Control and prevention of disturbances of the normal physiology of the muscle system of athletes

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Abstract

Objective of the study was to study the factors that provoke muscle pathologies during the period of intense loads of basic training in preparation for the main starts of the season.

Methods and structure of the study. A survey of 30 athletes under the age of 25 years was carried out using the methods of manual diagnostics, functional tests for lateroflexion (bends of the spine to the sides), as well as MRI examination of the state of the muscular corset of the spine.

Results and conclusions. Uncompensated pathologies of the tissues of the spine occur due to the development of spastic conditions of the intervertebral muscles. Spastic conditions of the muscles of the spine are caused by a violation of the state of the human neuromuscular apparatus due to malnutrition - excessive consumption of foods containing starch and sugar, white rice, with active elimination of vitamin B1 against the background of high loads. Pain syndromes in the spine can be prevented and/or stopped by normalizing the nutrition structure.

Keywords: *Muscle pathologies, nutrition, vitamins.*

Introduction. Muscular disorders in athletes (myalgia, myofascial pain syndromes, krepatura, etc.) are widely studied in sports science [1-3, 5]. In particular, it has been shown that intense physical loads of basic training, exceeding adaptive capabilities, have a significant impact on the psychophysical state of athletes, and are manifested by a complex of signs of overtraining, the gradations of which are presented in the works of N.I. Volkov (1999 and others) [4].

Nutrition has an extremely important influence on the functional manifestations of overtraining states, their control and prevention. Studies aimed at assessing the state of the functional systems of the body of athletes, in connection with the structure of nutrition during the period of intensification of loads at the base camps in preparation for the main starts of the season, are not enough, and they are mainly aimed at pathological manifestations in relation to working capacity and energy productivity.

The lack of a generally accepted approach to long-term prevention of disorders in the state of the muscular system of the spine hinders the development and implementation of a scientifically based training program, and real prevention of injury to the muscular system and tissues of the spine, which in acute cases leads to interruption of the training process for long-term rehabilitation.

This provision is especially relevant in relation to youths and juniors. In particular, in water polo, typological athletes are those whose height is 190-200 cm, and their weight is 78-85 kg. Of course, such height-weight characteristics cause significant stress on the muscular system of the musculoskeletal system in general and the spine in particular.

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sented are less relevant to the period of pre-competitive "narrowing".

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Results of the study and their discussion. As a result of staged surveys of national teams within the framework of the work of complex scientific groups, athletes are identified with an unpredictable decrease in the productivity of competitive activity, a high level of psychophysical tension, the causes of which, in relation to the research topic, are factorized in the form of: sleep disturbances (especially important during periods of intense exercise); discomfort in the muscular system, primarily the spine. It has been shown (Egorov G.E., 1983; and others) that pain in the back and spine occurs in athletes of different qualifications. It was found that more than 50% of athletes have pain syndromes in the spine and impaired mobility of the spinal segments detected in test procedures.

In many examined patients, back pain manifests itself only with manual diagnosis. In the majority of examined individuals who had pain in the spine, areas with reduced mobility or complete immobility of individual segments of the spine were found. Next to the data, as a rule, there were areas with hypermobility of the vertebrae, which created compensation for immobile segments, and a misleading picture of the flexibility of the entire spine.

We carried out an age analysis of the stages of development of dystrophic manifestations in the spine from 17 to 60 years. It was revealed that spastic states of intervertebral muscles are the primary process. Spasmodic muscles cause disturbances in the blood circulation of the vertebrae. As a result, over the course of several years, a decrease in the thickness of the intervertebral muscles, the appearance of osteophytes (outgrowths from the vertebral body) that injure muscles, osteoporosis of the vertebrae, leading to compression fractures of the vertebrae during high physical exertion, develop.

The next stage is the degeneration of the muscles of the spine and fibrosis of the muscles. Muscles lose their ability to contract and provide mobility to the spine. The back becomes "stony", and this leads to the irreversibility of dystrophic changes in the spine. In addition, compression of the sympathetic nerves emerging from the intervertebral foramina leads to chronic gastrointestinal diseases and cardiac dysfunction [6].

In the medical diagnosis, there is no analysis of the state of the muscles of the spine. In areas of the spine with discs affected by pathological changes, intervertebral muscles streaked with light thin stripes are visible behind the spinal canal. These are fatty layers between bundles of muscle fibers. Their presence is a sign of the inactivity of these muscles or the loss of their contractility.

In areas of the spine with good discs, the intervertebral muscles do not have fatty layers, and their structure has a darker texture than normal muscles. This is a sign of high muscle activity, muscle inflammation or swelling. It is in this area that the patient experiences pain, and not where there is "osteochondrosis" or disc herniation.

In most of the persons examined by us, who had pain in the spine, areas with reduced mobility or complete immobility of the spinal segments were found. Next to them, as a rule, there were areas with hypermobility of the vertebrae, which created a misleading picture of the flexibility of the entire spine. These disorders were caused by spastic conditions of the intervertebral muscles (Cherkasov A.D., 2009, 2012, etc.). Long-term spastic conditions of the spinal muscles lead to the development of dystrophic manifestations in the bone and cartilage tissue - osteochondrosis, disc herniation and compression fractures [8, 9].

The causes of pain in the back and spine are still the subject of debate. The causes and mechanisms of the occurrence of spastic conditions in the muscles are practically not studied. We have a number of observations of some sports veterans. Long-term observations show that physical or stress overloads are only provocateurs of spasticity, and the main cause of spastic conditions is a change in the ionic composition in the muscles and their energy supply. Here it is worth recalling the currently forgotten

beriberi disease, analyzed in the works of Zaborova and other authors [7].

According to our observations, and data from literary sources, in the European population of Russia, there is currently an increased consumption of starch, sugar, and white rice. A high consumption of white rice was also found in the base crops. With high physical exertion, there is also a lack of vitamin B1. This leads to muscle spasm, and is nothing more than a benign Western version of beriberi, rice disease.

Pain syndromes disappear two weeks after refusing to eat flour, sweet, white rice, and a course of vitamin B1.

However, for the muscular system of the spine, this is necessary, but not enough. Regular massage of the deep muscles of the spine is necessary, using "vacuum" techniques, which eliminates the spastic conditions of the muscles.

Without pretending to cover all aspects of nutrition, we propose our own approach to the content of some components of the nutrition structure of athletes during the period of basic loads of centralized preparation for the main starts of the season in order to long-term prevention and rehabilitation of injuries and disorders of the normal physiology of the spinal muscular system.

To preserve the health of athletes and prevent the breakdown of adaptation during the period of intense loads at the base training camp in preparation for the main starts of the season, the following measures are necessary:

• Regular diagnostics of the state of the muscular corset of the spine using manual diagnostics and functional tests for lateroflexion of the segments of the spine and identification of areas with reduced mobility of the segments, as well as areas with a painful condition of the muscles.

• Introduction to the medical diagnosis of an in-depth medical examination section: "Analysis of the condition of the muscles of the spine." At least, the introduction of this section in the list of surveys of complex scientific groups by sports.

• Limiting the consumption of foods containing high concentrations of starch (pasta, white bread, etc.) and sugar, as well as the complete replacement of white polished rice with brown. Additional consumption of foods containing vitamin B1, as well as complexes of vitamins of group B. The use of "Buffet" nutrition technologies, when athletes themselves choose a side dish, instead of a fixed serving of dishes, reduces the consumption of white rice.

• Embedding rehabilitation exercises for the muscles of the spine in the structure of the warm-up before training, and strength training.

• If spastic conditions of the spinal muscles are detected, massage the deep muscles of the spine using special "vacuum" methods. The usual back massage performed by the team's full-time masseurs must be supplemented with special techniques.

Conclusions. The most important factor in maintaining the health of athletes and ensuring stable adaptation to high loads of basic training is the prevention of spastic conditions of the muscular system of the spine. Uncompensated pathologies of the tissues of the spine occur due to the development of spastic conditions of the intervertebral muscles. Spastic conditions of the muscles of the spine are caused by a violation of the state of the human neuromuscular apparatus due to malnutrition - excessive consumption of foods containing starch and sugar, white rice, with active elimination of vitamin B1 against the background of high loads. Pain syndromes in the spine can be prevented and/or stopped by normalizing the nutrition structure.

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