APPLICATION OF PHYSICAL TRAINING IN INJURY REHABILITATION IN TABLE TENNIS ATHLETES

APLICAÇÃO DO TREINAMENTO FÍSICO NA REABILITAÇÃO DE LESÕES EM ATLETAS DE TÊNIS DE MESA

APLICACIÓN DEL ENTRENAMIENTO FÍSICO EN LA REHABILITACIÓN DE LESIONES EN ATLETAS DE TENIS DE MESA

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ABSTRACT

Introduction: Table tennis is a combative sport, and although there is no physical confrontation between athletes, its fast and intense movements require high physical conditioning. The knee joint is held in the flexed state for an extended period, and a deficiency in its stability can lead to disabling injuries. The International Table Tennis Federation reforms have led scientists to research further the stability and strengthening of the CORE muscles for injury prevention. Functional Motion Scanning is a screening technique devised to assess and guide musculoskeletal therapeutic protocol. However, there is still a misunderstanding about using this technique in table tennis players. Objective: Study the application of Functional Motion Scanning in the rehabilitation of sports injuries in male table tennis players. Methods: 20 college table tennis players from Hebei Normal University, aged 18 to 24 years, with sport level grade 2 and test score <8 and knee assessment scale score less than 90 points had the following data evaluated: Functional Motion Scan results, body composition, vertical jump, circumference, and lower limb strength. The exercise intensity and load were adjusted according to the individual physical condition of the participants who did not perform any other parallel activities during the 12 weeks of training. There was intervention three times a week for 20 to 25 minutes during the first six weeks. From the seventh to the twelfth week, intervention two times a week for 25 to 30 minutes. SPSS20.0 software was used for statistical analysis and graphing. Results: The number of knee injuries in table tennis gradually decreased from 3 to 1. An overall reduction in BMI and an increase in thigh and calf circumference were also observed. Conclusions: Physical training with screening positively impacted the prevention and treatment of knee injuries. ***Evidence Level II; Therapeutic Studies - Investigating the result.***

Keywords: Fitness Trackers; Physical Education and Training; Microtrauma, Physical.

RESUMO

Introdução: O tênis de mesa é um esporte combativo e embora não haja confronto físico entre os atletas, seus movimentos rápidos e de intensidade exigem alto condicionamento físico. A articulação do joelho é mantida no estado de flexão por um longo período e uma deficiência em sua estabilidade pode levar a lesões incapacitantes. As reformas da Federação Internacional de Tênis de Mesa levaram os cientistas a aprofundar pesquisas na estabilidade e fortalecimento da musculatura do CORE, visando a prevenção de lesões. O Escaneamento de Movimento Funcional é uma técnica de triagem idealizada com o intuito de avaliar e guiar o protocolo terapêutico musculoesquelético. Porém, ainda há incompreensões sobre a utilização dessa técnica em jogadores de tênis de mesa. Objetivo: Estudar a aplicação do Escaneamento de Movimento Funcional na reabilitação das lesões esportivas dos jogadores masculinos de tênis de mesa. Métodos: 20 jogadores de tênis de mesa universitários da Universidade Normal de Hebei, de 18 a 24 anos, com nível esportivo de grau 2 e pontuação no teste <8 e pontuação na escala de avaliação para joelho inferior a 90 pontos tiveram os seguintes dados avaliados: resultados do Escaneamento de Movimento Funcional, composição corporal, salto vertical, circunferência e força de membros inferiores. A intensidade do exercício e a carga foi ajustada de acordo com as condições físicas individuais dos participantes que não realizaram outras atividades paralelas durante as 12 semanas de treinamento. Durante as primeiras 6 semanas, houve intervenção 3 vezes por semana durante 20 a 25 minutos. Da sétima até a décima segunda, intervenção 2 vezes por semana entre 25 a 30 minutos. O Software SPSS20,0 foi utilizado para a análise estatística e elaboração dos gráficos. Resultados: O número de lesões no joelho no tênis de mesa diminuiu gradualmente de 3 para 1. Observou-se também redução geral do IMC e aumento de circunferência de coxa e panturrilha. Conclusões: O treinamento físico com triagem apresentou um impacto positivo na prevenção e tratamento de lesões no joelho. ***Nível de evidência II; Estudos Terapêuticos - Investigação de Resultados.***

***Descritores*:** Monitores de Aptidão Física; Educação Física e Treinamento; Microtraumatismos Físicos.

RESUMEN

Introducción: El tenis de mesa es un deporte combativo y, aunque no hay enfrentamiento físico entre los deportistas, sus movimientos rápidos e intensos requieren un elevado acondicionamiento físico. La articulación de la rodilla se mantiene en estado de flexión durante mucho tiempo y una deficiencia en su estabilidad puede provocar lesiones incapacitantes. Las reformas de la Federación Internacional de Tenis de Mesa han llevado a los científicos a seguir investigando sobre la estabilidad y el fortalecimiento de los músculos CORE, con el fin de prevenir las lesiones. La exploración del movimiento funcional es una técnica de cribado concebida para evaluar y orientar el protocolo

terapéutico musculoesquelético. Sin embargo, todavía hay malentendidos sobre el uso de esta técnica en los jugadores de tenis de mesa. Objetivo: Estudiar la aplicación del Escaneamiento de Movimiento Funcional en la rehabilitación de las lesiones deportivas de los jugadores masculinos de tenis de mesa. Métodos: Se evaluaron los siguientes datos de 20 jugadores universitarios de tenis de mesa de la Universidad Normal de Hebei, con edades comprendidas entre los 18 y los 24 años, con un nivel deportivo de grado 2 y una puntuación en la prueba <8 y una puntuación en la escala de evaluación de la rodilla inferior a 90 puntos: resultados del escáner de movimiento funcional, composición corporal, salto vertical, circunferencia y fuerza de las extremidades inferiores. La intensidad y la carga del ejercicio se ajustaron según las condiciones físicas individuales de los participantes que no realizaron otras actividades paralelas durante las 12 semanas de entrenamiento. Durante las primeras 6 semanas, se intervino 3 veces por semana durante 20-25 minutos. Del séptimo al duodécimo, intervenga 2 veces por semana durante 25 a 30 minutos. Se utilizó el software SPSS20.0 para el análisis estadístico y la elaboración de gráficos. Resultados: El número de lesiones de rodilla en el tenis de mesa disminuyó gradualmente de 3 a 1. También se observó una reducción general del IMC y un aumento de la circunferencia del muslo y la pantorrilla. Conclusión: El entrenamiento físico con cribado mostró un impacto positivo en la prevención y el tratamiento de las lesiones de rodilla. ***Nivel de evidencia II; Estudios terapéuticos - Investigación de resultados.***

Descriptores*: Monitores de Ejercicio; Educación y Entrenamiento Físico; Microtraumatismos Físicos.*

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INTRODUCTION

Table tennis is an antagonistic sport across the net. Although there is no physical confrontation among athletes, athletes need to constantly complete various high-density steps in the process of sports.[1] The knee joint is maintained in the flexion state for a long time. If the stability of the athlete's knee joint is poor or the strength of the muscles around the knee joint is insufficient, the knee joint injury is more likely to occur. In the training of table tennis players, coaches only pay attention to special training and ignore the training of physical fitness and other aspects. The physical qualities such as the strength of table tennis players have not been trained, the weak links of the body have not been strengthened, and the number of knee injuries is increasing. In recent years, with a series of reforms of the International Table Tennis Federation, the requirements of table tennis for core strength have become higher and higher, and the core strength training has also attracted the attention of many people in the field of table tennis.[2] Many coaches and athletes have taken core strength training as the content of physical training. However, there are still many misunderstandings about core strength in the current physical training system. The following first expounds a series of related concepts of core power. Then, combined with the characteristics of table tennis, this paper discusses the role of core strength training in the training of table tennis players and its training methods. This study tries to analyze the knee function and injury of table tennis players through FMS test and knee function evaluation. According to the situation of knee injury, the rehabilitation physical training of table tennis players in Colleges and universities is formulated. Rehabilitation physical training such as flexor and extensor strength training, static squatting and balance pad squatting not only help injured college table tennis players recover knee function, enhance the strength of muscle groups around knee joint, reduce the incidence of knee joint re injury, but also strengthen the physical quality of non injured athletes and increase the capital of injury prevention.[3]

METHOD

Subjects

Experimental study on the prevention and treatment of knee injury of table tennis players in Hebei Normal University.

Research methods

Inclusion criteria: 1. Age 18-24 years old; 2. Table tennis grade II (or above); 3. For athletes who meet the scores of FMS and knee evaluation scale, the score of FMS test is less than 8 points (out of 12 points), and the score of knee evaluation scale is less than 90 points (out of 100 points).

The exercise prescription is as follows. During training, the exercise intensity and load shall be further adjusted according to the physical conditions of men, women and athletes. Athletes are required to actively cooperate in training and do not carry out other training after participating in rehabilitation physical training.

1. Phase I: (1-6 weeks): intervene 3 times a week for 20-25 minutes each time.
2. The second stage (7-12 weeks): intervention twice a week, 25-30 minutes each time.

Data processing

Using spss20.0 mathematical statistics software and Microsoft Office word2003 carry out statistical analysis and chart making on the obtained data.[4]

RESULTS

Body shape indexes of athletes before and after rehabilitation physical fitness training

Table 1 shows the injuries of table tennis players in Hebei Normal University before training. Three athletes had knee injuries, two athletes had waist injuries, two athletes had shoulder injuries and one athlete had injuries in other parts. The injuries of these athletes belong to chronic injuries and can normally participate in training, but they often have slight pain when the load of special training intensity is large.

It can be seen from Figure 1 that after 3 months of rehabilitation physical fitness training, the FMS test scores of female athletes before and after training show that there are significant differences in scores of squatting, hurdles, lunge squatting and straight knee lifting before and after training ($P < 0.01$, see Figure 1). Among them, before training, the average score of female athletes' squat is 1.7, hurdle is 1.8, lunge squat is 1.9, and straight knee lift is 2.1.

As the knee rehabilitation physical training mainly focuses on the prevention of knee injury, strength training and stability training are

Table 1. Injury parts of athletes before and after training.

		Damage site	Knee joint	Waist	Shoulder	Other
Number of people	Before training	4	3	2	1	1
	After training	3	2	1	0	0

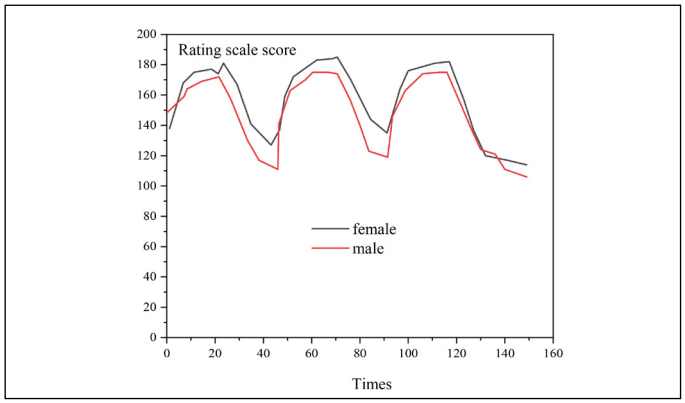

Figure 1. Recovery function evaluation score.

formulated for the knee, and no injury prevention training scheme is formulated for the shoulder and waist. Therefore, after 3 months of knee rehabilitation physical training, only knee injury was prevented and reduced, but the knee rehabilitation physical training did not have a positive impact on the injury prevention of other parts.[5,6]

DISCUSSION

After 3 months of rehabilitation physical training, there was significant difference in the injury of table tennis players before and after training ($P < 0.05$). Before training, the injuries of table tennis players in Hebei Normal University were knee, waist, shoulder and other parts, in which the proportion of knee injury was the largest. Because the knee joint of table tennis players needs to be in the flexion state to complete various steps and swing movements, maintaining this action for a long time is easy to lead to knee joint injury. Therefore, knee joint injury accounts for a large proportion in the injury of table tennis players.[7] Among them, 3 athletes had knee injury, 2 athletes had waist injury, 2 athletes had shoulder injury and 1 athlete had wrist injury. As the knee rehabilitation physical training mainly focuses on the prevention of knee injury, strength training and stability training are formulated for the knee, and no injury prevention training scheme is formulated for the shoulder and waist. Therefore, after three months of knee rehabilitation physical training, only the knee injury was prevented and reduced, but the knee rehabilitation physical training did not have a positive impact on the injury prevention of other parts.

Table tennis is famous for its fast speed, fast change and strong skills. Therefore, table tennis has high requirements for athletes' rapid response and rapid movement ability. Athletes need to change direction quickly for a long time in competition or training. If there is not enough core strength for support, the foot will lack sufficient stability every time it moves to the ground, and the injury of lower limb joints will be inevitable. In the fierce physical movement and rapid attack and defense transformation of athletes, strong core strength helps to maintain the accuracy of limb movement process and keep people's limbs in a normal position. It has a very important small muscle group that plays a stabilizing role, and it is also a key protection of the body. Their joint action has greatly prevented the occurrence of sports injury. Core strength helps athletes grasp the body center of gravity in the process of movement, so that the fulcrum of the foot when landing and the projection point of the body center of gravity are in a reasonable position, so as to reduce the injury probability of athletes when landing support.[8-9]

In addition, because the waist of table tennis players is twisting for a long time, different degrees of waist injury will be very common. Among the core muscle groups, multifidus muscle and transverse abdominal muscle play an important role in protecting the stability of human spine in the human trunk. Their arrangement position is similar to the inverted "t", so they are also called "t" protective belt. They cooperate with other small muscle groups and share the great responsibility of maintaining the stability of spinal column. When the strength of transverse abdominal muscle and multifidus muscle is strengthened, the stability of lumbar spine will be better, which will effectively reduce the probability of lumbar injury. If the athletes have suffered from different degrees of waist injury, they can carry out core strength training within the allowable range of the injury to strengthen the strength of the "t" protective belt. With the strengthening of the strength of relevant muscle groups, the injured lumbar spine of athletes will be in a gradually stable environment, which can not only prevent the further deterioration of sports injury, but also play a good role in helping rehabilitation.[10]

CONCLUSION

Rehabilitation physical training has an important impact on the prevention and control of knee joint injury. Through fascia relaxation and balance pad training, the function of the knee joint is improved, which improves the stability of the knee joint, and is conducive to reducing the incidence of knee joint injury.With the continuous development of competitive sports, the importance of scientific training is becoming more and more obvious, table tennis is no longer a simple technical competition, and the higher and higher confrontation intensity also puts forward higher requirements for the physical quality of athletes. Athletes more efficiently improve competitive ability to maintain fitness, also requires modern sports training to be more scientific and systematic. Core strength is an important part of modern physical training and a very key physical quality of table tennis players.

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