducing weight, body, nutrition has its own specific

feature. It is necessary to strive to eat no more food than before starting classes. Although this task is much more difficult for women than for men, since the former better adapt to changes in the external environment.

It is difficult for a woman who wants to lose weight through exercise to refrain from additional meals. Therefore, it is important from the very first lessons to tune oneself to a mental struggle with "hunger", otherwise the desired success will not be achieved.

REFEREEING AND COMPETITION RULES

We noted that contests of strength and beauty of male physique were held in Russia for a long time. The winners were determined by a panel of judges, which consisted of representatives of the local sports community and spectators. There were no approved rules for judging, but the jury and the audience always quite accurately and objectively identified the winner with a beautiful body build.

The rules are already in place today. They are set out in Statutes of the International Federation of Bodybuilding (Guide for judges, participants, organizers, 1987). Let us consider the main provisions of this document concerning the organization and conduct of competitions, refereeing and some rules.

CONTENT OF THE COMPETITION

The bodybuilding competition consists of two semi-finals and a final in each weight category.

In men's competitions there are five weight categories, women and juniors - three each:

Men: Flyweight - including 65 kg, Light - 66-70, Average - 71-80, Light Heavy - 81-90, heavy - over 90.

Women: light weight - 52 kg each, average - 53-57, heavy - over 57.

Juniors: light weight - 70 kg each, average - 71-80, heavy - over 80.

Junior (both for boys and girls) the age is considered up to 21 years, after which the athlete becomes an adult. The date of birth is documented at the weigh-in before the start of the competition.

For the competition, you need: a chief judge, a secretary, 9 judges (7 or 5 can be used), two judges who count, a timekeeper, a main organizer (master of ceremonies) and the required number of assistants

with participants. Women's championships are also served by 9 judges (7, 5), and five of them are women.

The formal uniform for male judges is a blue pid jacque, light blue or white shirt with tie, and for women, a blue jacket, light blue or white blouse and gray skirt.

Before the performance of the athletes of each category, the panel of judges must be presented to the athletes and spectators. The judges are seated in front of the stage at separate tables with chairs in order to have a good view of the posing platform and the participant standing on it. An additional table is set up for the scorer and the two scorekeepers. A place should be provided to the side of the stage for a speaker.

Table officials are not allowed to talk to each other, cheer or criticize athletes, or take pictures of them.

According to the International Rules, there is even a waiter who delivers refreshments to the referees at a convenient time.

On the eve of the competition, all competitors must check their weight (men in swimming trunks, women in bikinis). The panel of judges must print a time schedule for each weight category. The participant who does not "fit" into the category is given no more than 30 minutes to bring the weight back to normal. The chief referee controls the weighing and must confirm the weight of each participant.

The competition secretary draws up lists of all participants by weight categories and, having multiplied them, distributes them to everyone who is involved in the competition.

The order of appearance of participants before the judges is determined
is carried out during weighing; in accordance with it, everyone is given a number within his category. The number is attached to the left side of the trunks or bikini and must be worn during competitions and finals.

At international competitions, doping tests are conducted in accordance with paragraph 20 of the IOC Statutes.

After the weigh-in, preliminary competitions are held, which are open to spectators.

The stage for the competitors is located in front of the judges at a height of 1 m, otherwise the seats must be raised. The stage is equipped with three lighting devices, the first of which is necessary to illuminate the entire line of all participants when they first appear before the judges. The second device focuses on the location of the individual posing, and the third illuminates the posing of six participants.

On stage, the posing platform must be centered so that each judge can see the athletes standing on it from head to toe. For six competitors to perform, it must be 6 m long, 1.5 wide and 0.5 high, covered with a carpet on top, and the front and sides painted black. Athletes enter the stage from one side and go to the other.

Men - competitors must be dressed

you are in plain swimming trunks, and the women are in plain bikinis that expose the muscles of the abs and muscles of the lower back. It is forbidden to sew clothes from material with metal (gold or silver fabric for evening wear), use padding. Competitors are not allowed to wear shoes, watches, rings, bracelets, pendants, earrings, wigs, distracting ornaments or artificial body enhancers. Do not chew gum, candy, or smoke. The use of artificial means (walking sticks, hats, etc.) is strictly prohibited during the preliminary competitions and finals.

Fake body paint can be used no later than 24 hours before the competition. Excessively applying oils to the body is strictly prohibited, but creams, oils and moisturizers can be applied. Hair should not obscure the muscles of the shoulders and upper back.

To change clothes and warm up, the participant appears behind the stage 30 minutes before the start of the competition in his category. At this time, the judges check the athletes against the starting list.

If more than 15 athletes compete in the weight category, it is necessary to make a selection to reduce the number of participants to 15. All athletes of the category line up on stage (if necessary, in 2 ranks) in numerical order. Then the chief judge of the competition asks the participants to perform 4 poses (double biceps in front, chest on the side, double biceps in the back and calves, abs and hips) - 5 participants at once, in numerical order. The judges determine the 15 best athletes by marking their numbers with an X (x) for the semi-finals.

In the semifinals (1st category, 1st part), each of the 15 participants freely poses for 60 seconds to their own musical accompaniment; in the absence of the latter, it is provided.

When evaluating Round I of Part I, the judge must pay attention to the demonstration of the muscular body in an artistic and well thought out program. Posing shouldn't be just a series of movements. The participant must

show all sides of your body - front, back and sides, like all the main muscle groups. Decrease marks for poor posing and underdeveloped body parts.

Then (I category, II part) all 15 finalists are called to the stage by a group in order of numbers, who perform two turns in a relaxed position (front and back). After that, the judges move on to comparing 7 compulsory poses (for women and couples - 5), demonstrated by 5-6 athletes.

POSITION

MANDATORY POSITIONS FOR MEN

1. **Front double biceps.** Standing facing the judges, wearing a short distance from each other, raise both arms to shoulder level and bend them at the elbows. Hands should be clenched into fists, hands turned down. This will cause the muscles of the biceps and forearms, which are the main muscle groups assessed in the pose, to tighten. In addition, the competitor should strive to tighten as many muscles as possible as the judges will look at the entire body (fig. 31).

The judge makes a comprehensive assessment of the physique: examines the body, starting with the head (each part in descending order, starting from the overall impression, looking at muscle volume, balanced development, muscle density and relief). In descending order, examine the head, neck, shoulders, chest, all the muscles of the arms, the front of the chest volume of the trunk, the transition of the chest to the delta, abs, waist, hips, leg, calves and feet. The same procedure for posterior postures will include examining the top and bottom of the traps, teres muscles, muscles along the spine, back extensors, gluteus muscles, hamstrings, calves and feet. A detailed assessment of individual muscle groups can be made during comparisons, where it helps the judge compare muscle shape, density and definition while keeping in mind overall balanced development.

2. **Lats show in front.** Standing facing the judges, placing the feet at a short distance from each other, the competitor must put his hands, preferably clenched into fists, on the lower waist and "straighten" the latissimus dorsi. At the same time, you should try to strain as much of the anterior muscles as possible (Fig. 32).

The Judge must first ensure that the competitor is able to show the "span" of the lats, then continue the examination from head to toe as in pose 1, noting

Figure: 31. Demonstration of double biceps in front

first general aspects, and then concentrating on a more detailed examination of the various muscle groups.

3. Side chest. The competitor can choose either side of this pose to demonstrate their best hand. Standing with his left or right side to the judges, he bends the hand closest to them at a right angle with a clenched fist, and the other grabs the bent wrist. The leg closest to the judges is bent and on its toes. The athlete spreads the chest and, by means of upward pressure with a bent arm, strains the biceps as much as possible. It also tenses the thigh muscles, in particular the biceps group, and by downward pressure on the toe of the leg demonstrates the tension of the calf muscle (fig. 33).

The judge should focus on the chest muscles and curvature of the chest, biceps, hamstrings, calves and complete with a second examination from head to toe.

4. Back double biceps. Standing with his back to the judges, the competitor flexes his arms and wrists as in a double pose.

Figure: 32. Display of the broadest muscles in front

Fig 33. Demonstration of the breast from the side

biceps in front, puts the leg back, resting on the toe. Tighten the muscles of the arms, shoulders, upper and lower back, thighs and calves (Fig. 34).

The judge must first examine the muscles of the arms, and then the entire body from head to toe, considering more muscle groups than in other positions, including the neck, deltas, biceps, triceps, forearms, trapezium, teres, back muscles along the spine, extensors back, outer oblique, lats, glutes, hamstrings and calves. This pose, probably more than any other, will help determine the quality of muscle density, definition, and overall balance.

5. Display of the broadest muscles from behind. Athlete backs up to judges and puts his hands on his waist, keeping his elbows wide, with one leg resting on his backside to toe. Then strains the lats back as wide as possible and shows calf tension by downward pressure on sock legs (fig. 35).

Judges must evaluate the thread lats on the "span", good muscle density and again to finish the examination from head to toe.

6. Triceps. The athlete may again choose either side (best hand) to demonstrate this pose. Standing sideways to the judges, he must put both hands behind his back, interlocking his fingers or taking her front

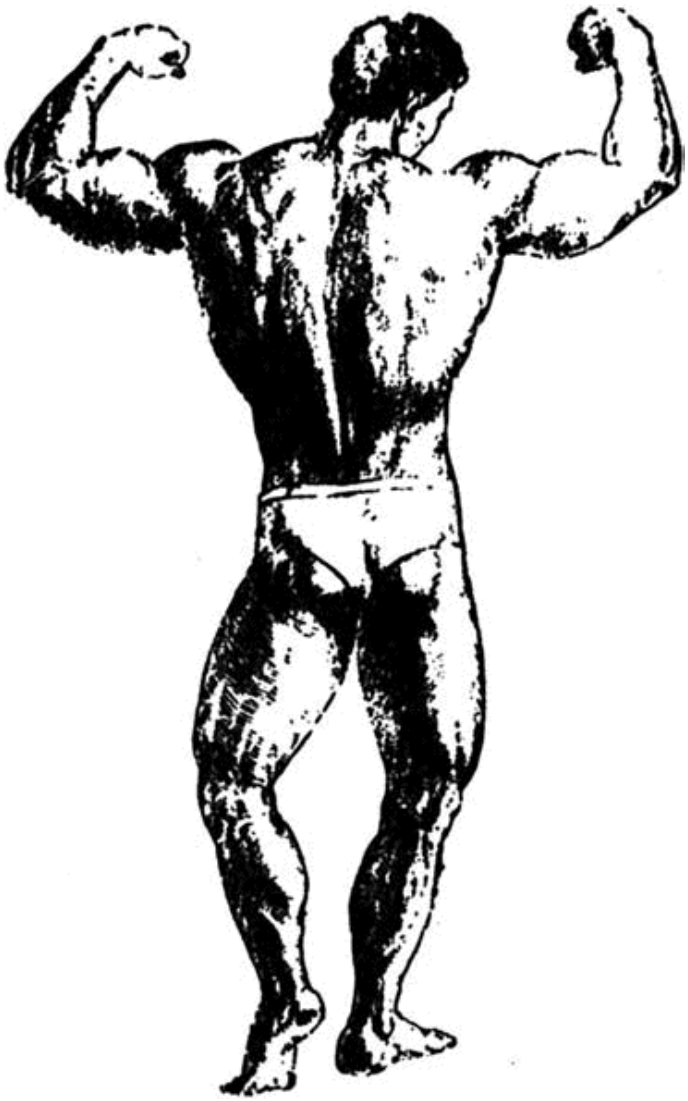


Figure: 34. Showing double biceps from behind

by the wrist. The leg closest to the judges should be bent at the knee and rest on the toe. The competitor presses on the front arm, forcing the triceps muscles to tense, lifts the chest, and tightens the abdominals in the same way as the thigh and calf muscles (Figure 36).

The judge must first inspect the triceps demonstration.

sa and then finish the inspection from head to toe. In this position and in the side chest position, you can see the thigh and calf muscles in profile, which will help to assess the comparative development of these muscles more accurately.

7. **Abs and hips.**Standing facing the judges, athlete puts both hands behind the head and puts one leg forward. Then he strains the abdominal muscles, pushing the torso slightly forward. At the same time, you should tighten the thigh muscles of the leg extended forward (Fig. 37).

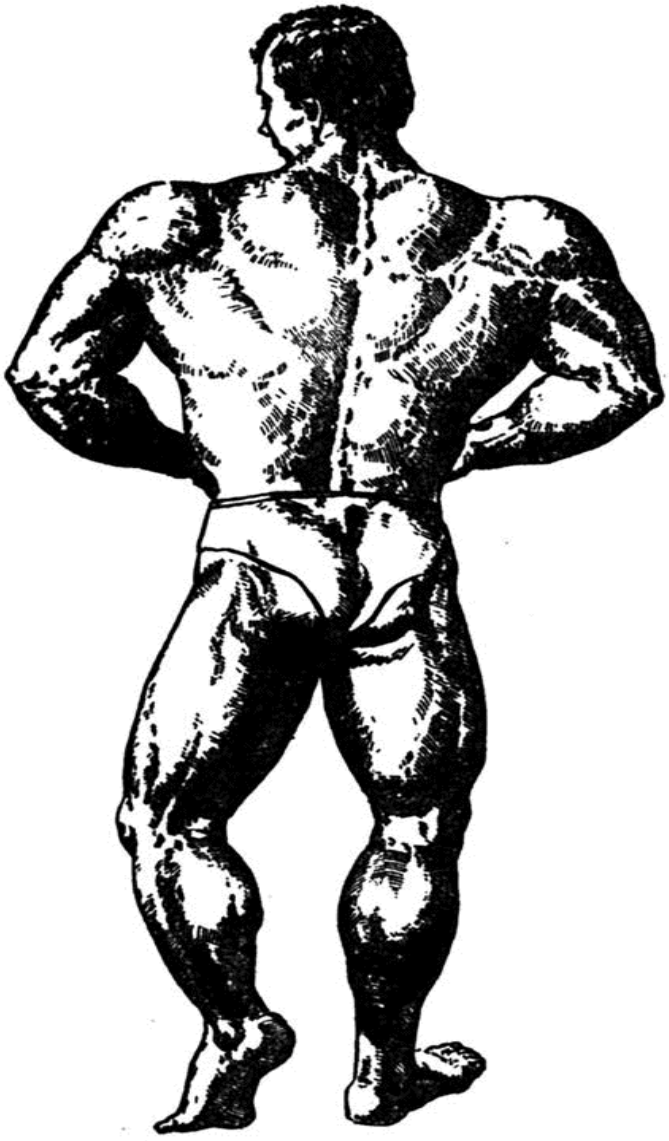


Figure: 35. Demonstration of the broadest muscles from behind

and

Fig. 36. Showing triceps

Figure 37. Press demonstration

The judge should examine the abdominal muscles and thighs and finish with a head to toe examination of the body. A comparison of the participants will help determine which of them has the best physique in terms of muscle volume, developmental balance, muscle density and definition.

REQUIRED POSITIONS FOR WOMEN

1. **Front double biceps.** Standing facing the judges, arms overhead at an angle of 45º, hands open and relaxed, right leg out to the side, biceps, abs, thighs and calves tense.

The judge judges the pose in the same way as for pose 1 for men.

2. **Side chest.** The competitor can choose either side to show her best hand. Standing with her left or right side towards the judges, she bends the front knee forward, raising the heel, and the front arm at a 90º angle with the palm up, with the back hand contracting the biceps, pectoralis, thigh muscles and calves.

The judge will judge this pose in the same way as pose 3 for men.

3. **Back double biceps.** Standing with your back, raising your arms above your head at an angle of 45º with open and relaxed hands, put one leg back, raising the heel; contraction of the biceps, upper and lower back, thigh and calf muscles.

Estimated as posture 4 in men.

4. **Triceps.** The competitor can choose either side to show her best hand. Standing with your right or left side towards the judges, put your front leg back, hands behind your back; contraction of the triceps, pectorals, abs, thighs and calves.

Estimated as posture 6 for men.

5. **Abs and hips.** Standing facing the judges, holding both hands behind the head, with one leg extended forward; contraction of the muscles of the chest, abs and thighs.

Estimated as pose 7 in men.

When assessing physique, the judge should look for the ideal muscular shape of the female figure. Other aspects are similar to the characteristics described for the assessment of men's posture, but muscle development should not be excessive, similar to the massive muscularity of the male physique. The muscle relief of women should not be confused with the effects of wasting caused by excessive weight loss.

In the first round, the judges may find other imperfections not visible in men - skin lesions, operating scars, etc. The judges must observe the gracefulness of the gait and posing.

Tables of judges' marks, statistical sheets filled in by the persons conducting the counts, the rest of the documents are the same as those filled in when judging men's competitions.

In the I round of the II part, the general shape and form of the various muscle groups are assessed. The judge favorably treats participants with a harmonious, classical physique, emphasizes good posture and athletic behavior, correct anatomical structure (body skeleton, broad shoulders, high chest, correctly arched back, good proportions between the trunk and limbs, straight legs - good skin with lack of blemishes, acne

and tattoos, neatly trimmed hair, good foot and toe shape). If there are difficulties in the distribution of seats among two or three participants, the judge looks for deficiencies according to the criteria listed above.

Both parts of the semi-final count as one round. The judge will classify the competitors from 1 to 15 without giving anyone the same place. The scorer will remove the highest two and the lowest two and add the remaining five places. In a competition with 7 or 5 judges, the highest and lowest marks are dropped. Each competitor's place totals determine the top six athletes for the final. This method is used to select the finalists in each weight category.

In the final, six participants perform a free
posing to music of their own choosing, and then collectively demonstrating seven separate poses (women and couples - five). Individual free posing and compulsory postures constitute the second round of the competition. One minute posing is not scored. The judges place the finalists on the 1-6th places, and the tallyers, again removing the two highest and two lowest marks, add the remaining five. The total amount is added to the amount of places collected by the participant in the semifinals. The athlete with the lowest total of places in two rounds is the winner. The final is served by the same 9 (7 or 5) judges who held the preliminary competition.

If any judge gives a mark that is significantly different from that given by other judges, the competition secretary may ask for an explanation.

The secretary has the right to remove a judge who is biased, incompetent towards athletes, or behaves inappropriately.

In each category, an awards ceremony is held after the finals and posing, while the finalists are lined up at the back of the stage. A posing platform can be used as a podium. Diktor announces the name of the participant who took 6th place, and he rises to the podium, taking the place on the left side. Then the athletes are named who received 5, 4,
3rd place, 2nd place, and finally the winner, who becomes the center.

In February 1990, the Congress of the International Federation
The lifting force adopted the technical rules for powerlifting (powerlifting), which recognize three movements performed in the following strict sequence: a) squats; b) bench press; c) cravings.

The main provisions of these rules set out the requirements for the organization and conduct of competitions, their refereeing.

Powerlifting competitions are held for juniors 14-23, men and women 24-40 and veterans 40 years and older. If there are age restrictions in the competition, the participant can remain in this category for a full calendar year.

In addition to age categories, weight categories are also accepted (Table 1).

Table 1

Weight categories

Category	Participant weight, kg	Category	Participant weight, kg
	Men		Women
52.0 kg	up to 52.0	44.0 kg	Up to 44.0
56.0 kg	52.01 - 56.0	48.0 kg	44.01 - 48.0
60.0 kg	56.01 - 60.0	52.0 kg	48.01 - 52.0
67.5 kg	60.01 - 67.5	56.0 kg	52.01 - 56.0
75.0 kg	67.51 - 75.0	60.0 kg	56.01 - 60.0
82.5 kg	75.01 - 82.0	67.5 kg	60.01 - 67.5
90.0 kg	82.51 - 90.0	75.0 kg	67.51 - 75.0
100.0 kg	90.01 - 100.0	82.5 kg	75.01 - 82.5
110.0 kg	100.01 - 110.0	90.0 kg	82.51 - 90.0
125.0 kg	110.01 - 125.0	Over 90.0 kg	Over 90.01 unlimited
Over 125.0 kg	From 125.0 and without injuries		

Each participant in the competition is given three attempts - in squats, bench press and deadlift. The result shown in each movement, excluding the fourth (record) attempt, is included in the amount scored by the sport in the shift. The winner of the competition in this category is the athlete with the highest score in all exercises. The rest are arranged in descending order.

An athlete who does not show results in one of the movements is excluded from the competition.

If several (two and more) participants have the same amount, the easier one will be on the higher place.

Bars used at World or Regional Championships must not be chrome, silver plated or painted between the locks.

The dimensions of the platform are not less than 2.5 x 2.5 and not more than 4.0 x 4.0 m, with a smooth and even surface, rising no more than 0.1 m above the level of the surrounding floor or scenes.

It is allowed to use only rods with discs. The neck should be straight, well-cut, no more than 2.2 m long, with a distance between the outer parts of the locks not less than 1.31 and no more than 1.32 m.The diameter of the neck should be 0.028-0.029 m, and the weight of the neck and locks - 25 kg. The bar should be marked (0.81 m) to control the bench press.

The mass of the discs may have an error within 0.25% and must correspond to the following weights: 0.5 (for records), 1.25, 2.5, 5, 10, 15, 20, 25, 45 and 50 kg. Discs weighing more than 25 kg must have a thickness of no more than 0.06 m, and 20 or less - no more than 0.03 m.

20-kg discs are painted in blue and black, 25 - red, 45 - gold, 50 - green, 15 - yellow and black, 10 or less - in any. The discs must indicate their mass. The first and heaviest discs put on the neck are turned "facing" inward, the subsequent ones - outward. The diameter of the largest disc should not exceed 0.45 m.

Squat Racks are durable and consist of a single piece or two separate stands to hold the bar in a horizontal position. The height of the stands changes from 1, at the lowest position, to 1.7 m at the highest. The height changes ascending, in increments of no more than 0.05 m.

The bench is also level, solid a structure with a length of at least 1.22, width 0.29-0.32, height 0.42-0.45 m, measured from the floor to the top of the bench surface. The height of the racks on the benches is from 0.82 to 1 m, measured from the floor to the bar of the lying bar.

During the competition, the referee announces his decision using the signaling - white ("there is a rise") and red ("no rise") lights. When switched on, the lamps light up simultaneously. White and red flags can be used.

Competitors perform in a single one-piece single-layer suit made of elastic material, without additional patches or spacers of any color

(flowers). Seams and their undercut should not exceed 3 cm in width and 0.5 in thickness, which should be taken into account in squats. A shirt of any color with short sleeves (4 cm above the elbow) can be worn under a lifting suit. You cannot perform in a ribbed, rubberized shirt with pockets, buttons, zippers. The collar can have a round or sharp neckline.

Under a lifting suit, you should wear sports panties or regular cotton or nylon pants made of a single layer.

Women may wear panties or panties if the elements are not helpful, and a bra that does not contain wires or supports.

It is allowed to perform in socks of any color, not rubber and not tight-fitting.

A belt with a buckle attached to one end can be worn over a lifting suit. The maximum belt width is 10 cm, the maximum thickness is 13 mm, the inner width of the buckle is no more than 11, the outer width is 13 cm.

Participants perform in training gymnastics
slippers, sports shoes, boots, or any other footwear that has a sole without metal spikes or pads.

You can use industrial bandages or bandages made of single-layer elastic covered with cotton, polyester, or a combination of both. Bandages made of rubber or its substitutes are prohibited. The length of the bandage for hands is no more than 1 m, width is 8 cm, for knees - 2 m and 8 cm. Combinations of bandages and knee pads are prohibited.

Do not use a plaster, bandage, or bandage as a means to help hold the barbell.

1 hour before the official weigh-in, two judges look through the costumes. At the request of the judge, the athlete is obliged to replace an item of equipment that does not meet the requirements of the rules.

Watches, jewelry, glasses and feminine hygiene items
do not need verification.

It is strictly forbidden to use oils, grease or other lubricants on the body, suit or personal equipment, except for powder consisting of chalk, talc, rosin, magnesium carbonate.

MOVEMENT AND RULES FOR THEIR PERFORMANCE

1. Squat. The competitor must place the barbell horizontally on the shoulders not lower than 3 cm from the top of the front delta. The bar must be held horizontally at

on my shoulders with my fingers, embracing the bar, put my legs evenly (flat) on the platform, straightening my knees.

Having removed the barbell from the racks, the athlete takes a step back, takes the starting position and so waits for the signal from the head judge. The signal will be given as soon as the competitor stands still and positions the barbell correctly. If retractable stands are used, the athlete removes the bar from the stands before they are removed and waits motionlessly for the head judge's signal. The signal is given by performing a downward movement with the hand, clearly saying the command: "Squat!"

Having received a signal from the head judge, the participant must bend the legs and lower the body until the upper surface of the legs in the hip joint is lower than the top of the knees. Then you should rise without double bouncing or any downward movement, until the knees are straightened. When the participant is stationary, the judge gives a signal to put the barbell in place: he performs a reverse movement with his hand and pronounces a clear command: "To the stands!" The Shift Sport puts the bar back in place.

The participant must stand facing the audience without touching to locks, rod ends or discs during the entire movement. However, the edges of the fingers holding the bar can touch the inner surface of the lock.

At any time, there must be at least two and no more than five assistants on the platform, who can be called for help to remove the barbell from the racks. However, as soon as the barbell leaves the racks, these persons are not allowed to help the participant to take the starting position, place the leg, take the correct barbell position, etc.

If the attempt fails due to an error of one or several assistants, by order of the head judge, the participant can be provided with an additional one for lifting the same weight.

The squat does not count due to the following errors:

— non-observance of the chief referee's signals when performing or completing a movement;

— double bouncing or more than one attempt to rise from a lower position;

— inability to take a straight position with straightened knees when performing and completing the movement;

— any movement of the legs to the side, back or forward during the movement;

— inability to bend the knees and lower the body until the surface of the legs in the hip joint is below the top of the knees;

— changing the position of the bar on the shoulders after the start of the movement;
— contact of assistants with the bar in the period between the signals of the referee;
— contact of the elbows or upper arm with the legs;
— the inability to return the bar to the racks;
— intentional throwing or overturning of the barbell.

2. Bench press. The front of the bench should be placed on the platform with the front facing the head judge. The participant lies on his back, touching the surface of the bench with his head, shoulders and pelvis. Feet are on the floor. This position must be maintained throughout the entire attempt.

If the color of the competitor's suit and the surface of the bench are not sufficiently contrasting to allow the judges to determine a possible lifting motion at the touch points, the bench may be covered with a cloth of a different color from the suit.

To position the feet firmly, the athlete can use discs or stands no higher than 0.3 m, while the entire foot must be flat on the surface. The dimensions of the stands should not exceed 0.45 x 0.45 m.

There may be 2-4 assistants on the platform, who are allowed to assist the athlete in removing the barbell from the racks. It is removed on straightened arms, and not on the chest. In this case, the distance between the index fingers should not exceed 0.81 m.

Taking the barbell on outstretched arms, the participant must lower it to his chest and wait for the signal (clap) of the judge. It is given when the bar is motionless on the chest. After the signal to complete the movement, the barbell is squeezed upward on straightened arms and held motionless until a clear command: "To the racks!"

Reasons for disqualification in the bench press:

— disobeying the judge's signals at the beginning or end of the movement;
— any change in the accepted position during the movement itself - lifting movement of the head, shoulders, buttocks or legs from the initial points of contact with the bench or floor, lateral movement of the arms on the bar;
— bouncing or cushioning the bar from the chest;
— pressing the barbell into the chest after receiving a signal from the judge;
— any uneven extension of the arms during movement;
— stopping the bar during its squeezing;
— contact of assistants with the barbell between the signals of the referee;

— any contact of the competitor's feet with the bench or its supports;

— deliberate contact between the bar and the uprights during movement to facilitate the bench press.

3. Traction. The bar must lie horizontally at the competitor's feet, grabbed with a free grip with both hands and lifted in one continuous movement until the athlete straightens (facing the gym). At the end of the movement, the knees should be fully extended and the shoulders pulled back.

The head judge's signal consists of a downward movement
hand down and a clear command: "Down!". The signal will not sound until the bar is stopped and the competitor is in a clearly completed position.

Any barbell lift or any deliberate attempt to lift the barbell must be considered an attempt.

Reasons for a deadlift disqualification:

— any stop of the bar not reaching the end position;

— inability to stand up straight with your shoulders back;

— inability to fully straighten the knees at the end of the movement;

— supporting the bar with your hips during the movement;

— any lateral movement of the legs, step forward or backward;

— lowering the barbell to the signal of the head judge;

— returning the bar to the platform without maintaining control with both hands.

WEIGHING. JUDGING

Weigh-in is carried out no earlier than two hours before the start of the competition in this category in the presence of three appointed judges and lasts 1.5 hours. The remaining time athletes use to prepare for the competition. The weighing of each participant takes place in a separate room in the presence of his coach and three judges. A competitor's true weight is not announced until all athletes competing in that category have been weighed.

An hour before the start, a draw is made to establish the weighing order. It also determines the sequence of lifting during the competition, when competitors will order the same weight for their attempts.

If the weight does not correspond to the category, the athlete can repeat the weigh-in within 1.5 hours, but after all competitors in the category have passed it.

10 minutes before the weigh-in, the athlete can change his usual category by contacting the head judge of the competition.

The panel of judges includes: judge-informant; timekeeper; stewards; recorders; assistants on the platform. A doctor must be present at the competition.

The informing judge organizes the attempts, announces the weight required for the next attempt and the name of the participant (calls him to the platform, announces the set weight).

The timekeeper monitors the recording of the time interval between the announcement of the readiness of the barbell and the start of the competitor's attempt, as well as that the athlete leaves the platform within 30 seconds after the attempt. The participant is given
1 minute after being called to the platform to start the attempt. If the athlete starts moving at the set time, the clock stops. If he makes a second or third attempt using the normal system, and at the same time has a queue to execute a movement, he gets 3 minutes with a warning signal at the end of the first two. In the squat and bench press, the start of the attempt coincides with the judge's initial signal, and in the deadlift, the start of the barbell lift.

Immediately after completing the exercise, the Steering Judge must approach the competitor and ask how much weight he will lift in the next attempt. The competitor is given 1 minute between completing the previous attempt and informing the informing judge, through the distributor, of the weight declared for the next one. If a competitor does not report a new weight within a minute, the barbell weight will be increased at the request of the next competitor in the normal sequence.

The Recorders will record the progress of the competition, sign the official weighing tables, record certificates and any other documents that require a signature.

Platform assistants assist athletes preparing to attempt.

Possible download errors:

— if there is less weight on the bar than the initial one, the attempt is scored, if the attempt is unsuccessful, the participant is given an additional attempt at the end of the round with the first initially requested weight;

— if the weight on the barbell is heavier than the one originally requested and the attempt is successful, it counts. If unsuccessful, the participant will be given

an additional attempt with the originally requested weight.

Three unsuccessful attempts in any movement will automatically exclude the competitor from the competition.

During the competition, there are three judges on the platform or stage, one of whom is the main or central and two are side judges. The head judge is responsible for giving the necessary signals in all three movements.

The signals for the three movements are as follows (Table 2):

Signals

table 2

Movement type	Start	Ending
Squat	Visible signal: movement of the arm downward with a clear command: "Squat!"	Visible signal: reverse movement of the hand along with a clear command: "Stand up!"
Bench press	Sound signal of the command: "Clap". If a competitor is deaf, the head judge may give a visual signal	Visual signal: movement of the referee's hand with a sound command: "To the stands!"
Thrust	No signal required	Visual signal: downward movement of the hand with an audible signal: "Down!"

Immediately upon the return of the barbell to the platform or to the stands at the end of the movement, the judges announce their decision with the help of light signals: white - "good rise", red - "failure".

Having noticed an error sufficient to be disqualified in

For this type of movement, the touch judge must raise his hand. If the referee and the side referee agree with this decision, the first stops the movement at a safe (in his opinion) point and gives the participant a signal: a downward movement of the hand and a clear command: "To the stands!" or "Deliver!"

If the observer is the chief judge, he must, without raising his hand, see (check) whether at least one judge agrees with the decision. If one or both agree, the head judge stops the movement.

Prior to the start of the movement, if any of the judges fail to score the barbell position or the athlete's original position, they may draw the competitor's attention to the error. If the majority of the judges consider the violation

allowed, the chief does not give a signal to start the movement. The head judge is not obliged to explain to the athlete his mistake, if he has the remaining unused time, which he can use to correct the position of the barbell or body position in order to receive the permit signal.

Judges should refrain from commenting, not receive any documents and not give a verbal report concerning the course of the competition.

The head judge has the right to consult with the sidelines, the jury or any other official to speed up the progress of the competition.

After the competition, the official score tables, record certificates and any other documents will be signed by three judges.

A judge elected as chief in one category may act as a side to the other.

The judges' clothing is a dark blue jacket, gray trousers, a white shirt, and a tie.

In men's powerlifting, sports categories are assigned when the following standards are fulfilled at competitions (Table 3).

Standards, bit requirements

Table 3

Category	Exercises	Ranks and ranks, bar weight (kg)						
		ms	kms	I	II	III	I jun.	II jun.
52 kg	Bench press		100	90	80	67.5	65	60
	Squat		125	105	95	90	80	70
	Thrust		140	115	105	100	85	80
	Amount	440	365					
56 kg	Bench press		110	95	85	75	70	62.5
	Squat		135	117.5	105	100	85	75
	Thrust		145	125	115	110	90	85
	Amount	475	390					
60 Kg	Bench press		120	100	90	85	75	67.5
	Squat		150	130	120	105	95	85

Category	Exercises	Ranks and ranks, bar weight (kg)						
		ms	kms	I	II	III	I jun.	II jun.
	Thrust		160	140	130	115	105	95
	Amount	515	430					
67.5 kg	Bench press		127.5	110	100	90	80	72.5
	Squat		162.5	140	125	115	105	90
	Thrust		170	150	135	125	115	105
	Amount	570	460					
75 kg	Bench press		135	115	107.5	95	87.5	75
	Squat		170	150	132.5	120	115	100
	Thrust		180	160	145	130	122.5	115
	Amount	620	485					
82.5 kg	Bench press		150	130	120	105	92.5	80
	Squat		180	170	155	135	120	105
	Thrust		190	175	160	145	135	120
	Amount	660	510					
90 kg	Bench press		157.5	140	127.5	110	100	85
	Squat		185	175	165	140	130	115
	Thrust		192.5	185	170	155	140	130
	Amount	690	535					
100 Kg	Bench press		165	150	132.5	120	105	90
	Squat		200	130	170	155	132.5	120
	Thrust		215	200	185	175	147.5	135
	Amount	725	580					
110 Kg	Bench press		180	160	140	132.5	110	95
	Squat		215	190	177.5	167.5	140	125
	Thrust		225	210	197.5	185	155	140
	Amount	750	620					

Category	Exercises	Titles and awards, bar weight (kg)						
		ms	kms	I	II	III	I jun.	II jun.
125 kg Press				190	170	150	140	115	110
	Squat			225	205	187.5	175	150	130
	Taga			230	220	200	190	165	150
	Amount	765		645					
Over Press				200	180	157.5	145	122.5	105
	Squat			24	21	192.5	18	160	140

125 kg