

ANALYSIS OF JOINT INJURIES AND MOVEMENT SKILLS IN COLLEGE BASKETBALL



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ANÁLISE DE LESÕES ARTICULARES E HABILIDADES DE MOVIMENTO NO BASQUETEBOL UNIVERSITÁRIO

ANÁLISIS DE LESIONES ARTICULARES Y HABILIDADES DE MOVIMIENTO EN EL BALONCESTO UNIVERSITARIO

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ABSTRACT

Introduction: Reducing the risk of joint injuries is especially important in combative contact sports such as basketball. **Objective:** Analyze the joint injuries of college basketball students and outline methods of improving sports skills to prevent sports injuries. **Methods:** The experimental group used a specific training for basketball skills training and knee joint recovery. The control group remained in ordinary basketball training, lasting 60 minutes, thrice a week for eight weeks. **Results:** The experimental group increased their squat level from 1.83 to 2.14 after the experiment; in terms of hurdles, there was a change from 2.09 to 2.62, the experimental group increased from 1.37 to 2.48, and in terms of active lower limb lifting, the experimental group increased from 2.19 to 2.72 after the test. **Conclusion:** The training presented showed a clear effect on the recovery of knee joint function and improvement in the competitive level of college basketball athletes. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Basketball; Sports Injuries; Knee.

RESUMO

Introdução: Reduzir o risco de lesões articulares no esporte é principalmente importante em esportes combativos de contato, como o basquete. **Objetivo:** Analisar as lesões articulares dos estudantes universitários de basquetebol e traçar métodos de aperfeiçoamento das habilidades esportivas para prevenir as lesões esportivas. **Métodos:** O grupo experimental utilizou um treinamento específico para treino de habilidades de basquetebol e recuperação articular dos joelhos. O grupo de controle manteve-se no treinamento de basquetebol comum, com duração de 60 minutos, três vezes por semana durante 8 semanas. **Resultados:** O grupo experimental aumentou o nível de agachamento de 1,83 para 2,14 após o experimento, em termos de obstáculos, houve alteração de 2,09 para 2,62, o grupo experimental aumentou de 1,37 para 2,48, e em termos de elevação ativa dos membros inferiores, o grupo experimental aumentou de 2,19 para 2,72 após o teste. **Conclusão:** O treinamento apresentado revelou um efeito evidente na recuperação da função articular do joelho e na melhoria do nível competitivo dos atletas universitários de basquetebol. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Basquetebol; Lesões Esportivas; Joelho.

RESUMEN

Introducción: Reducir el riesgo de lesiones articulares en el deporte es especialmente importante en los deportes combativos de contacto, como el baloncesto. **Objetivo:** Analizar las lesiones articulares de los estudiantes universitarios de baloncesto y esbozar métodos de mejora de las habilidades deportivas para prevenir las lesiones deportivas. **Métodos:** El grupo experimental utilizó un entrenamiento específico para el entrenamiento de las habilidades en el baloncesto y la recuperación de la articulación de la rodilla. El grupo de control siguió con el entrenamiento ordinario de baloncesto, de 60 minutos, tres veces por semana durante 8 semanas. **Resultados:** El grupo experimental aumentó el nivel de sentadilla de 1,83 a 2,14 después del experimento, en cuanto a las vallas, se produjo un cambio de 2,09 a 2,62, el grupo experimental aumentó de 1,37 a 2,48, y en cuanto a la elevación activa de las extremidades inferiores, el grupo experimental aumentó de 2,19 a 2,72 después de la prueba. **Conclusión:** El entrenamiento presentado reveló un claro efecto en la recuperación de la función de la articulación de la rodilla y en la mejora del nivel competitivo de los atletas universitarios de baloncesto. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptorios: Baloncesto; Lesiones en Deportes; Rodilla.



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INTRODUCTION

With the development of basketball, the relevant theoretical knowledge and technical actions have gradually matured. In addition, with the holding of major sports events, many college students have been attracted to participate. It can be said that basketball is very popular in

college physical education courses. High basketball is a kind of sports that the joints and muscles of the whole body work together to coordinate and combine aerobic and anaerobic activities.¹ Now, with the continuous improvement of the basketball concept, the project is developing in a high, fast and accurate direction. However, there is still a certain gap

between China's basketball training system and the world's advanced system. Because of the huge population of our country, the number of people who participate in basketball is also very large. In particular, the participation of college students is extremely high. When most college students participate in basketball, they lack the accumulation of theoretical knowledge, which leads to many hidden dangers in the process of sports. Different levels of basketball have different requirements for the body. In the process of sports, once you make technical actions beyond your body's tolerance, it is easy to cause sports injuries.² In all the basic basketball technical movements, the combination of running and jumping accounts for the majority. All kinds of technical movements need joint cooperation. Irregular movements are easy to cause serious joint damage.³ Long time and high intensity sports lead to fatigue, which is also an unsafe state of exercise.⁴ Moreover, basketball is a sport with skills. The reasonable use of movement skills is very helpful for the on-the-spot play and good sports injury.⁵ When colleges and universities carry out basketball courses, they should emphasize the use of skills in technical movements and other links. In fact, correct the students' wrong technical actions, and avoid all kinds of sports joint injuries caused by incorrect force generation.⁶ The curriculum should pay attention to the teaching of theoretical knowledge, so as to avoid students' blind movement, which may lead to failure to achieve the ideal training results. A thorough study of the injury of basketball joints and the use of movement skills will help students improve their basketball skills, have a positive impact on the improvement of college basketball courses, and contribute to the development of basketball in colleges and universities.⁷

METHOD

Investigation and research method

In order to analyze the impact of basketball joint injuries on college students and the ways of prevention in the training process, the basic situation of basketball specific college students' joint injuries should be analyzed first. In this paper, two rounds of questionnaires were distributed to basketball students who had joint injuries in a university. The content of the first round of questionnaire is the location of joint injuries of college basketball players. Through the collection of the questionnaire results, it can be seen that the knee joint injuries are the most, so the knee joint is the focus of this study. Then the second round of questionnaire was issued. The second round of questionnaire included three questions: first, the gender of college athletes, second, the injury of knee joint, and third, the cause of sports injury. The study and all the participants were reviewed and approved by Ethics Committee of Hunan Institute of Science and Technology (NO.HNITS019-PT25). A total of 60 questionnaires were distributed in the two rounds, and 58 valid questionnaires were obtained in the first round. In the second round, 35 questionnaires were distributed and 35 valid questionnaires were collected, including 24 male basketball players and 11 female basketball players.

Control experiment method

Among the 24 male basketball players who had knee joint injuries and basically recovered, 20 volunteers were recruited on a voluntary basis. These 20 volunteers have all experienced minor knee injuries and returned to the sports ground after good treatment. Twenty male basketball majors were randomly divided into 10 control groups and 10 experimental groups, numbered A to J. See Table 1 for specific basic information.

In terms of injury prevention and movement skill training, FMS test was selected as the reference. FMS test includes seven movements, such as deep squat, hurdle frame, straight lunge, shoulder joint flexibility, active leg lifting, and push up rotation stability. It can not only improve

Table 1. Basic information of subjects.

Experience group				Control group			
Number	Age	Height	Weight	Number	Age	Height	Weight
A	19.3	186.1	81.5	A	20.1	193.6	83.3
B	20.9	193.8	78.6	B	19.3	187.8	82.7
C	20.9	190.2	74.5	C	20.4	188.1	80.4
D	19.0	189.8	70.6	D	19.4	192.2	80.8
E	20.8	186.1	81.1	E	19.8	194.5	82.2
F	19.4	188.2	83.3	F	20.8	195.0	79.1
G	20.8	189.2	80.2	G	21.0	190.0	80.4
H	20.9	194.2	73.7	H	19.8	187.3	75.1
I	19.8	193.5	78.2	I	19.1	190.2	82.8
J	19.0	186.9	82.7	J	19.7	187.9	83.0

the movement skills of basketball, but also serve as a judgment standard for functional action screening to analyze the prevention of athletes' sports injuries.

Before the experiment, 7 indexes were tested, including deep squat, hurdle frame, straight lunge, shoulder joint flexibility, active leg lifting, and push up rotation stability. After the start of the experiment, the experimental group used targeted training to purposefully train the movement skills of basketball and the recovery of the knee joint, while the control group used ordinary basketball teaching skills. The duration of each exercise training was 60 minutes, and the relevant exercise training was conducted three times a week for a total of 8 weeks. During the experiment, the two groups of athletes maintained the same intensity of sports training except for the different contents of experimental training, and the two groups of athletes did not have sports injuries or diseases during the entire experimental cycle, thus ensuring the preciseness of the experimental results.

At the end of the experiment, the indexes of squat, hurdle frame, straight lunge, shoulder joint flexibility, active leg lifting, and push up rotation stability of the two groups of athletes were measured again. After obtaining the relevant data, in order to make the research more intuitive and more targeted, the obtained data were simplified and processed in the form of a three-point system. Among them, 3 points are excellent and fluent; 2. The athletes can complete relevant movements, but there are certain negligence and stiffness in the movement process, and the movements are not smooth enough; 1. The athletes' movements are not smooth, or even can not complete the specified movements; If the score is less than 1, the athletes will feel painful during the exercise. Excel software is used to sort out and analyze the data, and SPSS software is used to process the data.

RESULTS

Basic situation of joint injuries of college students majoring in basketball

As shown in Figure 1, 58 college basketball players suffered injuries at different joints. It can be seen from Figure 1 that the number of knee injuries was the largest, 35, accounting for 60.34%; The second is ankle joint injury, with 21 people, accounting for 36.21%; The third is wrist joint injury, with 14 people, accounting for 24.14%; Then came shoulder joint injury, with 8 people, accounting for 13.79%; The last one is elbow joint injury, with 3 people, accounting for 5.17%.

As shown in Figure 2, the second round of questionnaire survey was conducted for 35 people with knee joint injuries, and their gender and injured side were analyzed. It can be seen from Figure 2 that the most injured knee joint is on the left side, including 12 male athletes, accounting for 34.29% of the total, and 6 female athletes, accounting for 17.14% of the total; The second place in the distribution of knee joint injuries is bilateral injuries, including 7 male athletes, accounting for 20.00% of the total number, and 3 female athletes, accounting for

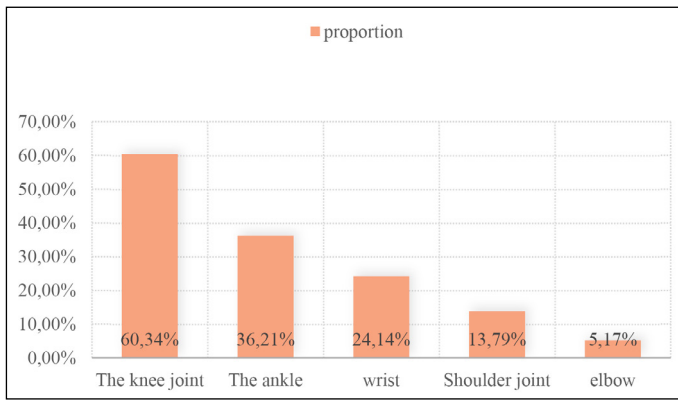


Figure 1. Injury of different joints of college basketball players.

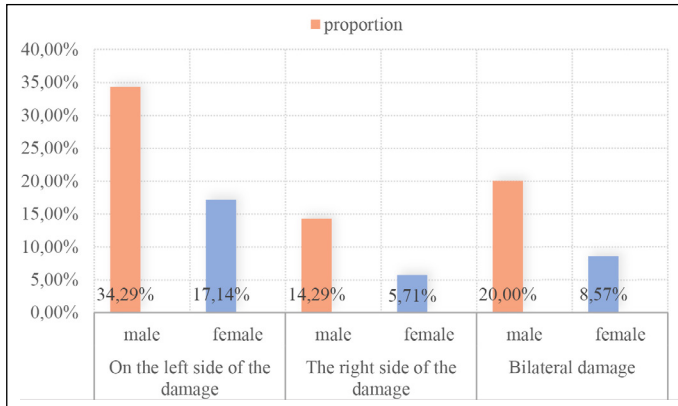


Figure 2. Distribution of knee joint injuries of college basketball players.

8.57% of the total number; The lowest proportion of injuries was on the right side, including 5 male athletes, accounting for 14.29% of the total number, and 2 female athletes, accounting for 5.71% of the total number.

As shown in Figure 3, the causes of knee injuries of college basketball players. It can be seen from Figure 3 that the main cause of knee joint injury is fierce confrontation, with 15 injured, accounting for 42.86%; Secondly, fatigue exercise and warm-up were insufficient, among which 8 people were injured by fatigue exercise, accounting for 22.86%, and 8 people were injured by insufficient warm-up, accounting for 22.86%; The third is the interference of other diseases, with 3 injured, accounting for 8.57%.

By summarizing and analyzing the contents of Figure 1, Figure 2 and Figure 3, it can be seen that knee joint injury is a relatively large proportion in the current basketball game. In the knee joint injuries, the left knee joint has a high proportion of injuries, and most of the knee joint injuries of athletes are caused by such factors as fierce confrontation in the training process and insufficient warm-up. Therefore, in sports training, some non-standard actions should be prohibited, and attention should be paid to warm-up activities. When fatigue occurs, the training should be stopped immediately to relax, so as to prevent injuries to the athletes' knee joints and prolong the athletes' sports life as much as possible.

Preventive effect of targeted training on sports injuries of college basketball players

After analyzing the joint injuries of athletes, it can be seen that knee joint injuries are a major sports risk in the sports training of college basketball athletes. Therefore, certain targeted training should be taken in sports training, which can not only enhance college basketball sports skills, but also prevent sports injuries, so as to prolong college basketball sports life, Improve sports level and competitive ability. The specific results are shown in Table 2 and Table 3.

Comprehensively comparing the results in Table 2 and Table 3, in terms of deep squatting, the experimental group increased from (1.835 ±

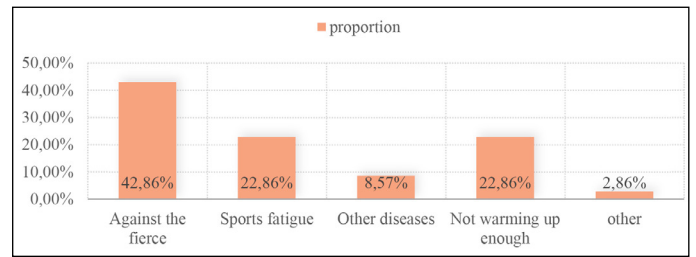


Figure 3. Causes of knee joint injuries of college basketball players.

Table 2. Preventive effect of targeted training on sports injury in experimental group.

Test items	Before training	After training	P
Squat	1.835±0.051	2.145±0.030	P<0.01
Hurdle frame	2.094±0.060	2.620±0.039	P<0.01
Straight Lunge	1.786±0.051	2.722±0.031	P<0.01
Shoulder flexibility	1.376±0.069	2.480±0.030	P<0.01
Active leg lifting	2.190±0.051	2.722±0.061	P<0.01
Push-up	2.431±0.089	2.832±0.040	P<0.01
Rotational stability	1.855±0.050	2.602±0.051	P<0.01

Table 3. Effect of general training on prevention of sports injury in control group.

Test items	Before training	After training	P
Squat	1.825±0.040	2.013±0.050	P>0.05
Hurdle frame	2.114±0.070	2.175±0.079	P>0.05
Straight Lunge	1.816±0.030	2.375±0.041	P>0.05
Shoulder flexibility	1.327±0.050	2.246±0.050	P>0.05
Active leg lifting	2.219±0.051	2.396±0.031	P>0.05
Push-up	2.402±0.089	2.731±0.050	P>0.05
Rotational stability	1.825±0.030	2.236±0.051	P>0.05

0.051) before the experiment to (2.145 ± 0.030) after the experiment, and the control group increased from (1.825 ± 0.040) before the experiment to (2.013 ± 0.050) after the experiment; In terms of hurdles, the experimental group increased from (2.094 ± 0.060) before the experiment to (2.620 ± 0.039) after the experiment, and the control group increased from (2.114 ± 0.070) before the experiment to (2.175 ± 0.079) after the experiment; In terms of straight lunge, the experimental group increased from (1.786 ± 0.051) before the experiment to (2.722 ± 0.031) after the experiment, and the control group increased from (1.816 ± 0.030) before the experiment to (2.375 ± 0.041) after the experiment; In terms of shoulder joint flexibility, the experimental group increased from (1.376 ± 0.069) before the experiment to (2.480 ± 0.030) after the experiment, and the control group increased from (1.327 ± 0.050) before the experiment to (2.246 ± 0.050) after the experiment; In terms of active leg lifting, the experimental group increased from (2.190 ± 0.051) before the experiment to (2.722 ± 0.061) after the experiment, and the control group increased from (2.219 ± 0.051) before the experiment to (2.396 ± 0.031) after the experiment; In terms of push ups, the experimental group increased from (2.431 ± 0.089) before the experiment to (2.832 ± 0.040) after the experiment, and the control group increased from (2.402 ± 0.089) before the experiment to (2.731 ± 0.050) after the experiment; In terms of rotation stability, the experimental group increased from (1.855 ± 0.050) before the experiment to (2.602 ± 0.051) after the experiment, and the control group increased from (1.825 ± 0.030) before the experiment to (2.236 ± 0.051) after the experiment. The experimental results show that the targeted training proposed in this paper combines rehabilitation sports with action skills, which can not only improve the athletes' sports level, but also integrate the rehabilitation of knee joints into it, so that athletes can reduce the risk of sports injury on the basis of improving their own skills. Compared with ordinary sports skills training, it is more suitable for people with a history of knee joint injury.

DISCUSSION

Basketball has a strong skill, and reasonable use of technical action can avoid various sports injuries. Moreover, it can improve the sports efficiency and effectively improve their own basketball level. Standardizing the use of various technical movements will help to make scoring easier and more efficient in the attack. In defense, it is not easy to lose points. In basketball competition, the competition time is long, which puts forward high requirements for students' physical fitness. Skilled use of technical movements can help students complete the competition in the most labor-saving conditions. Therefore, in college basketball teaching, the use of basketball movement skills is highly emphasized. In addition, the course content of using scientific skills should be updated in a timely manner to guide students' standardized technical actions. Pay attention to daily physical fitness training. It is helpful to improve students' basketball skills, and students will get richer project experience.

CONCLUSION

Sports injury is inevitable in athletes' sports career. How to strengthen athletes' skill practice, so that athletes can improve their skills and obtain the ability to resist sports injury, is a key part of current research. This article uses targeted training, trying to explore the role of targeted training in improving sports skills and reducing sports injuries. The eight week experimental results show that the training proposed in this paper has obvious effects on the recovery of knee function and the improvement of competitive level of athletes with a history of knee injury, so it is worth promoting.

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AUTHORS' CONTRIBUTIONS: The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Lin Zeyu: writing and execution.

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