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MEDICAL DEVICES TO RECOVER SPORTS PERFORMANCE

Yakubova Guyokhon Kuchkarovna,
Senior Lecturer of the Department of Theory and Methods of Physical Culture

Fayzullayeva Umida,
4th Year Student in the Direction of Physical Culture
Ferghana State University

ANNOTATION

At the same time, of particular importance is the predominant effect on those functional systems of the body that are the main ones in ensuring special performance in this sport and limit it. So, for sports characterized by a predominant manifestation of endurance, such a link will be the cardiorespiratory system and bioenergetics; for complex technical sports and sports requiring fine coordination of movements - the central nervous system and analyzers; for speed-strength sports - the neuromuscular apparatus, etc. Taking into account the heterochrony of the recovery of various body systems, special attention should be paid to the slowest recovering systems.

Restoration of sports performance and normal functioning of the body after training and competitive loads is an integral part of a properly organized system of sports training.

Physical activity is accompanied by certain functional and structural changes in the body that underlie fatigue. Fatigue is a natural physiological phenomenon, a consequence of the work done, is characterized by the development of a feeling of fatigue, a temporary deterioration in metabolism, regulation, the functioning of the main physiological systems, response to stress, a decrease in energy reserves, general and special performance.

The trace effects of the load stimulate the development of adaptation, contribute to the achievement of a new, higher level of performance. The appearance of a feeling of fatigue at the same time has a protective value, signaling a certain tension in the activity of the body, thereby protecting it from overstrain and overtraining.

At the end of the work, the phenomena of fatigue gradually disappear, recovery occurs. Recovery is a gradual return of the body's working capacity and functioning to a pre-working level or close to it.

The depth of fatigue, its duration and manifestations, as well as the speed of recovery, are due to a combination of factors of three main groups: the work performed (its nature, direction, volume, intensity, duration, degree of emotional stress caused by it, etc.), the state of the trainee (age, health , fitness level, individual characteristics, etc.), environmental conditions and features of the regimen of the period preceding the load.

The ability of a coach to manage fatigue and recovery states largely determines the culture of training and its effectiveness. The accumulation of fatigue (without appropriate recovery) can lead to the development of overwork and overtraining, a decrease in working capacity, and a cessation of the growth of sports results.

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There are recovery during the work itself, early recovery (immediately after the load, which actually boils down to paying off the oxygen debt) and late recovery (completion of the recovery of energy resources with a shift to excessive anabolism, recovery and increase in basic functions and performance). Of the other most important physiological characteristics of the recovery process, which must be taken into account when selecting and dosing means of recovery, it is necessary to name the unevenness of its course and heterochrony (non-simultaneous restoration of various functions and different parameters of the same function).

Data on the natural course of the recovery process with different types of work in different sports, for athletes of different ages and levels of training, at different stages of training and under different conditions are very important for rational, evidence-based training planning. No less important is a rational system for optimizing the recovery process, especially in the conditions of modern sports training with its inherent heavy loads, the ever-increasing tension of wrestling, the expansion of age limits, and the use of auxiliary means of improving performance.

The body's ability to recover is trainable: it is no coincidence that the speed of recovery is one of the main diagnostic criteria for assessing the response to the load and the level of fitness. The main way to optimize recovery processes is a rational training and regimen, a healthy lifestyle, and hygiene.

When using restorative agents, complexity is important. We are talking about the combined use of the means of all three groups and different means of one group in order to simultaneously affect all the main functional links of the body - the motor sphere, nervous processes, metabolism and energy, enzyme and immune status, etc.

At the same time, of particular importance is the predominant effect on those functional systems of the body that are the main ones in ensuring special performance in this sport and limit it. So, for sports characterized by a predominant manifestation of endurance, such a link will be the cardiorespiratory system and bioenergetics; for complex technical sports and sports requiring fine coordination of movements - the central nervous system and analyzers; for speed-strength sports - the neuromuscular apparatus, etc.

Taking into account the heterochrony of the recovery of various body systems, special attention should be paid to the slowest recovering systems.

It is necessary to pay attention to compatibility and a rational combination of the means used. At the same time, it should be borne in mind that some drugs enhance the effect of others and, conversely, some weaken or completely level the effects of other drugs. The correct combination of means of general and local influence is also essential.

Means of general influence (baths, showers, air ionization, ultraviolet irradiation, massage, hyperbaric oxygenation, vitamins, drugs, nutrition, etc.) have a wide range of non-specific general strengthening effect, and adaptation to them occurs more slowly than to local influences.

Means of local influence are prescribed with a predominant load on certain muscle groups, general - when working with a large volume and intensity, when fatigue is of a global or regional nature. When training twice a day, it is advisable to use local means of recovery after the first workout and means of general action after the second. It is important to correctly determine the timing of their appointment.

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So, for urgent recovery (during repeated starts, in short intervals between loads, etc.), you can assign a procedure immediately after the end of work. If the maximum increase in working capacity is required in a longer period, it is more expedient to prescribe means of general influence no earlier than 4-8 hours after the work performed.

Drug interactions are also complex. The combination of some drugs can lead to a significant change in pharmacodynamics and change the nature of the impact on the body. There are cases of direct pharmacological incompatibility.

The speed of recovery processes, sensitivity to certain means of recovery are associated with the individual characteristics of the athlete's body. Thus, individual differences in the ability to recover are known even with the same level of fitness. Some athletes, even in a state of good fitness, recover relatively slowly.

An analysis of such cases showed a large role in the nature of the restoration of the characteristics of the nervous system, neurohumoral regulation, and metabolic processes, which, apparently, is largely genetically determined. It is also known that each person has his own rhythm of restoration of altered body structures. Therefore, it is necessary to clearly know the natural ability of each athlete to recover in order to select the most appropriate recovery procedures and the mode of their application.

There are very large individual differences in the body's sensitivity to certain means of recovery (in particular, pharmaceuticals and some food products), physical factors, which depend on gender, age, diet, constitutional characteristics, alcohol consumption, nicotine, genetically determined activity of enzymatic systems.

Confidence is needed in the complete harmlessness of the drugs used in relation to metabolism and the activity of neuroendocrine mechanisms, metabolic activity, etc.

The use of insufficiently tested means in sports, without taking into account the individual sensitivity of the body to them, clearly developed and approved indications and contraindications, should be completely excluded. Only a doctor who is well aware of the characteristics and condition of each athlete and has special training and sufficient experience has the right to allow medicinal and some physical effects on the body.

Restorative means should be used in full accordance with the sport, tasks and stage of training, the nature of the performed and upcoming load. At the same time, it should be taken into account that it is far from always necessary to strive for an artificial acceleration of recovery, i.e., the removal of trace load phenomena. Sports practice has proven that in order to expand the functional capabilities of the body and achieve a new, higher level of performance, it is periodically permissible to conduct another training session against the background of incomplete recovery. It should be borne in mind that under certain conditions (immediately before competitions and during competitions, during the period of mastering new complex motor tasks, before classes aimed at developing speed or complex technique, as well as for insufficiently trained athletes or young athletes), such training is inappropriate, and after illness, if there are signs of overwork and overstrain, it is generally unacceptable.

Prolonged use is unacceptable in order to restore pharmacological and some physical means. In this case, adverse consequences are possible: the body's addiction to such drugs, the cumulation of side

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effects, and the decrease in the training effect of the load. The weakening of the body's natural ability to recover adversely affects its functional state after the abolition of special means of recovery.

A wide range of medical means of recovery can be used mainly at certain stages of training - mainly during multi-day intense competitions, several starts a day, before the most important competitions, at the stages of increasing loads and mastering new complex motor tasks (including to overcome the psychological barrier) , after "shock" training cycles, in the transition period after a busy season. At the same time, it is advisable to use such drugs cyclically for a duration of no more than 3-4 weeks with a wide variation in both the drugs themselves and the methods of their application (quantity, sequence, duration).

According to medical indications (after diseases, when signs of overwork, overstrain, overtraining appear and for the prevention of these conditions), medical means of recovery as prescribed by a doctor can be used by all categories of trainees at any stage of training.

Special care is required when prescribing certain means of recovery to young athletes, which is explained by the instability of functions, increased reactivity and susceptibility, still insufficient activity of a number of enzymatic systems, age-related characteristics of the body's response to physical activity. To the greatest extent, this applies to the period of active puberty, when all body functions are especially labile and sensitive.

Restorative measures should be included in the general plan for the preparation of athletes in close connection with the training regimen, reflected in self-control diaries, checked for effectiveness using the methods of pedagogical and medical control, monitoring health, well-being, performance, the state of the main functional systems and body reactions to physical activity.

Physical factors with high biological and therapeutic activity are used in sports medicine to prevent and treat diseases and injuries, harden the body, accelerate recovery and increase efficiency. There are natural factors (sun, air, water) and preformed (acting with the help of special devices), among which, for the purpose of restoration, mainly hydro-influences (various showers and baths), balneotherapy (baths of a special composition), heat and light therapy, oxygen therapy are used. , air ionization, electric currents of different frequencies and voltages, bar effects, various types of massage and baths.

Acting through the receptors of the skin and respiratory tract, physical factors cause a wide range of non-specific reactions in the body, affect metabolism, blood and lymph circulation, vascular tone, thermoregulation, immunity and enzymatic activity, nervous and humoral regulation, the activity of the central nervous system and internal organs, promotes the excretion of decay products from the body. Thus, physical factors increase the body's defenses, its resistance to various adverse environmental factors, relieve fatigue, and accelerate recovery.

Physical factors are divided into means of predominantly general impact (showers, shared baths, general and hydromassage, baths, ultraviolet radiation, air ionization, electrosleep and some other electrical procedures, etc.) and local effects (most electrical procedures, partial baths, decompression, thermal procedures, segmental massage, etc.). The latter, although they act mainly on certain muscle groups or reflexogenic zones, cause not only local, but also systemic reactions due to the ongoing redistribution of blood and changes in cellular metabolism. However, the means of general influence

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have a wider range of non-specific influence, and therefore adaptation to them occurs more slowly than to local influences. Means of local influence are prescribed with a predominant load on certain muscle groups, and means of general influence - after loads of large volume and intensity, accompanied by global or regional fatigue. With a two-time workout per day, it is recommended to use local remedies after the 1st workout and general effects after the 2nd.

The effect of physical factors on the body depends on their nature, dose, time of application, individual sensitivity of the athlete to them. Along with a general non-specific reaction, each remedy also causes specific reactions, it can have both a calming and stimulating effect. This means that in each specific case it is necessary to take into account the state and characteristics of the body, the nature of the work performed and the manifestations of fatigue. Therefore, physiotherapy should be prescribed only by a doctor.

It is important to correctly determine the timing of their appointment. For example, for urgent recovery in short intervals between loads, the procedure should be carried out immediately after the end of the load; to ensure long-term recovery - after 4-6 hours or more. To facilitate recovery at certain stages of training (after "shock" training cycles or with an increase in fatigue, etc.), it is advisable to carry out a course of procedures (8-12) daily or every other day. But it should be borne in mind that prolonged use of the same procedures causes the body to get used to them and reduce their effect. Therefore, it is recommended to vary the nature, duration, combination of procedures. At the same time, no more than 2-3 procedures can be applied, including no more than one procedure of each type so as not to overload the body.

Hydroprocedures - showers, baths, baths - act on the body with the help of temperature and mechanical factors. By adjusting the temperature and pressure of the water, you can achieve different effects.

Showers are hydroprocedures in which water acts on the body in the form of one or more jets with dosed temperature and pressure. At a water temperature of up to 20 °, the shower is considered cold, 20-33 ° - cool, 34-36 ° - indifferent, 37-38 ° - warm, 40 ° and above - hot.

Taking a warm shower (5-7 minutes) after training has a hygienic and calming effect and is an indispensable component of the training regimen. 20-30 minutes after training, before daytime rest and night sleep, the shower can be longer - it reduces excitability, improves metabolism, muscle and internal organs function. Cool and indifferent showers tone up, hot ones can be used for hypothermia and after a massage.

According to the increasing intensity of the mechanical impact on the body, the souls can be listed in the following order: dust, needle, fan, circular, jet (N.A. Belaya and others) - High-pressure souls have the strongest effect. In a jet shower (Charcot, Scottish), a large jet of water from a hose is sequentially supplied to different parts of the body, in a circular and fan - small jets simultaneously to many parts of the body. In contrast showers, 2 jet streams are supplied with alternating hot and cold water. Duration of procedures - from 1-2 to 3-4 minutes.

Fresh, gas, aromatic, mineral-chloride baths are used to restore working capacity. Warm baths (36-38°) have a calming and relaxing effect; they are prescribed at bedtime, after training or competition with a heavy load, no more than 2-3 times a week. Indifferent (34-35°) and cool (21-23°) short baths tone the

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body and increase metabolism; they are used mainly in those cases when the athlete in the recovery period is dominated by inhibitory processes. Hot baths are tiring and (except in cases of hypothermia) are not recommended for recovery purposes.

Contrasting baths (2 baths with a difference in water temperature from 5-10 to 20 °) and vibration baths (general or local exposure to water and vibration) have a more pronounced effect. They relieve fatigue, tone the body, increase efficiency. Vibration baths, in addition, have an analgesic effect. For the purpose of recovery, they are prescribed no earlier than 1 hour after training, 10-12 baths per course with a gradual increase in temperature difference and vibration strength. Of the gas baths, carbon dioxide and pearl baths are most widely used in sports medicine. In carbonic baths, in addition to temperature and mechanical factors, the body is also affected by a chemical factor - carbon dioxide. This helps to increase the tone of the nervous system, improve the function of the heart, blood vessels, the formation of biologically active substances in the skin, and accelerate the excretion of lactic acid. These baths 2-4 times a week not earlier than 1 hour after training and not later than 3 hours before it, followed by a 30-60-minute rest (10-12 baths per course).

In pearl baths, water is enriched with air injected under a pressure of 0.5-1.5 atm, which irritates the thermo- and tactile receptors of the skin and reflexively has a tonic effect on the body. They are recommended to be used mainly after competitions and training, accompanied by significant nervous tension. Assign 12-15 procedures 3-4 times a week, the water temperature is not more than 35-36 °.

In sodium chloride baths, natural mineral water (seas, springs, etc.) or prepared from salt is used. The bath has a tonic effect, improves the utilization of oxygen, and works well for violations of the regulation of vascular tone and changes in the musculoskeletal system. It is prescribed no earlier than 30 minutes before training and no later than 2 hours after it.

Alkaline (soda) baths also contribute to the restoration of the musculoskeletal system.

Of the aromatic baths, coniferous baths (with the addition of coniferous extract or tablets to fresh water) are the most widely used. They reduce the excitability of the nervous system, improve sleep, normalize the functions of various organs and systems that have changed due to fatigue. To prepare a coniferous bath in 200 liters of fresh water, dissolve 50-70 mg of the extract.

Baths (steam and dry-air - sauna) are widely used to restore sports performance. Steam (Russian) and dry-air (Finnish) baths differ in temperature and humidity. The steam room is characterized by high humidity (up to 70-100%) and relatively low air temperature (40-60°), dry-air - high temperature (up to 70-100°, sometimes more) and low humidity (within 5-15%). The sauna is easier to bear, the risk of overheating, violations of thermoregulation and body functions is less in it. Therefore, it is widely used in sports practice. The optimal temperature in the sauna should be considered 70-80 °, humidity - 5-15%, air movement - 0.3-0.5 m / s. The bathing procedure should not overwork the athlete, it should be accompanied by good health, normal sleep, a feeling of cheerfulness and a surge of strength.

The mode of taking a sauna depends on the nature of the previous load. If the bath procedure is carried out on the day of training, the time spent in the sauna should be reduced to 5-7 minutes, and the number of visits to 3, on subsequent days you can increase the stay to 10-15 minutes (but not more than 25 minutes) and the number of visits to 4- 5 with intervals between visits - 5-15 minutes. The effectiveness

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of the sauna increases when it is combined with contrasting temperature effects (cool or cold showers or pools) in the intervals between visits and subsequent massage. At the same time, hygiene recommendations must be observed. In practice, portable thermal cameras are also used.

Correctly used natural factors, in particular ultraviolet rays and light negatively charged air ions, also contribute to the normalization of body functions after physical exertion, the removal of a feeling of fatigue, and the increase in efficiency. Ultraviolet rays increase the immunological properties of the body, its enzymatic activity, regulate vitamin balance, increase glycogen reserves, reduce oxygen debt, and stimulate the functions of the central nervous system. A moderate increase in the air of negative ions, the basis of which are oxygen atoms, has a beneficial effect on well-being, functional state and body defenses. Such an influence is observed mainly on the coast of the seas, reservoirs, mountain rivers, in the middle mountains, near waterfalls.

If it is not possible to use the natural forces of nature, artificial ultraviolet irradiation (with the help of erythemal lamps) and air ionization by means of special devices that can be installed in the premises where athletes are after training and competitions are used. This is especially important in the autumn-winter period. The duration of the procedures is 5-15 minutes with a gradual increase to 20-30 minutes. The course is assigned 10-15 procedures.

To speed up recovery, various types of oxygen therapy are used - oxygen cocktails (vitamin-nutrient drinks with dissolved oxygen, inhalation of humidified oxygen, hyperbaric oxygenation in special pressure chambers (breathing oxygen or oxygen mixtures under pressure exceeding atmospheric pressure). For hyperbaric oxygenation, both single and multiple cameras.

For the fastest removal of local muscle fatigue, especially when they are overstrained, various types of thermal procedures are also used: sollux, paraffin, mud and ozocerite applications, local baths and other procedures.

Recently, in sports medical practice, various types of electrical procedures have begun to be used to speed up recovery processes: low-frequency pulsed currents - the so-called sinusoidally modulated currents and ultra-high frequency currents.

Sinusoidal-modulated currents - an alternating sinusoidal current that penetrates well into the depths of tissues, affects the sympathoadrenal system, hemodynamics, sensory zones of the cerebral cortex, improves metabolism, blood and lymph circulation in tissues, helps relieve fatigue, restore the structure and function of myofibrils. This procedure is recommended to be carried out during training and competitions (between repeated starts, halves, etc.). Its course use is advisable during the most stressful periods of training.

Microwave frequencies in centimeter and decimeter modes are recommended for recovery after loads aimed at increasing endurance. In the decimeter mode, they are successfully used for rehabilitation in case of damage to soft tissues and the musculo-ligamentous apparatus of the extremities.

Electrosleep - the impact of electric current on cortical processes - reduces nervous overexcitation and fatigue, calms, normalizes the regulation of autonomic functions. It is mainly used for sleep disorders due to severe overwork.

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Electrical stimulation helps to increase muscle performance, accelerate recovery processes, rehabilitation after injuries and diseases of the musculoskeletal system. Electrical impulses cause tetanic contractions of muscle fibers with subsequent relaxation, improve lymph and blood flow, increase contractility, and have an analgesic effect.

A powerful restorative remedy is manual and hardware massage. It helps to relieve the feeling of fatigue and nervous tension, pain, relaxation and improvement of blood supply to the muscles, and thereby restore and increase sports performance. Massage can be general and local (with an emphasis on the muscle groups that carry the main load during this work). In the restorative mass, unlike the training one, percussion techniques are excluded; it is dominated by kneading, rubbing and shaking techniques. It should be deep, gentle and painless. Particular attention should be paid to the places of attachment of muscles and the muscles involved in the act of breathing. It is desirable to carry out massage in a warm room; a warm shower is recommended before the massage, followed by a hot shower, bath or sauna.

Recently, segmental and acupressure massage, as well as acupuncture, have been increasingly introduced into sports practice.

The physiological rationale for segmental massage is the presence of reflex connections between internal organs and certain areas of the skin (Zakharyin-Ged zones), muscles, connective tissue, etc. Segmental massage is used when the skin becomes more sensitive in the area of the corresponding segments, the appearance of thickening in the muscles, pain and increased tension in the muscles and connective tissue on palpation. The elimination of these changes with the help of massage contributes to the normalization of the primary pathological focus. Segmental massage improves blood circulation for a long time, promotes muscle relaxation, stimulates healing processes, saves energy and increases efficiency. It is indicated before competitions and in the recovery period, with sports injuries and the treatment of a wide variety of diseases.

The basis of acupressure and acupuncture is the doctrine of biologically active points on the body surface (there are about 700 of them), which are characterized by higher rates of electrical conductivity, temperature and metabolic processes. The impact of massage techniques on biologically active points helps to reduce pain in injuries of the musculoskeletal system, reduce muscle tone, etc. Acupuncture is based on irritation (by inserting needles into biologically active points) of numerous nerve endings of the skin, subcutaneous tissue, tendons, periosteum, vessels and peripheral nerve fibers. Impulses from this irritation through the centripetal nerves enter various parts of the spinal cord and brain, which regulate and control the activity of all organs and systems.

Acupuncture contributes to the normalization of the processes of inhibition and excitation in the central nervous system, affects the blood content of extremely active chemical compounds (adrenaline, acetylcholine, histamine).

The mechanism of action of self-massage is similar to that of massage (including manual, segmental and acupressure). Using the basic massage techniques, self-massage can be carried out under any circumstances, combined with a warm-up and various training tools, and used in a bath. With self-massage, it is easy to dose the intensity and duration of exposure. However, despite the fact that the

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importance of self-massage in sports practice is very high, it cannot completely replace the massage performed by a massage therapist.

When choosing the considered physical rehabilitation means, it is necessary to strictly take into account the individual characteristics of the athlete and the characteristics of the sport, the volume and intensity of the previous training or competitive load, and the tasks to be solved in the following days.

All procedures (except for general hygiene and massage) can be prescribed only by a doctor, taking into account the condition of the athlete, his individual sensitivity, the degree and nature of fatigue, the type of sport and the stage of preparation.

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