



Research Article

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Research on athletes' nutrition supplement during tennis aerobic athletic ability competition

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ABSTRACT

A reasonable nutrition supplement can improve physical fitness and sports performance of tennis players. Tennis is a typical aerobic endurance sport. According to the judgment of energy metabolism, organism state of tennis and the features of energy supply system in tennis competition, this paper offers a series of scientific, reasonable, simple and pragmatic plan of nutrition meal, which tallies with the characteristics of motor projects, researching the dining condition and nutritious situation in the certain period of training, in order to provide reference for scientifically tennis training, teaching and exercising.

Key words: Athletes; Nutrition Supplement; Tennis Aerobic

INTRODUCTION

Tennis is a sort of sports program which needs accurate motion, delicate skills, fierce rivalry and highly mental ability and stamina. Tennis becomes more and more popular in the 21st century with highly-developed level and more fierce competition in the ground, all that means tennis develops toward to strength and speed style. China's tennis movement has improved widely in recent years, with competition level largely progressing. Li Ting and Sun Tiantian have won the women's doubles match in Athen's Olympic Games, hitting the record historically. As for Zheng Jie, Yan Zi and Peng Shuai, who are single players, have already won the good scores in international tennis matches, from which the hope of China's tennis can be observed. Because the competition program consisting of continuously short-time paroxysmal motions allows short time rest after every driving, the athletes' strength will be highly expected. Meanwhile, tennis need diversified sprint motions, which means invoking and breaking strength. From the view of trend, physical condition mainly decides the match result, when their tactics reaching to a certain level. All of these, can't be divided from athletes' physical strength improvement. Stamina is the base of motor skill, in which nutritious supplement is the core. Reasonable nutritious supplement plays a key role in the training effect and race scores of national short track speed skating. The aerobic metabolism capacity of athlete can effect special ability and Performances. In exercise Process, Energy metabolism can be reflected by the change of aerobic metabolism, and aerobic metabolism is related with RBC system's indexes.

I Energy Metabolism Characteristics and the movement function state of Tennis Sport

(1) Energy Metabolism Characteristics of Tennis Sport

Tennis is a mixture of aerobic and anaerobic exercise. As for tennis competitions, the game time is uncertain. Maybe the game will last for less an hour. However, sometimes, the competition will last for three or four hours when two sides are well-matched in strength. So in the match, the fighting is intensively fierce. A research conducted by British investigators Alan Pearson and Karl Cooke found that the average time of continuous fight for every ball is about 10.2s and that ratio of hitting time and non-hitting time in the game is 1: 1.7. At this time, the energy system which can completes each brief action needs neither the oxygen environment nor Oxygen. Nevertheless, with a game often lasting for 3 - 4H, it is essential for an athlete to have a super aerobic energy system, which can help synthesize ATP and CP at each interval. Besides, sugar is an important cell fuel in an intense exercise. The longer

athletes exercise, the greater the proportion of fat oxidation for energy will become. Glycolysis can maintain within 2 min, which is unnecessary for tennis sport. Even if a small amount of lactic acid is generated, it will be re-used during intermittent periods, not causing accumulation of lactic acid.

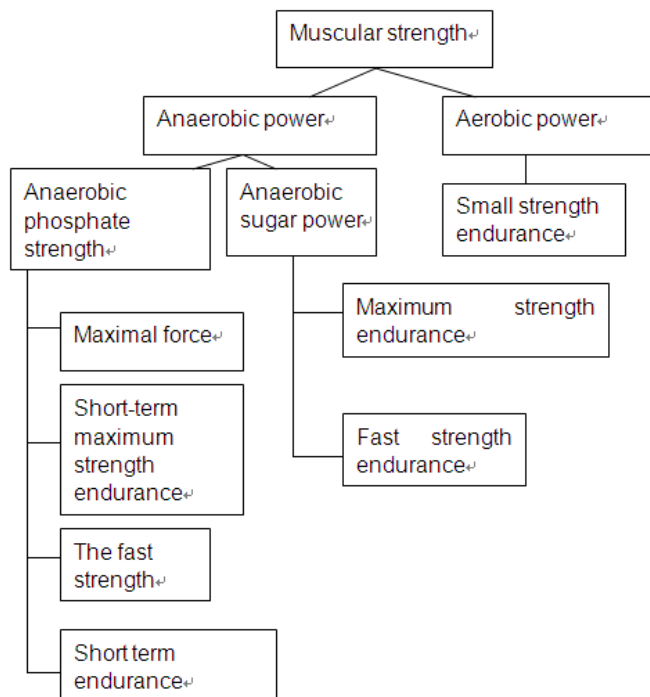


Figure 1. The structure diagram of aerobic power and anaerobic power

(2) Functional state of tennis

Tennis movement is characterized by strength, endurance, agility, speed and strength quality.

(1) The key to win a tennis movement is the technique of receiving and serving, whose basis is athletes' explosive force. For instance, serving lifts up a high standard for athletes on their wrist strength and back muscle strength. In addition, stroking needs athletes' powerful waist and shoulder muscle strength. Therefore, explosive force is the key to win a game.

(2) Tennis movement is an against-project changing with different forms of movement, in which the nature and intensity of action are bound to have a sharp or sudden change. Hence, athletes need high sensitive quality to make a quick judgment of the situation so as to complete the action promptly. The strength quality is the foundation and guarantee of athletes' mastering specific techniques. What's more, strength training which can ensure the effectiveness of sport organs is the basis for athlete's technology, tactics and physical training. Therefore, strength training, like physical training, is characterized by systematicness, planning and continuity. Foreigners calling it strength and conditional, which refers to special power system and its related movement quality, shows its important position in the visible physical strength. In a word, strength and conditional is a special power system and its related movement quality that can help athletes to win a high-level competition. As shown in table 1.

Table1 Traditional classification of power quality

Division basis	Category
Relationship	General strength, Specific strength
Form	Relative strength, Fast strength, Absolute strength, Strength endurance
Muscle working mode	Dynamic strength, Static strength
Special needs	Maximal force, Fast strength, Strength endurance, Reactive force
Size of load	Maximal force basic forces, Basic force, Rapid strength., Strength endurance

II Nutritional choices of tennis players during competition periods

(1) Nutritional supplement principles

Nutritional supplement principles mainly include time-choosing, less food and more meals, high nutrient, moderate fruit and vegetable, supplement of nutrient, adjustment of nutrient, in which choosing time is important because non-eating in time or eating at immoderate time is unhealthy for stomach spleen, having a bad influence on appetite and digest function; athletes' strength will fade away, missing the chance to obtain nutrient. It is rather wise to

choose the principle of less food and more meals. Athletes can choose from 3 times to 4, also, from 3 times to 5, not only not relieving the burden of stomach and intestine, but benefiting digest, which is beneficial for motion and health. It is essential for short track speed skating athletes of high chilling area to possess mutton and beef that is mixed up with angelica, poor man's ginseng, wolfberry, dried tangerine peel and other traditional Chinese medicine and red dates, Longan, ginger, brown sugar to eat, which can make athletes energetic. In order to maintain circulation of blood, it is proper for athletes to eat some fruit and vegetable in the process of high nutrient food. It is crucial to adjust well for food supplement, easily causing inner fire without supplement and illness, losing strength. Thus, it is difficult to choose from them. Therefore, athletes need to obtain necessary nutrient, for example, poor man's ginseng, pure creatine, lycopene, a bit of iron, strong recovery granule, high composite agent, can students, Lijia and so on, whose major active ingredients can stimulate pituitary and enhance testosterone, muscle development, explosive power and excitability in sports.

(2) Nutrient supplement and nutrient tonic before racing

It is essential for athletes to reserve glycogen, alkali, vitamin before racing about 1 week or 2. With the decreasing of the amount of exercise, it is a must for athletes to adjust food intake in case of gaining weight. Athletes can supplement sugary foods, including rice, noodles and so on, about 500 g each day. If necessary, eat little fried food and drink enough water. Meanwhile, athletes may choose some high protein fishes and egg food about 200g or so every day. And it is better to eat much fruit and vegetable to meet the need of supplementing enough vitamin and inorganic salt. Before 2 weeks of the race, athletes shall pay attention to enough intake of vitamin A, vitamin B and E, which can enhance muscle glycogen reserves and add up to 150 to 250 mmol/kg wet muscle with the combination of diet operation and training before racing. Apart from routine, you can improve the way to fill muscle glycogen 10 days in advance. Also, it is sensible to take in nutrient food 5 days ahead of time and high glycogen food after 5 days to increase the hepatic glycogen reserve. What is important, it is necessary to take in enough vitamin and inorganic salt instead of excessive protein and fat. What's more, ample intake of carbohydrate, high activity protein, special amino acid and antioxidant is rational. For example, bio flavonoids can play an important role in enhancing immune ability. Besides, in the course of high intensive training, glutamine is much more helpful to enhance athletes' sports ability and improve their performance.

(3) Nutritional supplements during the racing

Because the final champion's come-out needs multiple rounds in a project, it is necessary for athletes to make a physical recovery in between each round. If the pause time of the game is less than 30 min, they need to supplement liquid rich in carbohydrates such as sports drinks, fruit juice and so on. With an interval between 30 min and 60 min, nutrients like bread coated with honey or jam and energy bars are necessary. If the interval time is between 1h and 2 h, low-fat sauce pasta, steamed rice, noodles, sandwich or rolls can be taken into consideration. Those liquid or semi-liquid food containing monosaccharide, disaccharide, polysaccharide, low carbohydrates, a certain amount of whey protein, creatine, glutamine and a variety of trace elements and vitamin are easily absorbed. Besides, the supplementation of creatine can improve and enhance the function of skeletal muscle mitochondria, promoting muscle glycogen reserves, increasing muscle size and strength and improving the sprint ability of short track athletes in the match. The selection of pure creatine, creatine phosphate and creatine pyruvate, combining with enough water and sugar, can intensify the effect of creatine, relieving muscle fatigue appearing in the game effectively and maintaining athletes' sports ability.

(4) Nutritional supplements after the game

With tennis players' general continuous tense competitions causing great energy consumption of the body, reasonable nutrition supplements in time can help eliminate fatigue and restore physical strength. Sugar supplement after the game is an effective means to eliminate sports fatigue and promote physical recovery, enhancing body energy reserves. Taking 100-150g glucose immediately or supplementing sugar-rich food and beverage after a high-strength match can restore athletes' energy and promote the liver glycogen reserves so as to restore blood glucose levels and reduce the blood lactic acid content. Moreover, protein supplements like vegetable protein powder and whey protein help athletes to make a quick recovery after a match. Additionally, the intake of bioactive peptides plays an indispensable role in decreasing muscle protein degradation, promoting the rapid restoration of muscle, participating in the regulation of physiological activities of the human body, removing oxygen free radicals in the body, increasing the oxygen-carrying capacity of red blood cells and eliminating athletes' fatigue.

CONCLUSION

Advisable principles must be followed in the process of nutritional supplements, which can help athletes' physical recovery. Therefore, good nutrition means good nutrient reserves, better energy metabolism, wonderful performance and normal mental conditions, which help athletes to build up a good physical fitness and get satisfactory grades.

Thus , it is clear that a deep research on nutritional supplements of tennis athletes plays an important role in athletes' excellent performance.

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