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## Research on sports fatigue of complementary nutrition

Ying Zhang

North China University of Water Resources and Electric Power, (CHINA)

### ABSTRACT

At present, China is vigorously promoting the construction of healthy city, and youth is the master of the future city, which will adapt the city healthy mode and solve the health problems in the process of urbanization. Coping with the physical health of young people continues to decline, and require the teenagers must establish sports behavior and healthy lifestyle strengthen their ability of health maintenance. The ability of anti fatigue has been paid more and more attention, so people use a variety of methods to eliminate fatigue, such as the coaches and athletes in addition to hard training, also hope to aid to improve the sports ability through the application, especially the application of some does not contain prohibited drug substances in order to enhance the physical fitness, prevent fatigue, give full play to the function of the potential of the body to obtain the best performance. People will participate in fitness movement, also hopes to add some nutrients to eliminate fatigue as soon as possible, so as to better work, life and learning. In this paper, traditional Chinese medicine therapy and nutrition supplement for retrieval of database and China Journal Net Sports Fatigue articles, supplementary analysis of whey protein, antioxidants, traditional Chinese medicine and sports drink on anti fatigue effect.

### KEYWORDS

Nutrition; Exercise and sports.



## INTRODUCTION

In the years of the international sports biochemistry conference, sports fatigue is defined as: physiological process in the body can't maintain its function and maintain the scheduled exercise intensity at a particular level or not and if strictly in accordance with the requirements of modern sports, regardless of is the daily training. Also, it is to participate in the competition, require athletes to maintain body functions in critical condition, but if you keep a large amount of exercise in a long time training and violates the basic principles of training. At present, China is vigorously promoting the construction of healthy city, and youth is the master of the future city, which will adapt the city healthy mode and solve the health problems in the process of urbanization. Exercise excessively causes the body to produce fatigue, and light will influence the training effect. While for the body, it will bring serious damage and recovery of exercise fatigue has become an important topic in today's competitive sports scientific research. Fatigue and nutritional supplement is a state in which the body down temporarily in the motion work or after exercise capacity or ability to work with certain duration and cause of exercise-induced fatigue, which is more complex, and the view is different since the beginning of this century, researchers from different point of view.

A lot of research and experiments on sports fatigue phenomenon, and put forward the reasons of exercise-induced fatigue may exercise stress generation The negative effect of if metabolite accumulation acid metabolism environmental depletion during exercise, exercise stress metabolism will be through a variety of channels caused by the changes of muscle fiber structure integrity energy supply and regulation, resulting in movement muscle systolic and diastolic dysfunction, sports fatigue phenomenon in addition, energy failure is also the main cause of exercise-induced fatigue, sport in the long process of training, to the sugar and fat oxidation for energy, because the liver glycogen synthesis to supplement the blood glucose and the blood to the tissues and organs, and organization ability to use glucose and oxygen, as well as the body the oxygen supply with oxygen capacity constraints, resulting in motion delay for energy, resulting in fatigue

## PERFORMANCE OF SPORTS FATIGUE

When one feel fatigue, he can judge from many parts, such as want to go to sleep or just want to smoke. In all, we can find it from many ways, mainly in subjective feeling and some objective feelings.

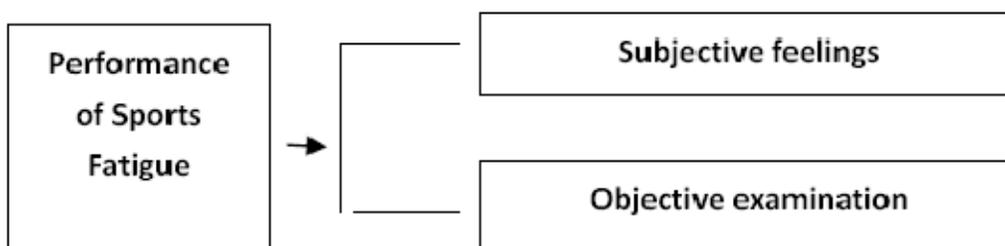


Figure 1 : Performance of sports fatigue

### Subjective feelings

In sports fatigue, players generally have limb weakness, muscle pain, very want to stop the movement, some people flustered, shortness of breath, chest tightness with thirst and feeling of collapse etc.. Subjective feeling is simple, easy to master, is suitable for the qualitative judgment, but easily influenced by subjective will of athletes.

### Objective examination

Objective to check some simple, some need the technology and method, a more complex, but in the quantitative determination of fatigue and to classify, fatigue index, and applied scientific research, medical supervision. Objective examination can be different from the body, organ, tissue cell level,

especially the recent changes in the research on fatigue of body cells and more. Sports fatigue, body not only at the organizational level of each system and organ, change, change and will occur various functions in cell level..

### THE NEED OF THE NUTRITION

Everyone needs some nutrition, following are some:

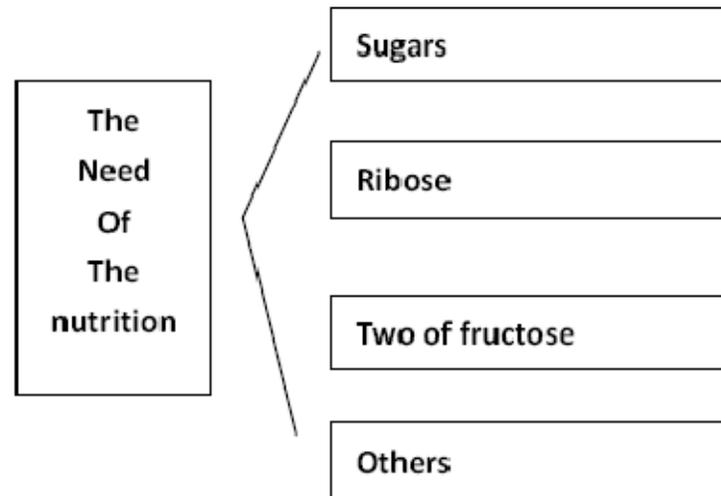


Figure 2 : The need of the nutrition

#### Sugars

It is the main energy substance to maintain the ability to exercise, on adenosine (AT P) synthesis speed greatly influence. There are blood glucose, liver glycogen and muscle glycogen. C HO in the oxygen supply sufficient or deficient can be decomposed for energy. A series of studies show that fully available CHO in vivo, which for the strenuous exercise, especially the movement for a long time is required. Before the high CHO diet, can prevent and delay the occurrence of fatigue. Glucose is the main energy movement; reduce blood glucose levels and glycogen loss and fatigue associated. Therefore the supplement of exogenous CHO, can increase the uptake of CHO muscle utilization, reduce the decomposition of glycogen, thus reducing the use of liver glycogen and muscle glycogen, and delay the appearance of fatigue. The index (G I) in the formulation of nutrient solution for training supplement of CHO, can provide training advantage. Research shows that food low GIC containing HO rich, continued before exercise is a good source of CHO, C HO is designed to stimulate sustainable energy supply. On the contrary, after training the high G I C containing HO rich diet, caused by mobilizing more insulin response to glucose and favorable to C HO reserve.

#### Ribose

It is the starting molecules in the synthesis of ATP, which is an important component of nucleic acid. In vivo, ribose, is mainly through the pentose phosphate pathway. The RNA is an important precursor of nucleotide, so it is an important raw material for the synthesis of skeletal muscle and myocardium energy. The ribose can accelerate the skeletal and cardiac pyrophosphate (P RPP) synthesis speed, eliminate the pentose phosphate pathway of glucose - 6 - phosphate activity low limit, so that the speed of synthesis of nucleotides multiplied, supplement of ribose can improve exercise capacity. The results support the ribose can provide muscle is combined into A TP.

A rate limiting factor of this hypothesis. In addition, a decrease is observed in the high intensity training of muscle ATP, seems not to high intensity exercise ability restriction. Thus, ribose is a safe and effective sports nutrition supplement.

**Two of fructose**

These two are important intermediates in glucose metabolism in addition to the quickly involved in glucose metabolism, synthesis of ATP, provide energy. It also has the activity of key enzymes regulating glucose metabolism. FDP is not only the intracellular energy substances, and adjustment ability of anaerobic metabolism is enhanced by the improvement and acceleration ATP, improve the cell after hypoxia adaptation level in physiological function and stress. F DP has many positive effects in the movement, such as short-term continuous administration of F DP mice after swimming stress resistance improved obviously, shows that FDP has obvious anti ischemia, hypoxia and anti fatigue action.

The physiological mechanisms may be: taking F D P could obviously decrease the plasma levels of lipid C two - two formaldehyde (M D A) increased the amplitude of M D A is reduced, which can protect the body from free radical damage, delaying fatigue; taking F DP can make the erythrocyte membrane N a+- K+- ATP enzyme activity increased significantly, thereby regulating energy metabolism, promote the transport, protect the cell membrane; taking F DP can improve the body's metabolism, reduce the accumulation of lactic acid, maintain the stability of internal environment. In addition, F DP has a protective effect on renal injury and ischemic brain tissue. Sports practice has proved that the athletes taking better than taking glucose fructose, fruit intake can be divided into before and during the promoting force of sugar supplement and after recovery of carbohydrate supplement, simple oral fructose may cause gastrointestinal discomfort, the best containing fructose intake mixed drink is appropriate.

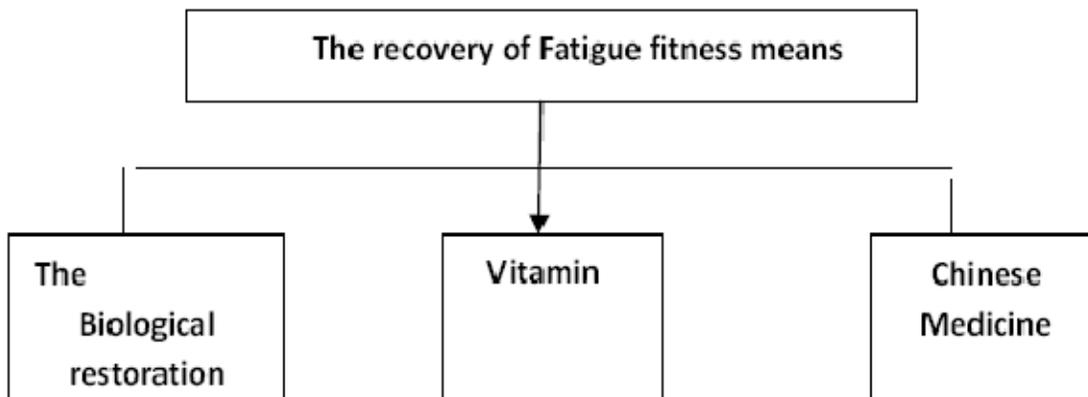
**Others**

Recently, the research of chatoyant has also made new progress. The results showed that chatoyant can be maintained in the anaerobic training rats Exercise ability, promote the synthesis of glycogen in strength training, maintain the blood p H value stability, and accelerate body in recovery after high intensity training. Long term small doses of chatoyant, can enhance the adhesion function of red blood cells to IC.

To participate in physical exercise should persevere, not want to exercise is to exercise, do not want to exercise will not exercise. This means to take part in the sports activities throughout the year. In different seasons to participate in sports activities, both favorable factors to seasonal changes in natural conditions, also have adverse factor changes in different seasons of natural conditions may have on the human body.

**THE RECOVERY OF FATIGUE FITNESS MEANS**

Also, when we meet some difficulties, we should recovery from them:



**Figure 3 : The recovery of Fatigue fitness means**

## The biological restoration

The biological restoration means biological recovery means mainly refers to the physical therapy massage and plenty of sleep, after a strong campaign, through the hot compress or Wen Shuiyu and other treatments can effectively accelerate the blood circulation, accelerate the excretion of metabolic waste, fully improve the nutritional status of the nerve and muscle, so as to alleviate exercise-induced fatigue and discomfort in addition, sports fitness after the proper massage can effectively eliminate the stiff muscles, relieve fatigue effect in addition, maintain adequate sleep can also promote the function of human organs to recover quickly, provide adequate time and facilities for the body energy reserves.

It is one of the important means of recovery of sports fatigue to maintain healthy habits, scientific adjustment exercise to maintain adequate sleep is an important method to eliminating fatigue, athletes to maintain a healthy and reasonable life Association in the fitness process, maintain the sleep conditions and dietary health good in sports fatigue phenomenon, timely adjustments to the exercise, appropriate to reduce the training of mild, making training plan and a scientific and reasonable method. In order to accelerate the recovery of sports fatigue recovery, Lao nutritional supplements, sports and nutrition supplement to maintain and the important factors to promote the health of the human body, between the two has the nutrition close complements is an important means of body level fast recovery, recovery of sports fatigue is the key to the body's energy reserves of recovery, therefore, use of nutrients can be fully replenished caused by the motion of matter consumption, repair damage in vivo mechanism, help eliminate body fatigue, promote the recovery of fatigue athletes physical fitness, and improve sports performance to add plenty of moisture, to ensure the normal operation of the physiological function to participate in regular physical exercise of people, water is the most important element of the nutritional supplement water body would be lost if the body fatigue weak phenomenon.

If the loss of body water will likely cause of death and the course of physical fitness, body water with a large number of sweat excreted, if cannot get seasonable complement, will cause the body physiological function cannot be the normal operation of the motor ability decreased rapidly so to add plenty of moisture in physical exercise and after the exercise, to ensure that the physical condition Normal operation function, and promote the recovery of sports fatigue sugar protein fat three nutrients and rational assort or arrange in pairs or groups, the body to promote the rapid restoration of sugar, fat and protein as the body's three major nutrients, the human body metabolism and exercise capacity has great effect of sugar cannot be ignored is the most important exercise energy source, is the main energy supply of muscle contraction and fat is an important material for energy storage, protein is the main material of tissue cells, three big nutrients for human body metabolism and exercise capacity has the important influence in the process of therefore, sports fitness, rational assort or arrange in pairs or groups and add three big nutrients in promote the players play a better athletic ability, promote the rapid recovery of sports fatigue

## Vitamin

As the reducing agent is important, can stimulate the cerebral oxygen utilization, increase the content of oxygen in the brain, thereby improving the body hypoxia tolerance, this movement is of special importance and vitamin supplement and not the more the better, in the vitamin supplement, should according to the special characteristics of the actual situation of athlete body and different, and under the guidance of a doctor can supplement the antioxidant capacity, resulting in tissue damage of cell membrane or body fatigue.

Therefore, after overtraining, increase - carotene intake, help to eliminate excessive training of discomfort, fatigue and decreased immune function to some degree. Study on Rob s o n, observation of the antioxidant vitamin supplements (18 m g - carotene, vitamin C and 900 m g 90 m g vitamin E) effect on immune cells continued after exercise. In the continuous subjects were given placebo or a mixture of antioxidant supplementation for 7 d, a duration of 2 h at 65% VO<sub>2</sub>max treadmill test, and immediately take to test before and after blood neutrophils were found significantly accelerate the oxidation of rupture in the subsequent training, even if the effect of functional training on neutrophils are in many aspects, the results still can indirectly indicate that in the continuous use of antioxidant supplementation

for 7 d, perhaps for the athletes to maintain the special function of the innate immune system is beneficial. In the last 1 months of swimming training, giving vitamin mineral supplements can reduce heart and muscle damage, and increase antioxidant levels and cell membrane lipid peroxidation level reduction

That is not the case. In fact, different seasons have different training requirements and matters needing attention, if not careful, improper methods, is likely to cause injury accident is not necessary and health problems, so that the effect of physical exercise at. For example, in spring training, because of cold spring, the changing climate, large temperature difference between morning and evening, the slightest mistake can easily catch a cold. So pay attention to the prevention, should exercise cannot act too hastily, to prepare for activity. Special attention should be paid to change clothes, if the body sweats, want to wipe the sweat, put on dry underwear. Don't let the cold wind blowing in the wet clothes, easy to catch cold, and induce other diseases, health effects

### Chinese medicine

In recent years, eliminate fatigue, promote the sports ability recovery and utilization of Chinese medicine, gradually becomes the focus of sports medicine research in china. How to eat Rhodiola is a species of medicinal plants growing in the anoxic zone, contains 16 kinds of amino acids, 11 kinds of trace elements and vitamin C, has anti hypoxia, anti fatigue effect, can improve the body's immune ability and work efficiency, delay fatigue. Injury changes of Cynomorium songaricum Rupr can improve mitochondrial cerebellar Purkinje cells; further improve the cell's overall energy generation Xie Shuiping, anti athletic fatigue too early. Pine needle pine kossen genus leaves, it is not only rich in vitamins, but also contains antioxidant flavonoids of a lot of proanthocyanidins (P CA). It by scavenging free radicals in vivo reduces lipid peroxidation of the body, can prevent human organ senescence and resistance to fatigue objective.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

An exercise, nutrition is reasonable to eliminate fatigue cannot be ignored, since people only pay attention to the warming up before exercise, but in different extent, recovery of sports fatigue, especially nutrition supplement eliminating fatigue method, allowing players to choose their favorite food, causes the athlete body nutrition is not equilibrium, delaying fatigue elimination time, affected the sports training and the improvement of athletic performance

### Suggestions

At present, China is vigorously promoting the construction of healthy city, and youth is the master of the future city, which will adapt the city healthy mode and solve the health problems in the process of urbanization. Science of nutritional supplements in the regulation of body function to speed up the elimination of fatigue accelerate the restoration to improve exercise capacity and other body functions, people are paying more attention to the nutrition side effects in different degrees, methodImproper, it will cause adverse effects, damage the health of athletes, therefore, proposals for combining different sports, take corresponding nutritional supplement, or under the guidance of medical personnel, the scientific use of nutritional supplements to help eliminate machine. Body fatigue, urges a recovery, improve training efficiency, so as to improve the athlete's athletic ability

## REFERENCES

- [1] Huang Jingheng, Xing Yujian; Health education [M]. Shanghai: Fudan University press, 203 (2011).
- [2] Zhang Xiaoyan; Introduction to health education [M]. Hubei: Wuhan University press, 170 (2010).
- [3] College of Humanities of Shanghai University of Finance and Economics Center for the study of economic and social development of Shanghai and the Yangtze River Delta. urban social development report, (2006).

- [4] The health of urban and social development [M]. Shanghai: Shanghai University of Finance and Economics press, 9, (2007).
- [5] Huang Jingheng; Health education [M]. Shanghai: Fudan University press, 161 (2006).
- [6] Guo root; Report of China health city "construction [M]. Beijing: China Economy Publishing House, 22 (2009).
- [7] Yang Tingzhong; The theory and practice of health behavior [M]. Beijing: People's Medical Publishing House, 4 (2007).
- [8] Wei Jianming; College students health education and physical fitness [M]. Hubei: Wuhan University of Technology press, 216 (2010).
- [9] P.L.Rice; health psychology [M]. Hu Peicheng, trans.Beijing: China Light Industry Press, 7 (2000).
- [10] Changchun; Health education and health promotion [M]. Beijing: Peking University medical press, 39 (2010).
- [11] Fu Hua; Preventive medicine [M]. Beijing: People's Medical Publishing House, 161 (2011).
- [12] Chen Anhuai, Chen Mengsheng; A dictionary of sports "MI. Shanghai: Shanghai Lexicographical Publishing House, 393 (2000).