Forming New Preventive Approaches in Sports Medicine

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Abstract

Sports training, physical education and health and fitness work is a process in the first the turn is socio-pedagogical, which determines the leading role of the trainer and teacher in it. However, the object of this process is a person with all the complexity of his psyche, body functions and relationships with the environment. Due to this the effectiveness of the process largely depends on the correspondence of the means and methods used to the state health, functionality, age and individual characteristics of each person. In modern conditions, when the health of the population, first of all, the younger generation, has significantly deteriorated, this is of particular importance.

KEY WORDS: vitamin; sports nutrition; lumbago; lumbodynia; blood flow

Introduction

Based on the theoretical biomedical disciplines of the curriculum, sports medicine belongs to the number of applied disciplines directly aimed at the professional training of a future specialist. The practical section of sports medicine is medical support for physical education and sports. At the end of the study of the course of sports medicine, students of higher educational institutions of a physical culture profile should know: the main tasks of sports medicine; organization of medical support for various contingents of people involved in physical culture and sports; tasks and content of the dispensary observing athletes; fundamentals of general pathology (the concept of health and disease, constitution, nonspecific reactivity, immunity, allergies, etc.), diagnostic capabilities of the main clinical and paraclinical examination methods, etc.

The article will highlight some special aspects about the structure of the morbidity of athletes. Among various diseases and pathological conditions in athletes, chronic inflammatory and degenerative diseases of the musculoskeletal system are most often found. Trauma also mainly affects the musculoskeletal system. The specificity of the type of motor activity and the external environment in which this activity is carried out has a very great influence on the manifestations of pathology in athletes. Chronic diseases of the musculoskeletal system are relatively rare in swimmers and are much more common in representatives of speed-power sports and martial arts. Diseases of the peripheral nervous systems are more common than among representatives of other sports specializations, found among jumpers, throwers, hurdlers, weightlifters, wrestlers and football players. The largest number of diseases in otolaryngology is recorded among those engaged in shooting, water and winter sports. In this case, the shooters are dominated by pathology.

At the same time, in the shooters, hearing pathology (neuritis of the auditory nerve) dominates, and in swimmers and skiers – diseases of the pharynx, nasal cavity and its paranasal sinuses.

The percentage of athletes with myocardial dystrophy due to chronic physical overstrain, as well as overstrain syndromes of the digestive and urinary systems, is the highest in sports aimed at the predominant development of endurance. True sports anemia tends to be seen in long-distance and extra-long-distance runners (primarily female runners). High blood pressure very common among weightlifters, and reduced – among gymnasts. As we can see, the problem is global and urgent. It is necessary to investigate the diseases that are most common in the clinical practice of sports medicine. Among diseases of the central and peripheral nervous system in the clinical practice of sports medicine the most common: neurocirculatory dystonia

and neurological complications of spinal osteochondrosis. Neurocirculatory (autonomic) dystonia includes conditions caused by a violation of the central and autonomic regulation of the activity of organs and systems. It is most often caused by acute or chronic stress and emotional stress. Anxiety, fear, depression provoke an increase in the activity of sympathetic or parasympathetic nervous system, which is manifested by functional changes in the cardiovascular, respiratory and other systems. Characterized by palpitations, pain in the heart, tachycardia or bradycardia, blood pressure lability, facial flushing, sweating, feeling short of breath, abdominal pain, a feeling of bloating, frequent and profuse urination or other symptoms in the absence of objective signs of damage to the cardiovascular, respiratory, digestive and genitourinary systems (or if there are changes in these systems, but not corresponding to the patient's complaints). Emotional disorders, asthenia, sleep disturbances, and the connection of somatic complaints with an emotional state are often noted. Neurological complications of spinal osteochondrosis are more often manifested by lumbar reflex syndromes: lumbago; lumbodynia; lumboischialgia. Here it is necessary to clarify that the literature describes the differences between the terms. Lumbago is a sharp, shooting pain in the lower back that usually develops with exertion. Examination reveals tension in the muscles of the back, usually scoliotic deformity of the spine, flattening of the lumbar lordosis, or kyphosis. Lumbodynia develops after physical exertion, awkward movement, or hypothermia. Examination reveals soreness, tension in the muscles of the back, limitation of the mobility of the spine [1, 2, 3, 4, 5].

Lumbaischialgia is characterized by a gradual or acute onset. Associated with trauma, tension, jumping, awkward turning, cooling. Has a typical localization: from the lumbosacral or the gluteal region, along the back of the thigh and further along the sciatic and (or) femoral nerve. The classic pain syndrome characteristic of lumbaischialgia, is Lassegh's syndrome. Besides noted: ankylosing spondylitis, Nari, Minor's syndrome. Femoral nerve damage can be due to the pathology of its roots, lumbar plexus and nerve trunk, pain points are determined at the level of the upper lumbar vertebrae, under the pupar ligament (outward from the femoral artery), on the inner surface of the knee joint and behind the inner condyle of the foot. Changes in the configuration of the spine are observed in the form of kyphosis or mild scoliosis. The pain is localized in the groin fold, along the front of the thigh, in the knee, sometimes extending to the inner surface of the thigh. Lassegh's symptom is usually absent. Nari's symptom is always positive. Wasserman's symptom is specific: in a patient lying on his stomach or on his side, when raising the hip, pain occurs in the groin region and along the front of the thigh. At palpation, as well as squeezing the skin and muscles with the fingers, muscle and skin pain occurs along the front of the thigh. At the cervical level may occur reflex syndromes – cervicalgia and cervicobrachialgia, which often develop after physical exertion or awkward movement in the cervical spine. Cediculopathies of

the lower cervical roots are much less common than reflex syndromes, and, in addition to muscular-tonic syndrome, manifest themselves as sensitive, reflex and (or) motor disorders in the innervation zone of the affected root. For the prevention of these and other diseases of athletes, one of the main methods is the appointment of vitamins and special diets to athletes. Features of the use of drugs belonging to the group of vitamins in the practice of sports medicine. The group of vitamins directly includes vitamins and their analogs, multivitamin preparations, complex preparations of vitamins with macro – and microelements, antianemic factors, phospholipids and unsaturated fatty acids, as well as coenzyme preparations. The aim of our study was to study the effect of vitamin preparations on the blood of athletes with various pathologies by evaluating rheological tests in the in vivo system.

Material and Methods

All studies were performed in vitro. Each athlete knew that his blood sample taken from him would be used to test of effect vitamin on his blood flow.

The following subgroups were created: blood samples from athletes with lumbago (n=5); blood samples from athletes with lumbodynia (n=5); blood samples from athletes with lumboischialgia (n=5).

In turn, multivitamins were added to the samples separately. Medicines were manufactured in France, but since the study is only scientific in nature, to avoid advertising, we do not publish the name of the drugs. After experimental studies, we prepared clinical studied. We gave the same drugs, but separately gave several athletes with undifferentiated diagnoses. All athletes have given specific informed consent in accordance with French law and in accordance with the recommendations of the European Council for Scientific Biomedical Research.

Evaluation of the RBC deformability index was performed with an aid of the nucleophore membrane filter method, which is based on assessing velocity of the erythrocytes passage through the very small pores (5μm, which is a diameter of the smallest capillary) of the filter, at constant pressure (10 cm of water column) and temperature (37°C). Obtaining the pure erythrocytes were performed by centrifuging the blood sample at 3000 tourn over/m for 15 min. Resulting plasma was aspirated with micropipette and the remaining blood cells were added with bovine serum albumin (0.2 mg per 5 ml) dissolved in the phosphate buffer. Then the blood was centrifuged second time at tourn over/m for 15 min. The precipitated erythrocytes, as well as thin layer of leukocytes and

thrombocytes, separated with the help of the phosphate buffer. This procedure was repeated three times. Purified erythrocyte mass was diluted in the phosphate buffer, with hematocrit of 10%. Evaluation of the deformability index implied measuring a velocity of the erythrocyte passage through the filter (mm/min) was recorded. The high-quality polycarbonate filters (with 5μm diameter pores) were used in measuring procedures. Blood plasma viscosity was examined in the capillary viscometer at 37°C, where the movement of plasma in the capillaries is induced by the force of gravity [6].

For in in vitro studies, we use tested biorheological markers according to the Mchedlishvili-Mantskava-Momtselidze method [7, 8, 9]. We did statistical analysis using MS Excel and Statistica.

Results

In all subgroups, the blood flow test was better after the addition of in vitro vitamins. Also, after taking large doses of the studied vitamin against the background of standard treatment, the health of all athletes improved.

Discussion

Vitamins are biologically active low molecular weight organic compounds necessary for the normal functioning of all living systems. These vital substances are not synthesized in the human body (with the exception of vitamin D, which can be synthesized in the skin) and must be supplied with food. Distinguish between water-soluble and fat-soluble vitamins. The former includes vitamins of group B, vitamins C, H and P, and the latter – vitamins A, D, E and K. Water-soluble vitamins do not accumulate in body tissues (with the exception of vitamin B12) and must be consumed daily. Fat-soluble vitamins can accumulate in tissues, and vitamins A and D exhibit toxic properties in case of overdose. The daily requirement for vitamins depends on the gender, age of the athlete, the type of sport, and the period of training. The question of the quantitative content of certain vitamins in the diet of athletes currently remains controversial. However, most researchers note that intense training and competitive loads, causing

tension in metabolic processes, cause an increased need for an athlete's body in many vitamins (B1, B2, B6, PP, C, etc.). This is explained by the increased use of vitamins (especially of group B) and their derivatives in the biosynthesis of enzymes involved in key biochemical reactions associated with the oxidation of nutrients and the formation of energy. An increase in the need for antioxidant vitamins (A, E, C) is associated with their increased consumption for inhibition of lipid peroxidation processes, which are significantly activated under high psychophysical stress. Thanks to antioxidant vitamins, the structural and functional integrity of cell and subcellular membranes is maintained, damage to muscle tissue cells by toxic lipid peroxidation products is significantly reduced, and the course of recovery processes in muscles after physical work is improved. With prolonged work in aerobic mode, the need for vitamins of group B and C increases significantly [11, 12, 13]. With short-term work of maximum power, when energy production is carried out mainly in anaerobic reactions, the need for vitamin PP increases. When exercising to build muscle, the body needs more vitamin B12, which plays an important role in amino acid metabolism and is required for the formation of red blood cells that transport oxygen to muscle cells. An abrupt change in climatic zones leads to an increase in the need for vitamins (especially C, P, B1). The excretion of vitamins and their metabolites with urine and sweat, increased under conditions of high psychophysical stress, is also essential.

Conclusion

Vitamins for athletes are necessary to increase the productivity of training, support high performance, in order to recover from strength loads, but they are even more necessary in case of illness. Biologically active mineral components are involved in all biochemical reactions and the appearance of new cells. The range of sports nutrition offers a varied selection of dietary supplements and vitamin and mineral complexes. An essential ingredient for maintaining strength Vitamin C has been scientifically proven to relieve muscle soreness. This makes it possible to train prepared and recovered. Tocopherol is considered to be the strongest antioxidant. It eliminates muscle pain, neutralizes damage that has appeared due to power loads. Vitamin E helps to relieve joint pain. Therefore, vitamins C and E limit oxidative damage. B vitamins are necessary for the functioning of the nervous system of the body. With a small amount of pantothenic acid in the body, an increase in joint pain is observed. Folic acid, pyridoxine and cyanocobalamin reduce the likelihood of heart and vascular disease. All of these

ingredients are included in our multivitamin. Calcium and phosphorus are involved in many biochemical processes that take place in connective tissue. Calcium is absorbed in conjunction with vitamin D. Zinc plays a huge role in the formation of connective tissue. With a deficiency of this mineral, a delay in the recovery processes of injured tissues is found, and the amount of synthesized collagen decreases. Copper has an anti-inflammatory effect that relieves joint pain. Potassium and magnesium are essential for maintaining heart function. The usefulness of these substances in participating in the conduct of the heart impulse, the regulation of metabolism, which takes place in the heart muscle. Vitamins for active sports should contain an increased dose of potassium and magnesium, due to the rapid depletion of these minerals after intense training. Multivitamins for sports, which contain vital biologically active ingredients that help in the fight against muscle pain and injury, prevent damage to joints, muscles, ligaments, tendons. In conclusion, it must be said that based on our data, we can conclude that the investigated multivitamin has a positive and effective effect on blood flow, the ordering of which is necessary in diseases such as lumbago; lumbodynia; lumbar to avoid microcirculatory catastrophe, which leads to strokes of athletes.

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