THE PREVENTION METHOD OF SPORTS MEDICINE IMAGING MODELING

O MÉTODO PREVENTIVO DA MEDICINA DO ESPORTE NO MODELO DE IMAGENS

EL MÉTODO PREVENTIVO DE LA MEDICINA DEL DEPORTE EN EL MODELO DE IMÁGENES

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ABSTRACT

Introduction: Sports injury is an important reason to interfere with sports training and physical exercise since it will not only bring unnecessary pain to the injured body, but also bring out negative emotions in athletes. Objective: To study the sports injury characteristics of high level competitive aerobics athletes in China. Methods: Literature data, questionnaire survey, expert interviews, field observation, mathematical statistics and physiotherapy tracking were used. Results: Wrists, ankles, waist and knees were the most frequently injured parts in high level competitive aerobics athletes in China. The main type of injury was acute injury, but chronic injury (48.18%) could not be ignored. Ninety percent of active high-level competitive aerobics athletes train with injuries, and 10 percent of them completely stop training because of injuries. Conclusions: Athletes should pay attention to their physical reserve and strengthen physical training. They must also be attentive to self-supervision, their own subjective feelings, and control the amount of exercise done. ***Level of evidence II; Therapeutic studies - investigation of treatment results.***

Keywords: Athletic injuries; Exercise; Gymnastics.

RESUMO

Introdução: As lesões no esporte são uma razão importante para interferir no treinamento esportivo e no exercício físico, já que não apenas levam a dor desnecessária do corpo lesado, mas também levam a emoções negativas em atletas. Objetivo: Estudar as características de lesões esportivas de atletas de ginástica aeróbica de alto nível competitivo na China. Métodos: Dados da literatura, questionário de sondagem, entrevistas especializadas, observação de campo, estatísticas matemáticas e acompanhamento fisioterapêutico foram usados. Resultados: Pulsos, tornozelos, cintura e joelhos são as partes lesadas com maior frequência nas atletas de ginástica aeróbica de alto nível competitivo na China. O tipo mais comum é a lesão aguda, porém a lesão crônica (48,18%) não pode ser ignorada. Noventa por cento de atletas de ginástica aeróbica de alto nível competitivo na ativa treinam com lesões, e 10% param de treinar completamente devido às lesões. Conclusões: Atletas devem ficar atentos a suas reservas fiscais e fortalecer seu treino físico. Devem também ficar atentos a auto supervisão, ao seu estado emocional e controlar a quantidade exercícios que praticam. ***Nível de evidência II; Estudos terapêuticos – investigação de resultados de tratamento.***

Descritores: *Traumatismos em atletas; Exercício físico; Ginástica.*

RESUMEN

Introducción: Las lesiones en el deporte son una razón importante para interferir en el entrenamiento deportivo y en el ejercicio físico, ya que no solo llevan al dolor desnecesario del cuerpo lesionado, sino que llevan a emociones negativas en atletas. Objetivo: Estudiar las características de lesiones deportivas de atletas de gimnasia aeróbica de alto nivel competitivo en China. Métodos: Se utilizaron datos de la literatura, encuestas de sondeo, entrevistas especializadas, observación de campo, estadísticas matemáticas y acompañamiento fisioterapéutico. Resultados: Muñecas, tobillos, cintura y rodillas son las partes lesionadas con mayor frecuencia en las atletas de gimnasia aeróbica de alto nivel competitivo en China. El tipo más común es la lesión aguda, pero la lesión crónica (48,18%) no puede ignorarse. Noventa por ciento de atletas de gimnasia aeróbica de alto nivel competitivo en China entrenan con lesiones, y 10% paran de entrenar completamiento debido a las lesiones. Conclusiones: Atletas deben atentarse a sus reservas fiscales y fortalecer su entrenamiento físico. Deben también atentarse a la autosupervisión, a su estado emocional y controlar la cantidad de ejercicios que practican. ***Nivel de evidencia II; Estudios terapéuticos – investigación de resultados de tratamiento.***

Descriptores: *Traumatismos en atletas; Ejercicio físico; Gimnasia.*

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INTRODUCTION

Sports injury is an important reason to interfere with sports training and physical exercise. It will not only bring unnecessary pain to the injured body, but also make the athletes have negative emotions in psychology. If this problem can arouse high attention, prevention, change the uncontrollable factors into controllable factors, we can prevent it in the first place, the incidence of sports injury control in the minimum. Taking aerobics athletes as an example, the characteristics of sports injuries were studied.[1]

With the rapid development of sports cause and the continuous evolution of competition rules in China, competitive aerobics tends to complete the technical movements with high difficulty and high standard, which puts forward higher requirements on the physical fitness, skills and psychological quality of the athletes with high level of competitive aerobics. How to avoid sports injury has become the key to achieve excellent results. The training of high-level competitive aerobics athletes is a long-term and complex process, which requires a large amount of manpower and material resources. Once the injury occurs, it will directly or indirectly affect the normal study and life of athletes, restrict the systematic and continuous training of athletes, affect the maintenance and further improvement of athletic performance of athletes, and even end the competitive career of athletes early, resulting in a great waste of sports talents.[2]

METHOD

Subjects

Characteristics of sports injury of high level competitive aerobics athletes in China.

RESEARCH METHODS

Literature method

Referred to a large number of domestic and foreign works and papers on competitive aerobics and sports injuries, which is the theoretical basis of this study.

Expert interview

According to the research needs, the authoritative experts in the teaching and training of competitive aerobics were interviewed

Questionnaire survey

According to the research needs, this study designed a set of questionnaire for athletes and a set of questionnaire for coaches. Admission requirements for the samples: athletes who have gained international masters, national masters, level 1 and other skills for more than one year nationwide; The training team members have obtained the above three levels of coaches. There are two ways to obtain athletes' samples: one is to conduct a questionnaire survey on 73 players who meet the conditions of this study in a competition site of the National Aerobics League; Secondly, a questionnaire survey was conducted among 15 national team members who participated in the training and 12 qualified athletes from the sports and art department of Beijing Sport University. The coaches' samples were 20 active coaches who participated in the pre-competition coaches' team leaders' meeting during a competition in the National Aerobics League. Basic information of athletes.[3] (Table 1)

Through statistical test, the validity and reliability of the questionnaire in this study meet the research requirements. (Table 2 and Table 3)

Mathematical statistics

MicrosoftOfficeExcel2003 statistical software was used for data statistics, and some data were processed by SPSS13.0 statistical software.

Table 1. Basic information of high-level competitive aerobics athletes.

Sports level	Gender	The number of people	Men and women than	The number of people (%)	Years of aerobics training		
					$\bar{x} \pm s$ (year)	The biggest	The minimum
The international masters	Man	16	4:1	23.26	7.61±2.98	11	4
	Woman	4			8.00±1.00	9	7
National athlete	Man	13	21:1	26.74	6.57±2.78	13	3
	Woman	10			6.78±2.91	11	1
Sports level	Man	21	1:1	50	3.38±1.30	12	2
	Woman	22			5.41±2.52	10	2
The overall	Man	50	1.4:1	100	5.74±2.84	13	2
	Woman	36			2.81±2.66	12	2
A combined	The total	86	1.4:1	100	5.77±2.73	13	1

Table 2. Questionnaire validity test.

Evaluation	Very effective	Effective	More effective	General	Invalid
Questionnaire Structure for Athletes	10	2			
Questionnaire content for athletes	8	2	2		
Questionnaire structure for coaches	11	1			
Questionnaire content for coaches	9	2	1		

Table 3. Reliability test table of questionnaire retest.

Questionnaire categories	Re-test the sample number	Interval between two times (d)	The correlation coefficient	Look-up table
Athlete Questionnaire	10	21	0.904	P<0.01
Coach Questionnaire	5	21	0.917	P<0.01

Logical analysis

Use induction, analogy and other logical analysis methods to make a comprehensive analysis of the observed objects and the situation reflected in the questionnaire.

Observation method

To observe the training process and rehabilitation of the national training team on the spot.

RESULTS

Common indicators for describing sports injuries include the rate of injury, the common site of injury, the duration of injury, the impact of injury on sports training (i.e., injury degree), the time of injury, and the relationship between injury and sports technique.According to the relationship between injury and sports technique, it can be divided into sports technique injury and non-sports technique injury. The following will analyze the injury characteristics of high-level competitive aerobics athletes in China from these aspects.[4]

The injury rate and analysis of high-level competitive aerobics athletes in China

This is shown in Figure 1. With the improvement of the level and the development of technology, damage becomes an inevitable problem. This is related to the training characteristics of events with long training duration, high training density and many competitions.[5]

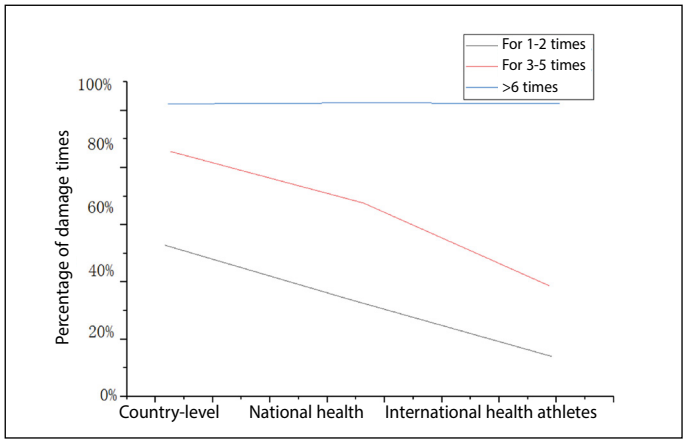

Figure 1. Frequency of morbidity of Chinese high-level competitive aerobics athletes in recent one year.

Table 4. Distribution of injury sites of Chinese high-level competitive aerobics athletes of different skill levels.

Injury	The international masters (n=20)		The international masters (n=23)		Level 1 (n=43)	
	The number of injured	%	The number of injured	%	The number of injured	%
Neck	5	25.00	3	13.04	4	9.30
Shoulder	8	40.00	4	17.39	0	0.00
Elbow	3	15.00	1	4.35	3	6.98
Wrist	9	45.00	10	43.48	9	20.93
The palm	1	5.00	1	4.35	1	2.33
The waist	13	65.00	7	30.43	5	11.63
Hip	8	40.00	4	17.39	1	2.33
Knee	7	35.00	6	26.09	7	16.28
Ankle	12	60.00	7	30.43	8	18.60
Toes	0	0.00	1	4.35	4	9.30

Distribution characteristics and analysis of common injury sites of high-level competitive aerobics athletes in China

According to the needs of investigation, one of the classification basis of injury is determined as the injury site, so that the training of this part can be more targeted in the training process, so as to enhance the anti-injury ability of the vulnerable part. The injury rates of wrist, ankle, waist, knee, hip and shoulder in the top six injury sites were 45.35%, 41.86%, 36.05%, 29.07%, 19.77% and 17.44% respectively, all of which were relatively high injury rates.[6] The last four injuries were neck, elbow, toe and palm, and the injury rates were 16.28%, 10.47%, 9.30% and 5.81%. The top six vulnerable parts of high level competitive aerobics athletes include the four vulnerable parts of competitive gymnastics, namely wrist, waist, knee and shoulder, while the ankle injury which ranks the second and the hip injury which ranks the fifth are different from the competitive gymnastics. This result shows that there are some movements with similar force structure in the two events, and the research results of injury characteristics, causes and prevention of competitive gymnastics can be used for reference to competitive aerobics.[7] The above is the overall distribution characteristics of the injured parts of high-level athletes. If the injury parts of high-level athletes are further subdivided by the three technical levels of international athletes, national athletes and national first-class athletes, it can be found that the distribution of the injured parts of high-level athletes at different sports levels also has its own characteristics, as shown in Table 4.[8]

The injury rate of toe decreased with the increase of athletes' sports level, while the injury rate of other parts increased with the increase of athletes' sports level on the whole. The highest injury probability of international athletes is waist injury, which is 65.00%, followed by ankle injury and wrist joint injury. The overall injury probability of national athletes is in the middle, among which the wrist joint has the highest injury probability of 43.48%, waist and ankle are the second and third, both of which are 30.43%. The overall injury probability of Level 1 was the lowest among high-level athletes, and the injury probability of wrist joint ranked the first among athletes of this level (21.43%), followed by ankle (19.05%), and the third was knee (16.67%). It can be seen that the distribution characteristics of injury sites are slightly different among athletes of different sports levels, among which the ankle and wrist joint have a relatively large injury ratio among all high-level athletes. With the lengthening of training time, increasing density, increasing number of competitions and higher level of participation in competitions, athletes' waist injuries have gradually become prominent, which needs to be paid attention to by national teams, universities, bases, centers and other training teams at all levels.[9]

DISCUSSION

The degree of athletic injury is to point to the degree that presses athletic ability to lose, specific divide for light injury, slander injury, serious injury. Those who are able to train according to the training plan after being injured are called minor injuries; those who are unable to train according to the training plan after being injured and need to stop the training or reduce the activities of the affected part are called slander injuries; Serious injuries are those that require medical treatment (e.g., hospitalization) to be stopped from training. The analysis from the degree of injury is beneficial to the formulation and modification of training plan, which is the special feature of the evaluation standard of sports injury degree, which is different from other medical injuries. The survey results show that the sports injury degree of high-level competitive aerobics athletes is mainly moderate and mild, of which the minor injury accounts for 49%, the vilified injury accounts for 41% and the serious injury accounts for 10%.[10]

CONCLUSION

Wrists, ankles, waist and knees are the most common parts of sports injuries in high level competitive aerobics athletes in China. The main type of injury was acute injury, but chronic injury (48.18%) could not be ignored. Ninety percent of active high-level competitive aerobics athletes train with injuries, and 10 percent of them completely stop training because of injuries. Therefore, athletes need to pay attention to physical reserve and strengthen physical training; And pay attention to the research and analysis of movement technology training, do a good job in self supervision, pay attention to their subjective feelings such as dizziness, fatigue, weakness, etc.), but also pay attention to the wrist, ankle, waist and knee joints easy injury such as muscle, ligament around whether there are acid bilges feeling of pain or stiffness, if feel this way, players need to control sports load on its own. Coaches should pay attention to the recovery measures after training, and require athletes to actively use various means to relax after training, and rationally use cold therapy, heat therapy, cold compress, hot compress, massage, electric therapy, light therapy and other methods.

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