EFFECTS OF RUNNING ON SPORTS INJURIES DURING REHABILITATION

EFEITOS DA CORRIDA SOBRE AS LESÕES ESPORTIVAS DURANTE A REABILITAÇÃO

EFECTOS DE LA CARRERA EN LAS LESIONES DEPORTIVAS DURANTE LA REHABILITACIÓN

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ABSTRACT

Introduction: Running is a simple, comfortable, low-cost aerobic exercise that promotes health and prevents obesity and heart and brain diseases. Its practice has grown considerably as therapy, and recent studies indicate that there may also be benefits during physical rehabilitation. Objective: Study the effects of running on sports injuries during rehabilitation. Methods: A search was made in the current medical literature to develop a therapeutic management plan. The experimental test method consisted of a study with 38 healthy runners. They were divided into healthy and injured groups according to their sports injuries. Within one year after the experiment, the physical function of the two groups of runners was evaluated again. The result was compared through mathematical statistics among other research methods. Results: The total score of the injured group in the FMS test of screening general body movement function was ≤14 points; the comparison found that the athletes in the injured group generally showed weaker bilateral function than the healthy group. Conclusion: Running exercise is feasible in patients with sports injuries, medium intensity running can improve the speed of recovery in these patients. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Running; Athletic Injuries; Rehabilitation.

RESUMO

Introdução: A corrida é um exercício aeróbico simples, confortável e de baixo custo que pode promover a saúde e prevenir a obesidade, doenças cardíacas e cerebrais. Sua prática tem crescido bastante como uma terapia e estudos recentes indicam que possam haver benefícios também durante o processo de reabilitação física. Objetivo: Estudar os efeitos da corrida sobre lesões esportivas durante a reabilitação. Métodos: Efetuou-se uma pesquisa na literatura médica atual para elaborar um plano de conduta terapêutica. O método de teste experimental consistiu num estudo com 38 corredores saudáveis. Eles foram divididos em grupo saudável e grupo lesionado, de acordo com suas lesões esportivas. Dentro de um ano após o experimento, avaliou-se novamente a função física dos dois grupos de atletas. O resultado foi comparado através do método de estatística matemática entre outros métodos de pesquisa. Resultados: A pontuação total do grupo lesionado no teste FMS de triagem da função de movimento corporal geral foi de ≤14 pontos, a comparação constatou que os atletas do grupo lesionado geralmente mostraram uma função bilateral mais fraca do que o grupo saudável. Conclusão: O exercício de corrida mostrou-se viável em pacientes com lesões esportivas, uma corrida de média intensidade pode melhorar a velocidade de recuperação desses pacientes. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

***Descritores*:** *Corrida; Traumatismos em Atletas; Reabilitação.*

RESUMEN

Introducción: La carrera es un ejercicio aeróbico sencillo, cómodo y de bajo coste que puede promover la salud y prevenir la obesidad y las enfermedades cardíacas y cerebrales. Su práctica ha crecido mucho como terapia y estudios recientes indican que puede haber beneficios también durante el proceso de rehabilitación física. Objetivo: Estudiar los efectos de la carrera en las lesiones deportivas durante la rehabilitación. Métodos: Se realizó una búsqueda en la literatura médica actual para elaborar un plan de manejo terapéutico. El método de prueba experimental consistió en un estudio con 38 corredores sanos. Se dividieron en un grupo sano y otro lesionado según sus lesiones deportivas. Un año después del experimento, se volvió a evaluar la función física de los dos grupos de corredores. El resultado se comparó mediante el método de la estadística matemática, entre otros métodos de investigación. Resultados: La puntuación total del grupo lesionado en la prueba FMS de detección de la función de movimiento corporal general fue de ≤14 puntos, la comparación encontró que los atletas del grupo lesionado mostraron generalmente una función bilateral más débil que el grupo sano. Conclusión: Se demostró que el ejercicio de correr es factible en pacientes con lesiones deportivas, la carrera de intensidad media puede mejorar la velocidad de recuperación en estos pacientes. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

***Descriptores*:** *Carrera; Traumatismos en Atletas; Rehabilitación.*

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INTRODUCTION

As an aerobic exercise, running is easy, comfortable, low-cost, easy to improve, and can promote health and prevent obesity, heart disease, and brain disease, and other chronic diseases due to running at home and abroad, sports, and running. competition. has grown like a mushroom.[1] For runners, it is a lifestyle in pursuit of physical and mental health, for the host city, it is a way to spread culture and promote economic development, for the country, it is an important strategy to achieve "Healthy China", forming a virtuous circle. Ye L constructed a functional fitness training system for basketball players based on a three-level training model.[2] Orchard J W also used this as a theoretical basis to construct a badminton player's body movement function evaluation index system. These studies have a good reference for other projects to carry out physical exercise function training practice and theoretical research.[3] Everhart J S et al summarized the common sports injury risk factors in running events from the aspects of biomechanics, anthropometrics, neuromuscular and training.[4] Nielsen R O believes that the physical fitness of football players refers to flexibility and stability as the basis, form and physical function as the guarantee conditions, and sports quality as the core element, maintain conditions for football players to train and play.[5] Valizade-Orang A also believes that the real core of functional training is the therapist's understanding of sports injuries in the diagnosis and treatment, rather than a training tool, and consider functional training as the application of functional anatomy to exercise training.[6] Described by Zhan J as a "ring" around the abdomen, Weak muscles or lack of coordination can lead to incapacity, poor movement patterns, stress, overuse, and injury.[7] The purpose of this study is to investigate the runners to understand the basic situation of their running, the characteristics of sports injuries, compare the injury characteristics of runners of different genders, analyze the causes of sports injuries, in order to provide reference for further research on injury prevention of runners.

METHOD

Research object

The author takes the construction of the physical motor function index system of adolescent middle-distance runners and its empirical evidence in lower extremity sports injuries as the research object.

Research methods

Documentation Law

The subject words are "motor function", "body motor function training", "middle-distance running body motor function", "middle-distance runners' sports injuries", "middle-distance runners' biomechanics and sports injuries" and so on. In the National Library and the Library of the Capital Institute of Physical Education, relevant literatures were retrieved through CNKI (Chinese literature and foreign literature), EBSCO Sports Science Database, WebofScience and other databases.[8] On the basis of extensive reading, focus on reading related articles on body motor function, body motor function training, physical fitness, etc., as the logical starting point and the basis for analysis of this research.

Test method

In this study, 42 young middle-distance runners from an amateur sports school in a province were selected, and 2 athletes with a history of lower extremity injury in the past six months were excluded, and a total of 40 people were included. All athletes have more than 2 years of middle and long-distance running training experience, and are over 14 years old and under 17 years old, including 24 male athletes and 16 female athletes. There are 18 second-level athletes and 22 third-level athletes. After the completion of the test, 2 male athletes transferred schools, and the remaining 38 athletes, including 22 males and 16 females, are shown in Table 1. Except for 2 athletes, the dominant leg of all athletes is the right side, the physical function of young middle-distance runners was tested, and the injuries of the athletes within one year after the test were collected, and divided them into healthy and injured groups. All subjects voluntarily participated and gave full informed consent to the test, and signed the informed consent form.

Test method

For the first three days of all the following tests, the subjects stopped large-scale exercise or high-intensity training, and the training was mainly relaxation running training, the tests were mostly arranged on weekends, and each test was conducted on 1-2 items, and sufficient rest time was arranged between each test.

Mathematical Statistics

Subjects' age, height, weight, leg length, years of training, and test results were descriptive statistics with mean and standard deviation (M±SD). Uniform 95% confidence interval was used, $P<0.05$ was considered significant, and $P<0.01$ was considered highly significant.[9]

Ethical Compliance

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Guilin University of Electronic Technology following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

Statistics of damage

Statistics on the injuries of the athletes during the year. Number of Injuries Most athletes have 1-2 injuries in a year. Athletes suffered a total of 3 hip and thigh injuries, the knee joint injury was the most (9, 23.7%), and the calf and calf tibia, achilles tendon, ankle, and foot injuries were 4 each. Statistics on the left and right sides of lower extremity injuries showed that 4 people were injured on the left leg, 10 people were injured on the right leg, and 3 people were injured on both sides, as shown in Figure 1. In addition, judging from the time of injury of athletes in a year, the number of athletes injured in December-January (7 people) and June-July seasons (9 people) is the highest at the end of winter training, the distribution of the number of injuries in other training months is relatively scattered, it can be seen that most athletes are injured due to high exercise volume and high intensity.

Table 1. Basic information of athletes (N=38).

Gender	N/person	Age	Height (cm)	Weight (kg)	Training years	Leg length (cm)
Total people	38	14.8±1.4	159.0±26.2	49.3±11.1	1.3±0.7	88.0±4.1
Male	22	14.8±1.5	161.6±31.7	52.4±11.8	1.2±0.7	88.4±4.2
Female	16	14.3±1.1	154.4±9.6	43.7±7.4	1.3±0.8	87.4±4.3

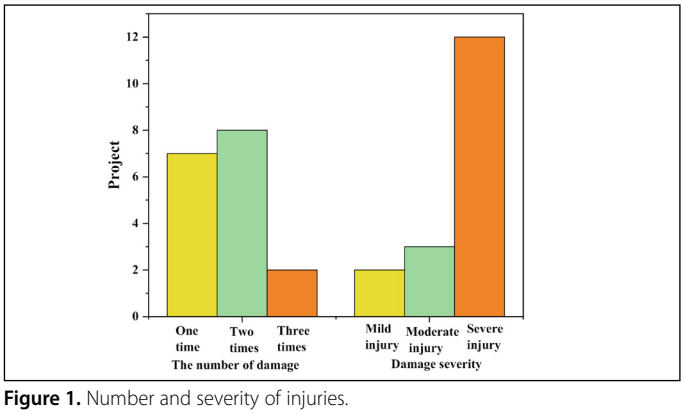

Figure 1. Number and severity of injuries.

The above data show that the injury rate of young middle-distance runners is 44.7%, and male injuries are higher than female injuries. Most of the injured athletes are injured at a more severe level, and there are more athletes with 1-2 injuries a year.

Comparison results of the overall functional movement screening on both sides of the healthy group and the injured group

Table 2 conducts paired sample T-test on the FMS test results on both sides of the healthy group and the injured group, respectively. The results showed that the difference was significant in the healthy group($P<0.05$) , except for leg support, and other scores of the game were not different ($P>0.05$) .

The paired sample T test showed that the results of the above-mentioned adolescent middle-distance runners in the healthy group and the injured group were compared on both sides of the body motor function test, there was no significant difference in the results of physical motor function test of both sides of the injured group ($P>0.05$), while the difference in the scores of lower limb flexibility in the healthy group except for the FMS test was significant ($P<0.05$), and other indicators had no significant difference. Significant difference ($P>0.05$).

Comparison and analysis of muscle function test results between healthy and injured groups

As shown in Table 3, the comparative results of the muscle strength of the injured muscle group and the healthy group showed that the maximum strength, muscle tension, and breaking strength of the healthy group was more than the injured. group, but the breaking strength test of the healthy group was greater than that of the injured group ($P <0.05$).

The results of the comparison of muscle function between the healthy group and the injured group showed that, the injured leg in the injured group had better muscle function than the matched leg in the healthy group, and the results of the explosive standing long jump were significantly different between the two groups.

DISCUSSION

This study found that 81.3% of lower back injuries among long-term runners in Beijing were lower in this study, which may be due to longer age and more running of participants in this study. Most runners suffer from sports injuries during and after exercise. This may be due to the lack of research on warm-up and cool-down, most runners warm up before running for less than 10 minutes, and the warm-up is usually stretching and running.[10] Preparation during exercise should include 5-10 minutes of general preparation, such as running and jumping, and 8-12 minutes of dynamic stretching. process is insufficient.

Table 2. Comparison of the paired sample T-test results of the FMS test results on both sides of the injured group and the healthy group (N=38 people).

Project	Injury group			Healthy group		
	Healthy legs	Injured leg	P value	Matching legs	Match leg to leg	P value
Squat	--					
Hurdle step	2.3±0.5	0.4±0.5	1.00	2.3±0.5	2.1±0.3	0.17
Straight split squat	2.3±0.5	2.3±0.5	1.00	2.4±0.5	2.4±0.5	1.00
Shoulder flexibility	2.8±0.5	2.8±0.4	1.00	2.9±0.3	2.8±0.6	0.34
Active leg lift	2.1±0.7	1.9±0.8	0.59	2.0±0.9	2.4±0.8	0.04*
Body rotational stability	2.0±0.0	2.0±0.0	1.00	2.1±0.6	1.69±0.3	0.17

Table 3. Comparison of muscle function between the injured leg in the injured group and the matched leg in the healthy group (N=38 people).

Test items		Injured group injured leg	Healthy group matching legs	P value
Max force/kg	1RM Single Leg Squat	102.6±28.6	106.7±13.1	0.09
Muscular endurance	Single leg 90° half squat	28.8±26.0	29.3±11.2	0.21
Explosive force/cm	Standing long jump	181.8±65.3	192.4±24.8	0.049*

CONCLUSION

In recent years, due to the continuous change in people's knowledge of health and health prevention strategy, the index of the group involved in the physical exercise has gradually expanded. Compared to walking, running, and other sports, more intense sports like basketball and soccer are more likely to cause sports injuries. For people with running injuries, the consequences of sports injuries not only affect the next exercise, but also easily affect their activities and the everyday life, causing a lot of stress for the patient. Experience in injury management has shown that severe sports injuries often require a long period of time before normal activity can be restored.

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