

## Research Article

### Study on the Reasonable Dietary Supplement during the Period of Competition

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**Abstract:** In this study, by means of stating the theoretical basis for the nutritional supplement before the competition, during the game and after the competition, it discusses the dietary designing strategy for the athletes during the competition, so as to provide scientific guide for improving athlete's performance. The dietary structure of the players during the period of competition can directly influence the final results.

**Keywords:** Dietary structure, nutritional supplement, sports competition

#### INTRODUCTION

There are higher and higher requirements on the athletic competition such as the athletes' physical fitness, the energy mobilization, muscle strength and nerve reflexion and other aspects, thus there is a small gap between success and failure. Sports performance has been more and more close to the limit of human ability, in order to create a new good achievement, athletes must be engaged in training more than the limit, without nutrients as the strong base, it could not reach the expected goal. The reasonable nutrition supplement for athletes can be conducive to fully play the effect of training of athletes and show the athletic ability, at the same time, it can help body to have a fast recovery and adapt themselves (Van Hall *et al.*, 2000). Especially during the period of competition, using nutritional supplements rightly can eliminate the sports fatigue and improve exercise capacity, preventing the disorders and diseases that are caused by exercises.

#### MATERIALS AND METHODS

When the competition is coming, the physiological changes of the athletes have some differences.

**The theoretical basis of nutritional supplement before sports competitions:** The physiological characteristics of this period are as follows: the cerebral cortex is in a highly excited state, the nerves are with high tension, the nervous systems can have large energy consumption, the digestive function of stomach is significantly impaired, which often expressed as athletes had poor appetite, loving or preferring the dietary habits. Before the competition, athletes must maintain and improve special athletic ability as well as the ratio of the optimal weight and fitness. Therefore, the main task of diet and nutrition supplement is to

ensure that the diet habits and system unchanged, based on this, adding the appropriate essential nutrients.

The basic nutritional principle before competition is: do not eat new food a week before the competition, actively adapt himself to the dietary system of the local place, eat less food with more times, eat foods that are easily to be digested, appropriately add water and inorganic salt (Jentjens *et al.*, 2001). In addition, the nutrition before the competition must be reflected in the quality of diet. If you are taking part in running and jumping games, due to the lack of oxygen, the muscle energy metabolism mainly reaction in the metabolism of sugar, sugar is to serve as a source of energy. In the circumstances of the same oxygen consumption, the energy provided by sugar is more than the energy provide by fat, which must consider the supply of foods with low fat and high sugar to the organisms, so as to increase the storage of muscle glycogen, promoting muscle strength as well as the athletic performance (Van Loon *et al.*, 2000).

In order to meet the needs of metabolism, it must increase the amount of fat, so as to prevent the blood glucose from being decreased. In addition to the appropriate heat energy, it should pay attention to nutritional balance and it should contain a variety of diet structure such as organic salt, rich Vitamin before the competition, but at the same time, it must prevent the excessive supplement. In addition, before the competition, trying to avoid eating much cellulose which is easy to produce gas, avoiding eating a certain amount of stimulation food, spicy food, salty good, raw vegetables and chives. The dietary protein supply before competition should not be too much, considering the acidic substances produced by protein metabolism, which can make the body produce acid fluid and unhelpful to the competition, therefore, it is necessary to master and understand the digesting time of the main nutrients according to the characteristics of each items in track and field, so as to have moderate intake of

energy. For example, the digesting time for meat food is about 3 h, while the digesting time for fish, eggs is about 2 h, the digesting time for milk, bread, rice, noodles is about 1-2 h, while the digesting time for fruits and vegetables is about 2 h and so on (Burke *et al.*, 1996).

**The theoretical basis for nutritional supplement during the period of sports competition:** With the continuous development of power, speed of the athletes in the competitions, if the athletes want to obtain better results in the competition, they must have good physical fitness, so as to ensure the adequate energy supply to complete all the actions. The energy supply in the competition can be simply summarized in Table 1.

As we can see from Table 1, in the system of athletic competition, the energy supply system belongs to the Region I, Region II and Region IV, the competition of athletes is a high intensity exercise, the exercising time is short, the heart rate after exercising can be up to 200/min immediately. The body must use high efficient energy supply system in a short time. Therefore, the main source of energy is phosphagen energy supply system. When the time of exercising reached to 60~90 sec, the exercise with high intensity, the accumulation of lactic acid is increased, the source of energy is from the phosphagen and glycolysis and lactic acid energy supply system. Because phosphagen system can maintain high powerful activities not exceeding 8 sec, after consumption, in 20~30 sec, it can synthesize only half, after 2~3 min, synthesis in half, it can achieve full recovery, while the time for providing energy by glycolytic system is about 33 sec. In the entire competition, the phosphagen system cannot have enough time to fully recover after providing the energy in each period.

During the competition period, properly providing the nutrients to the athletes that have been consumed is very necessary. Such as: the long distance running, steeplechase running, decathlon items, because the long time strenuous exercise can lead to the loss of the body water, minerals and glycogen storage of the body can be consumed with a great deal of sweat (Janero, 1991). It is very necessary to replenish water, sugar, minerals. During the period of having nutritional supplement, it needs to observe to make sure whether the players excreted water a lot or the energy consumption is a lot, so as to determine the first replenishment is water or sugar, as for the nutritional problems during the competition, the priority is to consider what kind of nutrition is lost with the most rapid speed, then giving priority to have the corresponding supplement.

**The theoretical basis of nutritional supplement after the sports competition:** The most important nutrition supplement after competition is to have supplement for body fluid and loss of sugar as soon as possible. Within 10 min after the end of the competition, the athletes should drink a cup of sugary drinks. The first meal after

Table 1: Energy supply of athletes

The functional system	Exercise intensity area	Time of exercises
Phosphagen system	I	<45 sec
Phosphagen and glycolytic system	II	45 sec-2.0 min
Glycolysis and aerobic oxidation system	III	2.0-3.5 min
Aerobic oxidation system	IV	>3.5 min

Table 2: The classification of carbohydrate

Classification	Subgroup	Composition
Sugar	Monosaccharide	Glucose Galactose Fructose
	Disaccharide	Sucrose Lactose Malt sugar
Oligosaccharides	Sugar alcohol	Sorbitol
	Isomaltose fructooligosaccharides	Malt dextrin
Polysaccharide	Starch	Amylopectin Modified starch
	Non-starch polysaccharides	Cellulose Pectin

the competition (or training) should be within 1.5 to 2 h after the end of the competition to eat. Foods should be rich in sugar, protein, vitamins and minerals. The fruit juice is very useful to add the missing body fluids and minerals.

## RESULTS AND DISCUSSION

Athletes will reduce the amount of exercising differently before the competition. From the practical point of view, it is better to end the last great intensity training in the three days before a very important sports competition and then transferring to the general level of training. Therefore, the amount of heat supply in the diet of athletes should be changed with the amount of training. If the energy intake cannot be reduced appropriately, it will increase the body weight and body fat, while the excessive body weight and body fat are the factors to limit the speed, strength and endurance. In order to meet the heat and fluid balance, at the same time, the weight and the volume of food should be smaller, which can be easier to digest and absorb. In principle, foods should be with high carbohydrate and low fat, a small amount of protein with plenty of water, which are rich in inorganic salt and Vitamins (Table 2).

In order to improve diet quality, the foods that players like to eat should be cooked with good flavor, balanced nutrition, dietary diversification as far as possible, which should meet the physiological requirements as well as the psychological need. It should avoid excessive high protein or fat food before competition, because the metabolites of protein and fat can produce the body acidic, so that the fatigue can be occurred in advance. Thus, people can adopt the sodium bicarbonate, sodium citrate, potassium citrate or basic drugs as the measures to increase the basic reserve, these methods have not be prohibited yet by the

International Olympic Committee. But with the load of the base, the urine alkali salt can reduce the degree of urine acidity, which can interfere with the doping test, thus, athletes may be disqualified. While some athletes, after taking large doses of alkaline salt an hour or so, they can appear gastrointestinal discomfort and diarrhea and other symptoms, moreover, the excessive alkaline salt can cause severe alkali poisoning and disturb the function of nerves.

The athletes's diet during the period of competition should avoid food with high fat, beans foods contained with more fibers, coarse and leek, which are so easy to produce the gas or delay the gastric emptying time, athletes should also decrease the food with too much sugar, or spicy food to prevent the adverse stimulation to the gastrointestinal tract. During the period of early competition, the excessive Vitamin supplement has no beneficial effect on human exercising ability. If the body does need Vitamins, then Vitamin is good for health and functional status. Vitamin B1 must be phosphorylated in vivo can it play its role, therefore, it needs to start the supplement ten days before the competition. The daily dose should be 5-10 mg. While, if Vitamin A supplement is too much, it can cause poisoning, the daily dose should be 5000 or 10000 IU. The requirement for Vitamin C before competition should be 200 mg daily.

### **CONCLUSION**

As for the athletes, during the period of competition and training, nutrition should meet the balanced needs of energy and fluid. Paying attention to the reasonable nutrition supplement with scientific

training, which can have significant meaning for athletes to improve the athlete's performance as well as the technical and tactical level, improving athletic performance, preventing sports injury as well as prolonging the sports life expectancy during the period of competition.

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