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The Effect Of Regular Physical Activity On The Functioning Of The Nervous System.

Makhov AS, and Medvedev IN*.

Russian State Social University, st. V. Pika, 4, Moscow, Russia, 129226.

ABSTRACT

Modern researchers pay great attention to the reaction of various organs and body systems to changes in environmental parameters. Currently, non-pharmacological effects on the body are considered particularly promising, especially with the help of physical exertion. They are considered an available tonic and health factor. In this regard, of great interest is the study of various aspects of the influence of physical training on individual organs and body systems. In view of the enormous integrating role of the nervous system in the body, changes in it against the background of regular muscular loads are of particular interest changes in its functioning in these conditions. During physical exertion in the body, a large number of conditioned reflex connections between the cerebral cortex, the motor apparatus and the nerve centers arise and strengthen. From the muscles and internal organs, impulses enter the brain, new neural connections and new conditioned reflexes are formed. All parts of the nervous system are involved in this process: central, peripheral and vegetative. As a result of physical exercises, the strength, balance and mobility of all nervous processes increase. Under the influence of physical exercise, their improvement takes place, which helps a person to better tune in to the upcoming activity. A similar tuning of the organism is found in relation to the functional state of the brain, the musculoskeletal system and all the internal organs.

Keywords: nervous system, physical activity, sport, training, physiology.

Corresponding author

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INTRODUCTION

Modern researchers pay great attention to the reaction of various organs and body systems to changes in environmental parameters [1-3]. These studies have long been conducted on various biological objects [4, 5], which allows us to consider the problem more holistically [6-8]. Inclusion in studies of productive animals [9, 10] allows us to go beyond the bounds of basic science [11, 12] in these observations and to approach the possibility of practical application of the knowledge obtained in our studies [13, 14]. Currently, special importance is given to the results of non-pharmacological effects on the body and especially the action of physical exertion [15, 16, 17]. They are considered a serious, tonic and healthy factor [18, 19]. In this regard, of great interest is the study of various aspects of the influence of physical training on various organs and body systems. In view of the huge integrating role of the nervous system in the body, changes in it against the background of regular muscle loads are of great interest.

Considering the above, the goal is set in the work: to consider the effect of regular physical exertion on the functional characteristics of the brain.

During physical exertion in the body, a large number of conditioned reflex connections between the cerebral cortex, the motor apparatus and the nerve centers arise and strengthen. From the muscles and internal organs, impulses enter the brain, new neural connections and new conditioned reflexes are formed. All parts of the nervous system are involved in this process: central, peripheral, and vegetative [20].

As a result of physical culture and sports, the work of the central nervous system improves. This is due to the activation of blood circulation and an increase in the supply of oxygen to the brain [21].

During sports training, the athlete gradually processes each new movement, making it more perfect. During each workout in the central nervous system, new synapses are formed between the neurons that control the workings of the muscles and realize the movements. At first, these movements are awkward, clumsy, since new conditioned-reflex connections have not yet been formed. As the number of workouts increases, they become more rational and accurate. When the connections are fully formed, and the conditioned reflexes are fixed, the new movement is carried out easily, at ease, almost automatically, without requiring the special attention of the athlete [22].

Under the influence of properly constructed sports training, it is possible to improve the adaptive-trophic effects of the nervous system, which helps to ensure a more active functioning of organs and systems, which contributes to an increase in the functional capabilities of the whole organism [23]. With rational sports activities, the latent period of the motor response is gradually shortened, the differentiation of movements improves, and the lability of the neuromuscular apparatus increases. At the same time, excessive loads, on the contrary, can significantly worsen these indicators, reducing the excitability of the central nervous system [24]. A higher functional mobility of the nervous system is observed in sprinters, sporting players, fencers, that is, in representatives of those sports that require both a fast pace of movement and precise differentiation of stimuli. Lower functional mobility of the nervous system is registered in weightlifters. These features of the functioning of the central nervous system are associated with the specifics of training in the chosen sport and with the features of sports selection, conducted already in the early stages of training athletes [25].

The activity of the analyzers is significantly improved by the athletes. Thus, it is possible to note an improvement in their functions of the organ of vision: an extension of the field of vision (especially in sporgetics), some improvement in visual acuity (mainly in those engaged in cyclic and team sports) and coordination of eye movement [26].

In sports, the activity of the vestibular analyzer is also significantly improved. Its excitability decreases, accuracy of reproduction of movements and their coordination improves. For training the vestibular analyzer, rotation in the Barani chair (passive training) and various gymnastic exercises (active training) can be used, which give a greater effect than passive rotation [27].

A significant role in sports belongs to the auditory analyzer. If training is conducted with musical accompaniment, it can have a beneficial effect on the heart rate, respiratory rate and mood of the athlete. Strong sound effects observed, for example, when training motorcycle racer, can have a negative impact on

the body (reduce performance, lead to headaches). In addition, motorcycle racer engaged in water-motor sports and shooters experienced a decrease in hearing acuity (perception of high frequencies - up to 10,000 Hz and low - up to 125-250 Hz) and the appearance of tinnitus. A typical disease in shooters is neuritis of the auditory nerve arising from hearing injuries. Moreover, arrows from a pistol often lose their hearing on the right ear, and those engaged in trap shooting and rifle arrows on the left ear [28].

There are features of the functioning of the nervous system in athletes of different ages, gender, athletic qualifications and work experience. Thus, young athletes have a higher tone and greater excitability of the sympathetic section of the autonomic nervous system, as evidenced by the large values of the pulse rate at rest and when performing, for example, an orthostatic test. The severity after working shifts in them is more noticeable than in adults, and therefore young athletes need more time to restore the functional state of the body after exercise [29].

In female athletes, compared with men, there is a relative predominance of sympathetic tone, which is manifested in a slightly higher pulse rate in their dormant state. Much more often athletes have no abdominal reflexes, which is associated with the peculiarities of the state of the anterior abdominal wall. The difference in muscle tone between men and women is small, but other tonometric indicators (tension and amplitude) are higher in men than in women [30, 31].

With increasing sports experience and the growth of sportsmanship, an increase in the percentage of athletes with low reflexes is observed, which is associated with the emergence of new functional relationships between higher motor and signal centers. With the growth of fitness, improvement of motor and vegetative functions is observed, the establishment of an optimal ratio between them. Moreover, changes in the activity of the autonomic nervous system are manifested in an increase in the prevalence of the tone of its parasympathetic division (manifested in a decrease in heart rate at rest after performing a standard load, in a relative increase in skin temperature) and in a faster recovery of vegetative functions after work and a decrease in the degree of heterochronism restoration of motor and vegetative functions [32, 33].

In the practice of sports medicine, the tendon reflexes of the biceps and triceps are frequently examined, as well as the carporadial periosteal reflex. On the lower limbs, knee and Achilles reflexes are evaluated. In addition, skin reflexes (abdominal and plantar reflexes) are often evaluated. Among the latter, corneal, conjunctival and pharyngeal reflexes are determined. Given the possibility of the presence of pathological hand and foot adductor reflexes [34].

When assessing the condition of athletes, they try to register the following changes of reflexes: decrease or loss (hypoilus areflexia) - when the reflex arc is damaged, and the reflexes are revived (with functional disorders) and increased (hyperreflexia) - if the pyramidal pathway is affected. Also in athletes, given the asymmetry of the reflexes (anisoreflexia), which allows to catch unilateral violation of motor functions [35]. In sports medicine, there have been cases when, after heavy physical exertion, the tendon (especially the knee) and skin (abdominal) reflexes of athletes were reduced and even temporarily disappeared.

CONCLUSION

As a result of physical exercises, the strength, balance and mobility of all nervous processes increase. Thanks to this, conditioned reflexes are formed more quickly and successfully. Most trained people belong to the strong and mobile type of the nervous system. Under the influence of physical exercises, they improve their nervous processes, which ensure that a person performs the necessary actions. A similar tuning of the organism is found in relation to the centers of the brain, which control the motor apparatus and the work of the internal organs that provide the performance of physical exercises.

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