

Research Article

Study on Physical Training and Nutritional Support of Athletes

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Abstract: This study introduces the concepts of nutritional support and methods of physical training in detail. Finally, it summarizes the relationship between physical training and nutritional support. Physical training is inseparable from energy supply and the source of sport energy is from nutritional support. Various nutrition supplies is closely related to physical recovery of athletes.

Keywords: Nutritional support, physical fitness, physical training

INTRODUCTION

Human bodies have the similar features with the precision instrument. Functional operation will be in the best condition based on highly mutual coordination and cooperation of all components. In some sense, one aim of sport training is to seek the higher coordination. Human bodies, however, are different from objects (Van Hall *et al.*, 2000). All components need metabolism and they are constantly updated. It means that nutrient supply and metabolism excretion shall be highly coordinated and balanced. Normal metabolism and better nutritional status of body are important guarantees for maintaining the life activity. Under the condition of competitive sport, metabolism of body is extremely strong. It indicates that the sport nutrition is different from the public nutrition in the general population based on the basic nutrition, that is, there has higher requirements on demand and supplement of nutrition.

Any metabolic disorder or malnutrition will affect the functions of tissues, organs and cells. The nutritional status of body is closely related to the sport status of athletes. Nutritional supplement shall not only have the function of improving physical exertion in training but also be beneficial to the recovery of sport. However, if the nutritional requirements of body cannot meet the requirements of body metabolism and growth and development, additional methods shall be taken or special nutrition is supplemented in order to intake enough calories and various nutrients to meet the demand of maintaining function of body cells, structure, metabolism and sport. This is the nutritional support (Jentjens *et al.*, 2001).

The physical fitness of athletes is affected by various factors as genetic, nutrition and training. Where, scientific training and nutritional support are the

two important factors of improving the physical fitness of basketball players. And, the main method of developing and improving the physical fitness is scientific training. Meanwhile, proper dietary nutrition and nutritional support have become the important means to improve the competitive ability of athletes either.

In the study on the physical fitness of athletes, relevant studies on sport nutrition and fitness are mainly focused on energy supplement and demand of carbohydrate, protein and fat (Burke *et al.*, 1996). And, relevant studies on demand of water, electrolytes and minerals and trace elements and vitamin metabolism have always been very active and in-depth.

MATERIAL AND METHODS

Physical training methods of athletes: Methods of physical training referred to the approaches and methods are improving the physical fitness level to achieve the training objectives and to finish the training mission in the physical training activities (Kreider, 1999). The direct purpose of adopting targeted training methods is to improve the physical fitness level of athletes. There are many training methods and these have different load characteristics. Correct understanding and holding of these methods could help to improve the physical fitness level of athletes. Load characteristics of training methods are shown in Table 1.

Division of training period of physical fitness: Division of training period of physical fitness mainly includes two aspects:

Division of annual training period of physical fitness: A complete annual physical fitness is taken as

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Table 1: Load characteristics of training methods

Method		Continual training	Interval training		Repetitive training
			Low intensity	High intensity	
Load	Capacity	High	Middle-high	Middle-low	Low
	Intensity	Low	Middle-low	Middle-high	High
	Interval	None		Not enough rest	Relative enough rest
Main development quality		General endurance	General endurance		Greatest force
			Power-endurance		Fast force
		Power-endurance	Special endurance		Speed force
			Speed endurance		Greatest speed

Table 2: The phased development of competitive state and division of major periods

The development process of competitive state	Biological foundation	Training task	Training period
Form	Adaptive mechanism: phenomenon of organism being adapt to external stimulate	Improving competitive state, promoting formation of competitive state	Preparing period
Remain	Mobilization mechanism: physiology/psychology capability be released to mobilization, system in a high coordinating condition	Developing steady competitive state, creating good results in the match	Competing period
Disappear	Protection mechanism: the organism stopped positive stress reaction automatically	Positive recovering, eliminating physiology psychology tired	Restoring period

the basic unit and the training in one year is divided into several short periods and the purpose of this is convenient to implement training on physical fitness and to control the training.

Division of training on the physical quality: The purpose of this is to control the training on strength, speed and endurance effectively. The structure characteristics of the annual training period are presented by the amount of number of major periods.

Generally, there are several types as single period, double period and multi period. The goals of major periods for training are to participate in the competitions and to get satisfactory results. The periods are determined and divided on the basis of the stage characteristics of development process of competitive status of athletes. Development process of competitive status and division of major periods are shown in Table 2.

Characteristics of food energy demand for sport: In general, the energy consumption of sport is about 600 kcal/h. Athletes need to obtain high energy from the proper food in order to achieve and to maintain good physical condition to ensure the annual physical training. And, they shall avoid intaking excessive Kalori in the rest period. The most important principle of dietary is to keep the balance of nutrition. The nutrition elements required in human bodies are including carbohydrate, fat, protein, minerals (calcium, iron) and vitamin etc. sport nutritionists recommend that each meal shall include the nutritional ingredients with following proportion: 60-65% carbohydrates, 15-20% protein and 20-25% fat.

Nutrition supply before competition and training: For the sake of health, eating shall be started within 3 -

4h before the competition so that it has time to digest food in the stomach. The principle of high carbohydrate (60-65%), low fat (20-25%) and moderate protein (15-20%) shall be followed by eating before competition and plenty of water or juice shall be drunk. Food can be taken during intermittent of training. However, the drinks or food which has more sugar must be avoided to prevent increasing of sugar content in blood. If you feel hungry, you could eat half piece of nutrition bar or half a fruit. Do not try to take new high energy food in the interval of training and insist on taking safety and proper food. During keeping nutritional balance, amount of food shall be consistent with the amount of sport. Some athletes do not have breakfast and this will gradually result in energy shortage. Attention will not be concentrated in training and it will probably cause accident. Therefore, diet as breakfast, lunch and super must be surely arranged.

Dietary for weight control of athletes: The athletes, who participate in the weight level competition, must control their weight. How to keep the weight under the premise of not affecting the competitive level? Excessively restricted diet can cause anemia. Proper diet is to reduce energy intensity as far as possible under the premise of not affecting the food quantity. Fat, cake, alcohol and beverages have high energy (Tipton *et al.*, 2001). Therefore, when control the weight, the food with less protein, minerals and vitamins shall be prevailed. Seaming, baking, cooking should be preferred when cooking food. Avoid cooking and frying food by oil as far as possible. Moderate meat and chicken could be eaten in daily diet. However, green and yellow vegetables shall be prevailed. Bean product is the best food for weight control.

Physical training and nutritional intervention in the match are mutually improved: The physical fitness is an old and big problem of our sport teams in the process of entering into the international competition terrain and matching against with the strong teams in Europe and America. And, the training effect cannot be promoted in the short term. One of the key problems is that the scientific nutritional support is necessary for improving the physical fitness of athletes who bear high strength training. Therefore, great importance shall be attached to the important function of metabolism in training. Athletes are not robots. Scientific physical training and targeted nutritional support could enhance the maximum training efficiency and tap the potential of physical fitness of athletes to the greatest extent (O'Neil *et al.*, 1996).

RESULTS AND DISCUSSION

Study on targeted nutritional support will seek a breakthrough for improving the physical fitness level of athletes: In view of development of current study on related nutrition, nutritional support has become an important part of all athletics. Study on improving the sport quality as health, sport speed and endurance of athletes has been widely carried out. The current study on sport nutrition mainly includes diet structure, lack of nutrients, nutritional supplements, nutrition intervention measures and nutrition mechanism. The results of these studies promote improvement of the physical fitness of athletes to a certain degree.

Study on nutritional support focuses on discipline-crossing and integration: Discipline-crossing and integration shall be strengthened and horizon shall be broadened to explore new methods and approaches while attaching great importance to the self-discipline of sport nutrition. Specifically, the following aspects shall be attached great importance to:

Close combination of less nutrition and more nutrition: Sport nutrition shall closely combine the study progress of relevant disciplines as general nutrition science, biochemistry and molecular biology.

Dynamic balance of intake and excretory: We shall correctly understand side effects on nutrients or its metabolic intermediates and body metabolic end product while correctly understand the nutrition effect of nutrients and get rid of one-sidedness of nutrients supplement and of neglecting the study on excretory load of moving body after supplement of nutrients. At present, it is in urgent need of study on the nutrition measures of light burden of body metabolism of athletes before match.

The unity of opposites of nutrition and toxicity: The effects of nutrition and toxicity are relative. In some cases, nutrients can become toxin. Therefore, we shall not only focus on the nutritional effect of nutrients but also carry out study on toxic side effects on the body by nutrient or metabolic intermediates and metabolic end product.

Organic combination of single action and interaction: Different nutrients are interactional in different segments of absorption and body's metabolism. Therefore, study on the interaction between different nutrients has become a pressing matter of the moment.

Personalized demand for nutritional support of different sport: The fatigue reasons of different sport and different training methods are different. Therefore, the physical recovery methods are also different. Wrestling is a kind of power sport. And, the physical fitness of the athletes who work on that has close relation with nutrition. Stronger power and coordination nerve system are needed for wrestling and the explosive power must be generated in a short period of time. This sport have features as severe hypoxia, oxygen debt is more than nitrogen and strong metabolism.

Therefore, for wrestler, protein supply in food shall be improved. Basketball belongs to skills athletic opposition project on the same field. Consumption of energy materials and accumulation of lactic acid in muscles and blood are the main reasons for fatigue of basketball players. Therefore, besides supplement of water and minerals, dextrose shall be immediately taken as nutritional supplement after basketball match. After match, high calorie food which is rich in easily absorbed sugar and protein and low fat content shall be maintained and much vitamin shall be supplemented.

CONCLUSION

Recovery of physical fitness of athletes mainly depends on adjustment of amount of sport, physical therapy and massage. Proper nutrition is one of the important factors of athletes to win the match and it is guarantee for health and sport ability of athletes. Nutritional support is closely related to training, body status and recovery process of athletes.

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