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BIOCHEMICAL BASIS OF NUTRITION DURING EXERCISESVARIOUS SPORTS

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Annotation
The goal is to provide sufficient information about the nutrition of athletes, the difference between the nutrition of people who train and those who are not engaged in physical labor. The difference in the nutrition of athletes lies in the increased energy consumption, and, accordingly, the high consumption rates of proteins, fats, carbohydrates and vitamins, as well as their different ratios at different stages of training. Each sport has its own characteristics, taking into account which recommendations are given in nutrition and the diet is adjusted accordingly.

Keywords: nutrition of athletes; energy costs; long distance running; swimming; skating; skiing.

Food is an essential part of human life. A properly selected diet is the key to normal growth and development of the body, high working capacity, and an obstacle to the development of diseases.

The nutrition of athletes has some differences from the nutrition of people who are not engaged in physical activity. First of all, this is due to the high and very intense energy consumption of athletes, depending on the types of sports, they range from 4000 to 7000 kcal per day. Comparing the intensity of energy consumption, the following data are given: a worker engaged in physical labor consumes 0.03-0.05 kcal / h for 8 hours, a marathon runner while running - 0.3 kcal / h, a sprinter - 3 kcal / h. When performing physical activity, the anaerobic method of obtaining energy is activated (lactic acid is the end product), and during physical labor, the aerobic method (the end product is water). Thus, in order to provide the muscles with energy, it is necessary to consume a sufficient amount of carbohydrates, since it is they that can undergo anaerobic decay and release a sufficient amount of energy per unit of time. Also, the carbohydrate reserves of the body are quickly depleted when performing physical exertion, so it is necessary to consume carbohydrates during exercise. This practice is used by skiers, cyclists - eating during a marathon. Thus, the daily requirement for carbohydrates in athletes should be at least 700800 g per day. A distinction must be made between simple and complex carbohydrates. Simple

carbohydrates have a sweetish taste, are quickly and completely broken down in the body, briefly and significantly increasing the level of glucose in the blood, while not giving a feeling of fullness. Complex carbohydrates break down more slowly, increase blood glucose for a longer time, but less sharply, thereby bringing a feeling of satiety.[2] In this case, the glycemic index of products should also be taken into account. So foods with a high glycemic index are used after prolonged physical exertion to restore glycogen stores, and foods with an average are preferably taken during exercise.

In order to maximize the restoration of muscle glycogen after a workout or before a competition, it is advisable for an athlete to consume 7-10 g of carbohydrates per kilogram of body weight daily. A few hours before training / competition, it is recommended to consume 1-4 g of carbohydrates per kilogram of body weight. Also, after training, it is necessary to take carbohydrate-rich food within 2 hours, since the maximum rate of glycogen resynthesis lasts about two hours after the end of training. After 2 hours, the rate of resynthesis is reduced by half, due to a decrease in muscle sensitivity to insulin. At the same time, it has been proven that the use of glucose and sucrose is more effective for resynthesis than fructose, its efficiency is 50% lower [3].

In addition to the increased consumption of carbohydrates, during physical activity, the breakdown of proteins, especially muscle tissue, is actively taking place. Thus, an increased intake of amino acids from food is necessary. In athletes whose physical exercises are associated with endurance, the amount of protein should be 1.2-1.4 g per kilogram of body weight. 1.7-1.8 g per kilogram of body weight - in athletes associated with power sports. 2.4-2.8 g per kilogram of body weight - when doing power-speed sports. But at the same time, it is impossible that the diet contains an excess amount of protein. In the experiment, for 7 days, the athletes adhered to one - a high-protein diet, others - a high-carbohydrate one. A week later, a decrease in the efficiency of the group that consumed a high-protein diet was found. Also, when eating a large amount of protein,

the load on the kidneys increases, the risk of developing atherosclerosis increases, the loss of calcium and water increases - which are undesirable effects. So, with a protein content of more than 26% of the daily diet, a decrease in kidney function has been proven.

Fats are also essential for athletes. Their energy value is very high (142 ATP molecules, compared to 38 glucose), but their oxidation requires a very large amount of oxygen (26 oxygen molecules for fat oxidation and 6 molecules for glucose oxidation) [2]. When studying diets rich in fats, it should be noted that an increase in the amount of free fatty acids in the blood does not lead to an increase in working capacity, and a

short-term increase in free fatty acids even leads to a decrease in endurance. In addition, a diet high in fat increases the risk of developing many diseases. Therefore, athletes should not increase the amount of fat in their diet, their amount should not exceed 25% of the total diet [3].

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During exercise, metabolism is activated and the consumption of coenzymes in reactions aimed at obtaining energy is accelerated. This creates an increased need for vitamins in the body[2]. For every additional 1,000 calories, the need for vitamins increases by 33%. nutrition[3].

When playing sports, the excretion of minerals from the body in the composition of sweat increases, the content of calcium, phosphorus, magnesium and potassium decreases most significantly. There is also a risk of reduced blood iron in endurance athletes, as well as in female athletes, which is associated with their menstrual cycle. Therefore, it is necessary to take mineral water containing these trace elements,

multivitamin complexes, or special pharmaceuticals (asparkam, calcium glycerophosphate, iron glycerophosphate, etc.).

Of course, when doing any kind of sports, you must follow the regime. You should eat at least 5 times a day, despite the fact that the time of eating is consistent with the schedule of training or competition, you should, if possible, maintain the traditional distribution: breakfast, lunch, lunch, afternoon snack and dinner.

Also, the culinary processing of athletes' food is important.

Cooking should improve the digestibility of foods with minimal loss of nutrients. It is necessary to avoid cooking methods that significantly increase the fat content (frying in a large amount of oil, adding mayonnaise to food, various fatty sauces). Products should be consumed as natural as possible. Recommended processing methods: boiling, steaming, in the oven, on hot coals, on the grill, baking in foil. Roasted, breaded and dough-wrapped meats, stews should be consumed in moderation. You should limit the intake of spicy and irritating seasonings that increase appetite. They should be replaced with softer ones. Limited salt intake, about 6-8 g per day. Sugar and honey are acceptable as sweeteners in moderation (less than 10% of daily energy value). For salads or cooking, you need to use vegetable oils (without heat treatment). It is useful to use lemon as an oil substitute to reduce energy costs. Preference should be given not to cold, but to heated dishes, as they saturate better [3].

During training, you should adhere to the following basic rules: food should be as varied as possible. Whenever possible, eat natural and fresh food, even raw. Fast food should be avoided (due to high fat content and insufficient nutrient value). A significant part of the diet should be foods rich in carbohydrates: cereals: rice, dough products, cookies, muesli, confectionery; fresh fruits, fruit compote, jam or marmalade, syrups; fresh and dry legumes, potatoes; sweet dairy products; o sugary drinks and energy drinks. Unpeeled fruits, complex foods (such as whole grains) need to be eaten more often to introduce more nutrients. Do not use foods with a lot of fiber, very fatty, very hot, and those that require a long chewing. Drinking regimen: liquid is taken before exercise, during exercise and after it; you need to use energy drinks (with fast sugars and minerals); be sure to drink between meals; o in warm climates and during the warm season, fluid intake increases due to increased sweating.

Features of nutrition when running long distances.

The main feature of long-distance running is high energy consumption. Thus, if the costs are not compensated, then the performance will decrease, and consequently the result of the athlete. The recommended percentage of the diet: 70% carbohydrates, 15% proteins and 15% fats [1, p.98]. Such a large amount of carbohydrates is necessary

to replenish glycogen stores after training / competition. There is also evidence of an increase in speed in the last 5 kilometers when eating a high-carbohydrate diet. An important feature of this sport is the large loss of water due to increased sweating. In this regard, athletes are recommended to drink 5 ml of warm water per kilogram of body weight before training, during the first hour of training 100 ml of a cold glucose polymer solution, after an hour and a half of training, the same solution is taken, but with the addition of electrolytes to it[1, p.100]

Features of nutrition in swimming lessons.

A feature of swimming is the duration of training (often about 3-4 hours) and the combination of various types of exercises (on land, in water, strength training, endurance training, etc.). In accordance with this, the energy consumption of men for one workout for 4 hours is about 5000 kcal, women about 4000 kcal. In connection with such high energy costs, it is necessary to increase the intake of carbohydrates - the norm is 600 g per day, the increased intake of proteins - the norm is 1.5-2 g per kilogram of body weight per day. In addition to nutrition, there should be a proper correction of the workload of training days - the alternation of a day with a high-intensity load with a day with a low-intensity one [1, p. 103] Features of nutrition in speed skating.

Speed skating is characterized by the following features:

different duration of the load from sprint to marathon. The duration of the races can reach 18 hours, while the aerobic load is increased accordingly, and the power load, the load on endurance, and speed abilities are combined. Since training takes place all year round, and there is not always an indoor ice rink, you should adhere to the following diet: carbohydrates at least 60% of the daily diet, before training 100 g of carbohydrates, 1.6 g of protein per 1 kg of body weight daily - to maintain muscle masses. Between competitions, it is necessary to take a light carbohydrate meal and a large amount of liquid is required [1, p. 108-109].

Peculiarities of nutrition during skiing.

Cross-country skiing is characterized by a high load on the cardiovascular system, and a strong depletion of glycogen stores. Calorie consumption per workout reaches 6000 kcal, which is very energy-intensive. In accordance with this, meals should be three times a day and include light snacks between workouts (lunch, afternoon snack). Food should be high in carbohydrates, and be sure to contain a large amount of liquid (up to 8 liters per day), because despite the cold

season, athletes have increased sweating [1, p. 110] Features of nutrition during gymnastics.

Gymnastics - traditionally speaking about this sport, thin, short athletes are presented. It is in this that the greatest problem of nutrition in this sport is hidden. Since, in order to achieve the desired figure, athletes do not follow a diet that compensates for energy costs, they reduce the amount of food consumed, the level of basal metabolism decreases [1, p. 120]. All this in adolescence leads to anemia and amenorrhea, and the risk of osteoporosis due to insufficient calcium intake also increases. Thus, the diet should contain 60-65% carbohydrates, 15% proteins, 20-25% fats. Meals should be frequent and fractional. During the competition, it is recommended to consume 150-200 g of sports drinks containing carbohydrates [1, p. 122]

The relationship between physical activity and nutrition is very clearly seen both in general principles and in particular examples of sports, so it is necessary to adhere to both the fundamental aspects of rational nutrition and choose some features of each individual sport in order to maintain normal health of athletes and therefore achieve better results.

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