DIAGNOSIS OF SPORTS FATIGUE AND NUTRITIONAL INTERVENTION IN TRACK AND FIELD

DIAGNÓSTICO DA FADIGA ESPORTIVA E INTERVENÇÃO NUTRICIONAL NO ATLETISMO

DIAGNÓSTICO DE LA FATIGA DEPORTIVA E INTERVENCIÓN NUTRICIONAL EN EL ATLETISMO

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ABSTRACT

Introduction: As a high-intensity physical sport, athletics can easily cause serious physical injuries and even psychological problems if not diagnosed after sports fatigue. Objective: Study the relationship between sports fatigue and nutritional intervention in track and field. Methods: One hundred track and field athletes in a province were investigated. Through literature survey, questionnaire survey, and other data testing, track and field athletes' sports fatigue and nutritional status were analyzed to determine the necessary relationship between sports fatigue and nutritional intervention. Results: The coach's judgment of sports fatigue during athletes' training is characterized by a lack of technical accuracy, leading to the decline of athletes' physical recovery ability and aggravating sports fatigue to a certain extent. As a high-intensity physical exercise, athletics must diagnose sports fatigue in time and provide effective nutritional intervention. Conclusion: The research shows that after high-intensity exercise, the diagnosis of sports fatigue in track and field athletes is of great importance in judging the athletes' physical function, and scientific nutritional intervention plays an important role in athletes' excessive physical function, improving their sports ability and relieving sports fatigue. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Diet, Food, and Nutrition; Fatigue; Track and Field.

RESUMO

Introdução: Por ser um esporte físico de alta intensidade, o atletismo pode facilmente causar lesões físicas graves e até mesmo problemas psicológicos se não forem diagnosticáveis a tempo após a fadiga esportiva. Objetivo: Estudar a relação entre a fadiga esportiva e a intervenção nutricional no atletismo. Métodos: Foram investigados 100 praticantes de atletismo em uma província. Através de pesquisa bibliográfica, levantamento de questionários e outros testes de dados, a fadiga esportiva e o estado nutricional dos esportistas de atletismo foram analisados para descobrir a relação necessária entre a fadiga esportiva e a intervenção nutricional. Resultados: O julgamento do treinador sobre a fadiga esportiva durante o treinamento dos atletas é caracterizado pela falta de precisão técnica, levando ao declínio da capacidade de recuperação física dos atletas e agravando a fadiga esportiva em certa proporção. Como um exercício físico de alta intensidade, o atletismo necessita de diagnóstico da fadiga esportiva não apenas no tempo, mas também de uma intervenção nutricional eficaz. Conclusão: A pesquisa mostra que após o exercício de alta intensidade, o diagnóstico da fadiga esportiva dos praticantes de atletismo é de grande importância para julgar a função física dos atletas, e a intervenção nutricional científica desempenha um papel importante na função física excessiva dos atletas, melhorando sua capacidade esportiva e aliviando a fadiga esportiva. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

***Descritores*:** *Alimentos, Dieta e Nutrição; Fadiga; Atletismo.*

RESUMEN

Introducción: Al ser un deporte físico de alta intensidad, el atletismo puede provocar fácilmente graves lesiones físicas e incluso problemas psicológicos si no se diagnostican a tiempo tras la fatiga deportiva. Objetivo: Estudiar la relación entre la fatiga deportiva y la intervención nutricional en el atletismo. Métodos: Se investigó a 100 practicantes de atletismo de una provincia. Mediante un estudio bibliográfico, un cuestionario y otras pruebas de datos, se analizó la fatiga deportiva y el estado nutricional de los atletas para averiguar la relación necesaria entre la fatiga deportiva y la intervención nutricional. Resultados: El juicio del entrenador sobre la fatiga deportiva durante el entrenamiento de los atletas se caracteriza por la falta de precisión técnica, lo que conduce a la disminución de la capacidad de recuperación física de los atletas y agrava la fatiga deportiva en cierta medida. Como ejercicio físico de alta intensidad, el atletismo necesita un diagnóstico de la fatiga deportiva no sólo a tiempo, sino también una intervención nutricional eficaz. Conclusión: La investigación muestra que, tras un ejercicio de alta intensidad, el diagnóstico de la fatiga deportiva de los atletas de atletismo es de gran importancia para juzgar la función física de los atletas, y la intervención nutricional científica desempeña un papel importante en la función física excesiva de los atletas, mejorando su capacidad deportiva y aliviando la fatiga deportiva. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

***Descriptores*:** *Nutrición, Alimentación y Dieta; Fatiga; Atletismo.*

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INTRODUCTION

Since the 21st century, compared with other countries, China's comprehensive track and field sports level is still in a low position. One of the major reasons is sports fatigue.[1] The high-intensity competitive sports training has made athletes' physical fitness close to the limit. Injuries and basic injuries in the training process are inevitable.[2] The timely diagnosis of sports fatigue can effectively prevent irreversible physical injury to a certain extent.[3] With the development and innovation of sports related technologies and training methods in various countries, various ways of physical recovery after sports strain have become the focus of attention.[4] While the competitive level of global track and field sports continues to break the world record, the increasingly fierce world competitive sports enable athletes to engage in long-term, high-intensity and heavy-duty physical training for the purpose of improving their own sports ability and achieving excellent sports results.[5] Due to the lack of attention to sports fatigue, athletes' training will not be continuous, systematic and effective after a long time of accumulated pain, which will affect the performance of competitive competitions. At the same time, sports fatigue will also further erode the athletes' bodies, leaving incalculable physical damage and pain.

This paper studies the relationship between Sports Fatigue Diagnosis and nutrition intervention and track and field athletes.

METHOD

The track and field athletes in a provincial training base are trained intensively, with the same training structure, unified canteen diet and consistent nutrition intake. 60 male track and field athletes and 40 female athletes are selected as the research objects. The study and all the participants were reviewed and approved by Ethics Committee of Hebei Vocational College Of Politics And Law (NO.19HBCPL078). The correlation between exercise fatigue and nutrition intervention after training is judged according to the data. The basic physical conditions of men and women are shown in Table 1.

Through the method of crowd interview, we visited the training base on the spot to understand some practical problems of track and field athletes, such as training frequency, training feeling, diet structure, nutrition intake, etc., extended the content of relevant problems, and conducted in-depth discussion with relevant people on Sports Fatigue Diagnosis, nutrition intervention and other issues, so as to find and summarize the athletes' training and diet pain points.

Literature method: through consulting and collecting relevant papers in the library, China Journal Network, Wanfang Data Network, HowNet, etc., we can understand the relevant literature of track and field athletes' sports fatigue, sports training and nutrition intervention, collect and summarize the research status and problems related to sports nutrition intervention and Sports Fatigue Diagnosis at home and abroad, and understand the relevant research results and countermeasures.

Questionnaire survey method: through consulting the relevant experts to understand the relevant suggestions, after training, adopt the questionnaire method to understand the training fatigue status and quantity of track and field athletes, daily dietary intake, collect the relevant data, and conduct research and Analysis on the athletes' nutrition intake method, the understanding degree of athletes' nutrition intervention, the understanding degree of functional consumption, etc., and analyze the coaches' judgment on track and field athletes' sports fatigue observation method.

Table 1. Basic physical conditions of men and women.

Gender	Number of persons	Age (years)	Height (CM)	Weight (kg)	Sports years (years)
Male	60	18.573±1.787	169.367±0.599	69.600±1.687	6.123±1.797
Female	40	17.171±0.889	161.567±1.191	53.896±1.185	5.093±0.298

RESULTS

Judgment of exercise fatigue

Observation method can deal with the original information. It is the coach's daily judgment of the athletes' whole training state according to whether the athletes' body changes after the training process. At the same time, observation method is an individual active cognitive process with inaccuracy.

It can be seen from Table 2 that coaches use observation method to judge the sports fatigue of track and field athletes. In terms of accuracy, it can be seen that the ability to complete actions decreases and the lip color is abnormal, $p<0.05$, with statistical difference; The balance ability decreased and the reaction was slow ($p<0.01$). In terms of coaches' understanding of this experience and knowledge, there were differences in the judgment of some physical states, such as decreased strength, decreased speed, decreased flexibility, decreased endurance, decreased ability to complete actions, and decreased explosive power ($p<0.05$).

On the whole, there is a certain difference between the accuracy of coaches' judgment on the overall sports fatigue state of track and field athletes and the actual accuracy.

Analysis on training fatigue feeling of track and field athletes

From the training status of female track and field athletes, the number of people who think that the training level is strong and strong accounts for 75.51 of the total number, while the relatively relaxed group accounts for only 24.49% of the total number of people. From the training status of male track and field athletes, the proportion of the number of people in each state is relatively average.

It can be seen from Figure 1 that in the response of female track and field athletes to the degree of fatigue, the fatigue rate accounts for 71.6% of the overall, and the less fatigue accounts for 28.4%. Male track and field athletes have little difference from female track and field athletes in the degree of fatigue under high-intensity training. The proportion of each number of physical fatigue is relatively average, and the overall state is significantly higher than that of female track and field athletes. The above data objectively reflect the high-intensity and high load training faced by track and field athletes, and the high-performance body consumption will also have a higher demand for carbon, water and nutrition.

Analysis of daily nutrition of track and field athletes

Athletes need various kinds of food for diversified nutrition supplement in their daily diet. The nutrition intake should be kept average, and excessive intake and partial eating should not be allowed.

Some athletes will have the idea that sports performance is only related to sports training, ignoring the intake of daily nutrition. Athletes

Table 2. Accuracy test of observation method.

Observation indicator	Accuracy of fatigue judgment (SIG)	Understanding of coaches (SIG)
Explosion	0.2716	0.0172
Shortness of breath	0.8811	1.0177
Muscle spasm	0.1488	0.1725
Downside	0.2056	0.0445
Heavy pace	0.1602	0.7092
Heavy breathing	0.3600	0.6940
Unusual complexion	0.0671	0.1288
Stunned	0.2037	0.0969
Lip color abnormal	0.0202	0.0461
Sweating a lot	0.8199	0.2697
Delayed response	0.0071	0.1170

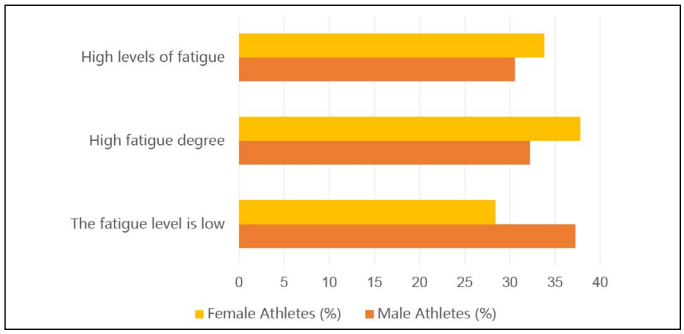

Figure 1. Analysis of athletes' fatigue.

need to pay attention to this and understand their daily nutritional supplements; Adopt the knowledge of nutrition intervention in the daily diet, and take the required food according to the daily training content and the degree of exercise fatigue to achieve the purpose of nutrition supplement. Do not only choose your own preferred food types to avoid the problem of malnutrition.

Unreasonable dietary intake is easy to cause athletes' body nutrition imbalance, leading to athletes' sports fatigue, physical function decline, and further decline in training quality. It can be seen from Table 3 that in view of the nutrition problems existing in the athletes' daily diet, the nutrition required by the daily human diet can be classified into five categories: protein, sugar, vitamins, minerals and fat. Athletes and relevant parts of the canteen can formulate reasonable nutrition plans for different types of sports according to different needs and carry out scientific and healthy nutrition intervention.

Track and field athletes' understanding of nutrition intervention

Nutrition intervention is a countermeasure and method to improve the existing problems such as over nutrition and lack of nutrition. Nutrition intervention in sports is conducive to helping athletes recover from physical fatigue and help maintain and improve their physical state

It can be seen from Figure 2 that 35% of male track and field athletes have an unclear and indifferent attitude towards the need to ensure nutrition balance in terms of understanding of nutrition intervention; 27% of the athletes knew about the help of nutrition balance but did not have a deep understanding; 20% of the athletes had a comprehensive understanding of nutrition balance and intake, and believed that nutrition was more important for daily training; 18% of the athletes had a deep understanding of nutrition intervention and nutrition intake structure, and believed that effective nutrition intake was conducive to ensuring the high efficiency of training. The number of female track and field athletes who did not know about nutrition intervention was 29%; The number of people who knew the nutrition intervention but knew the supplementary score was 38%; The number of people who have made some understanding and think it is important is 24%; The number of people who think nutrition intervention is very important is 9%. It can be seen that male and female track and field athletes have a low understanding of nutrition intervention as a whole, and the concept knowledge of how to correctly ingest nutrition structure is not within the scope of athletes' knowledge.

DISCUSSION

Today, with the development of Internet technology, the scientific training methods of sports are more high-quality and comprehensive. Under the application of today's advanced technology, the reasonable nutrition intervention of track and field athletes has become one of

Table 3. Types of nutrient intake.

Food category	Nutrient	Give an example
cereal	Carbohydrate, protein, cellulose, vitamins	Fine grain (rice, white noodles), coarse grains (sorghum, oats, soybeans, corn)
Sugary drink	Carbohydrates and inorganic salts	
vegetable and fruit	Food fiber, mineral, vitamin C, carotene, vitamin A, folic acid	Leaf vegetables, tomatoes, carrots, eggplants, apples, citrus
Meat and eggs	Protein, fat, minerals,	Lean meat, beef and mutton, pork, poultry meat
Dairy product	Vitamin A, B vitamin	Fresh milk, yogurt
Beans and their products	Calcium, protein, vitamins, cellulose, minerals, protein, fat	Various beans, tofu, yuba, thousands of pieces
Edible oil	Protein, fat	Olive oil, sesame oil, deep sea fish oil

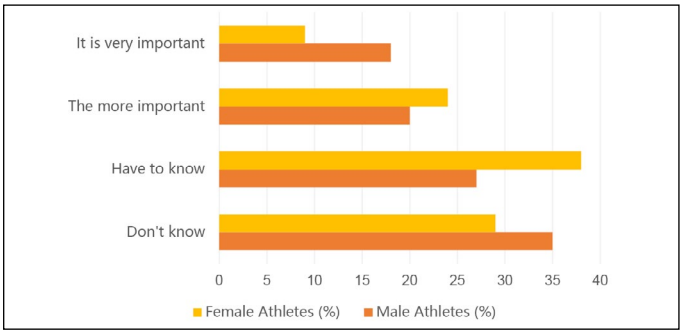

Figure 2. Understanding of nutrition intervention for track and field athletes.

the important factors to maintain the high level of athletes. The most important feature of track and field athletes' training is that anaerobic metabolism is the main function in the training process. Athletes' bodies need to complete rapid physical energy supply and metabolism in a short time in the training process. Therefore, athletes need to pay close attention to their own sports fatigue, ensure a high-quality and healthy nutritional diet structure, and ensure the overall energy supply of the body by accurately obtaining effective energy from food, so as to meet and ensure the needs of athletes in training and competition. In view of the problems existing in Sports Fatigue Diagnosis and nutrition intervention of track and field athletes, we put forward the following suggestions for improvement:

Athletes establish the understanding of nutrition and diet and actively judge sports fatigue

In daily life, athletes should fully understand the necessity of nutrition supplement, have a high understanding of daily diet from the ideological level, establish healthy eating patterns and habits, reduce partial eating in diet, and ensure the balanced intake of protein, vitamin A, B, C and other nutrients. Athletes should understand their actual needs, lay a solid and accurate foundation for a reasonable nutritional structure in the future, and provide the source power for efficient training. Athletes should actively judge the degree of physical fatigue after training, make relevant measures in time, and communicate with trainers in time after finding problems related to diet and sports fatigue, so as to solve the problems from the source, which is more conducive to helping athletes' own development.

Enhance coaches' attention to sports fatigue and nutrition intervention

On the basis of ensuring the efficient training of athletes, attention should also be paid to the physical and mental health of athletes. Coaches should learn more comprehensive materials. If necessary, they

can take athletes for unified physical examination to master the basic physical data of all athletes. At the same time, they should coordinate the scientific and balanced development of athletes in training and diet. Due to gender differences, athletes' individual physical conditions are different, Targeted training programs and concentrated diet and nutrition supplement programs can be adopted for different athletes. Under the condition of ensuring normal training and balanced nutrition intake, an appropriate amount of sports nutrition can also be used to help athletes improve their level.

Relevant governments and departments provide scientific guidance to athletes' trainers in various aspects

Relevant national departments and governments should attach great importance to and support athletes' Sports Fatigue Diagnosis and nutrition intake. Coaches should also actively communicate with relevant departments, regularly test athletes' physical and psychological conditions, fully understand athletes' nutrition, physical and psychological conditions, and timely adjust athletes' diet to ensure efficient training of athletes. At the same time, relevant departments can regularly give relevant lectures to athletes and coaches to convey the importance of sports fatigue diagnosis, improve athletes' attention to sports fatigue, establish scientific eating habits and ideas, and clearly understand the necessity of nutrition intervention. Make use of the existing technology to effectively carry out nutrition survey for various types of sports, and use the method of combining management, health, canteen and other methods to provide nutrition intervention guidance for individual athletes, so as to further improve the level of athletes.

CONCLUSION

The timely diagnosis of sports fatigue is conducive to timely understanding the basic physical condition of athletes, adjusting the training content according to the physical differences of athletes, and a healthy nutritional structure after sports is conducive to rapidly improving the physical quality of track and field athletes, promoting the recovery of athletes' physical functions, and helping them achieve better results. In the study, it can be seen that track and field athletes can adopt targeted healthy diet to make the nutrition intake more comprehensive, which is more conducive to ensuring the athletes' nutrition balance and actively supplementing the training consumption. The improvement of athletes' physical quality needs scientific nutrition intervention. Relevant departments and coaches need to pay more attention to how to build the nutrition structure and learn relevant content.

The timely diagnosis of sports fatigue needs to attract the attention of athletes and coaches in time to reduce the physical injury after sports overwork. In terms of diet structure, athletes' understanding of the knowledge related to reasonable nutrition intake is superficial, and their attention is low as a whole. Athletes need to actively understand the relevant content and judge their own nutritional needs. On the whole, it is necessary for coaches and athletes to learn and discuss the correct and reasonable nutrition structure and the correct way of nutrition intake. Good physique is not only influenced by innate physique and acquired training, but also inseparable from the timely diagnosis of track and field athletes' sports fatigue and the quality of acquired nutrition supplement.

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