

# PHYSICAL TRAINING APPLIED TO INJURY PREVENTION IN BASKETBALL



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TREINAMENTO FÍSICO APLICADO NA PREVENÇÃO DE LESÕES NO BASQUETEBO

ENTRENAMIENTO FÍSICO APLICADO A LA PREVENCIÓN DE LESIONES EN EL BALONCESTO

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## ABSTRACT

**Introduction:** Basketball is a sport with high demands for physical and mental quality. Weakness in any aspect can easily cause damage to the body, with joints being the most stressed parts and extremely vulnerable to damage. **Objective:** Verify the effectiveness of the application of physical training in reducing physical injuries in basketball players. **Methods:** In this study, a total of 124 college students who participated in basketball at 4 universities were volunteers for the research, divided into a control group and an experimental group for an 8-week protocol. During the experiment, the control group participated in basketball four times a week for 6 hours without any intervention measures. Results: The experimental group participated in basketball four times a week for 6 hours, adding 4 times a week plus an additional 4 hours of physical training. It was found that the statistics of sports injuries in the experimental group were significantly lower than those in the control group ( $p < 0.01$ ), and the degree of sports injuries in the experimental group was slightly lower than that found in the control group. **Conclusion:** Eight weeks of 32-hour physical training can prevent sports injuries in college student basketball, providing physical protection for basketball players and preventing sports injuries.

**Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** Physical Education and Training; Basketball; Sports Injuries.

## RESUMO

**Introdução:** O basquetebol é um esporte com altas exigências para a qualidade física e mental. A fraqueza em qualquer aspecto pode facilmente causar danos ao corpo, sendo as articulações as partes mais estressadas e extremamente vulneráveis a danos. **Objetivo:** Verificar a eficácia da aplicação do treinamento físico na redução de lesões físicas dos jogadores de basquetebol. **Métodos:** Neste trabalho, um total de 124 estudantes universitários que participam do basquete em 4 universidades foram voluntários para a pesquisa, divididos em grupo controle e grupo experimental para um protocolo de 8 semanas. Durante o experimento, o grupo de controle participou do basquetebol quatro vezes por semana durante 6 horas sem nenhuma medida de intervenção. Resultados: O grupo experimental participou do basquetebol 4 vezes por semana durante 6 horas, acrescentando 4 vezes por semana, mais 4 horas adicionais de treinamento físico. Verificou-se que as estatísticas de lesões esportivas no grupo experimental foram significativamente menores do que as do grupo controle ( $p < 0,01$ ), sendo o grau de lesões esportivas no grupo experimental ligeiramente menor do que a encontrada no grupo controle. **Conclusão:** Oito semanas de treinamento físico de 32 horas podem evitar lesões esportivas no basquetebol dos estudantes universitários, proporcionando proteção física aos jogadores de basquete e evitando a ocorrência de lesões esportivas. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Educação Física e Treinamento; Basquetebol; Lesões Esportivas.

## RESUMEN

**Introducción:** El baloncesto es un deporte con altas exigencias de calidad física y mental. La debilidad en cualquier aspecto puede causar fácilmente daños en el cuerpo, siendo las articulaciones las partes más estresadas y extremadamente vulnerables a los daños. **Objetivo:** Verificar la eficacia de la aplicación del entrenamiento físico en la reducción de las lesiones físicas en los jugadores de baloncesto. **Métodos:** En este trabajo, un total de 124 estudiantes universitarios que participan en el baloncesto en 4 universidades fueron voluntarios para la investigación, divididos en un grupo de control y un grupo experimental para un protocolo de 8 semanas. Durante el experimento, el grupo de control participó en baloncesto cuatro veces a la semana durante 6 horas sin ninguna medida de intervención. Resultados: El grupo experimental participó en baloncesto cuatro veces por semana durante 6 horas, añadiendo 4 veces por semana más 4 horas adicionales de entrenamiento físico. Se comprobó que las estadísticas de lesiones deportivas en el grupo experimental eran significativamente inferiores a las del grupo de control ( $p < 0,01$ ), y el grado de lesiones deportivas en el grupo experimental era ligeramente inferior al encontrado en el grupo de control. **Conclusión:** Ocho semanas de entrenamiento físico de 32 horas pueden prevenir las lesiones deportivas en el baloncesto de los estudiantes universitarios, proporcionando protección física a los jugadores de baloncesto y previniendo la aparición de lesiones deportivas. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptores:** Educación y Entrenamiento Físico; Baloncesto; Lesiones en Deportes.



## INTRODUCTION

Basketball is one of the most popular sports among college students at present. It is composed of various forms of movements, which requires high consistency of movements of participants, and is competitive and challenging.<sup>1</sup> However, basketball is highly antagonistic and the process of sports is intense. If we don't pay attention to it in the process of sports, it will cause different degrees of sports injuries. College students can strengthen their bouncing ability, increase their muscle content and reduce their body fat rate through physical training, and they won't be easily injured even if they don't warm up enough.<sup>2</sup> However, basketball is highly antagonistic and the process of sports is intense. If we don't pay attention to it in the process of sports, it will cause different degrees of sports injuries. In the process of basketball training, it is necessary to carry out uninterrupted training and competition. If sports injuries occur midway, athletes need to adjust for a period of time, and severe cases will not be able to return to the sports arena.<sup>3</sup> At present, people's awareness of sports is gradually enhanced, and they also show great importance. As an important part of physical education in colleges and universities, basketball has attracted many students' active participation.<sup>4</sup> The reasonable development of physical training plays an important role, so teachers must attach great importance to it. Combining with the actual situation of college basketball education, they should actively carry out scientific and reasonable physical training activities to help students do a good job in preventing sports injuries and fundamentally reduce the probability of basketball sports injuries.

Basketball requires high physical fitness of athletes, and the whole process of sports is intense, so sports injuries happen from time to time. Under this background, in order to reduce the incidence of sports injuries in basketball and ensure students' physical safety, it is necessary to carry out physical training for college students.<sup>5</sup> Regular basketball training can not only effectively improve athletes' heart and lung function, but also play a positive role in athletes' muscles and bones.<sup>6</sup> College students should actively carry out physical training under the guidance of physical education teachers, give full play to the preventive role of physical training in basketball sports injuries, and effectively avoid injuries.<sup>7</sup> In this paper, the concept of physical fitness is described in detail, the types and causes of common sports injuries in basketball are put forward, and the current situation of physical fitness training and its important role in preventing basketball sports injuries are analyzed.

## Overview of physical training and sports injuries

### Physical training

Physical fitness training mainly refers to the coaches' corresponding training activities according to athletes' physical fitness and sports needs, with the aim of enabling athletes to have good physical fitness and participate in sports in the best physical condition. If you want to carry out all kinds of sports smoothly, it must be based on good physical condition. Generally speaking, in the process of sports, various organs and tissues of the body will also be in a certain sports environment, and all aspects of abilities shown in this background are collectively referred to as physical fitness.<sup>8</sup> Generally speaking, in any sports, a certain amount of physical training will be carried out to reduce the probability of athletes' sports injuries, and avoid the inability to continue participating in sports or even more serious situations caused by sports injuries. Physical training is the training process of athletes' body and various parts based on their actual physical condition.<sup>9</sup> Before taking part in sports, it is usually necessary to carry out corresponding physical training activities, so that athletes can make adequate<sup>10</sup> preparations and adjust their physical state during the training process. It plays an important practical role in protecting athletes'

physical functions and reducing the probability of sports injuries, and it can also help athletes get a good sports experience to a certain extent.

## Common basketball sports injuries

### 1. Contusion

Contusion is a kind of closed injury, mainly caused by blunt external force, which occupies a large proportion in basketball. Usually, most of the contusions in basketball are simple finger or wrist contusions, which lead to swelling, subcutaneous bleeding and other problems, and the pain is severe.

### 2. Joint sprain

Joint sprain is mainly the abnormal torsion of the joint, which leads to the damage of related tissues. Usually, ankle joint and knee joint are the places where joint sprains occur most frequently in basketball. In severe cases, joint movement disorder and severe pain are caused.

### 3. Muscle strain

In the process of basketball, more leg movements are involved, so it is easy for athletes to cause muscle strain in this process. Usually, problems such as inadequate preparation, incomplete relaxation of muscles and irregular movements can lead to muscle strain.

## Research object and method

### Literature data method

According to the needs of research writing, this paper consulted papers and books on basketball sports injuries, basketball sports training, basketball biomechanics and rehabilitation physical training at home and abroad, and based on multi-interdisciplinary, analyzed basketball players' sports injuries, explored the rules of basketball players' sports injuries, analyzed the characteristics of rehabilitation physical training system, and thought about the application of physical training in basketball players.

The study is Purely observational studies which no need to registry ID of ICMJE, and all the participants were reviewed and approved by Ethics Committee of Sanmenxia Polytechnic College, China (NO. 2021041)

### Questionnaire survey method

According to the design of the questionnaire, this research adopts two forms: interview and questionnaire, and distributes the questionnaire to outstanding basketball players, aiming at the sports injury and rehabilitation physical training of basketball players. Among them, 124 questionnaires were distributed, 124 were recovered and 124 were valid.

## Experimental method

A total of 124 college students who often take part in basketball in 4 universities are taken as the research objects, and they are divided into the control group (62) and the experimental group (62) for 8 weeks. During the experiment, the control group took part in basketball four times a week for 6 hours without any intervention measures. The experimental group participated in basketball 4 times a week for 6 hours, but added 4 times a week for 4 hours of physical training.

## Research results

In the investigation of whether sports injuries affect daily physical training, it is shown that 31 people are very lightly injured and do not affect normal training, accounting for about 34.8% of the total number of injured people. 31 people were slightly injured, which did not affect normal training, accounting for about 34.8% of the total number of injured people. The degree of injury is average, and there are 22 people who do not affect the normal training, accounting for about 24.7% of the total number of injured people. Five of the injured were seriously injured and unable to train at all, accounting for about 5.6% of the total number of injured. See Table 1 for details.

**Table 1.** Effects of sports injuries on training.

Affect	Example number	Proportion (%)
Very light, does not affect normal training	31	34.8
Light, does not affect normal training	31	34.8
Generally, it does not affect normal training	22	24.7
Heavy, completely unable to train	5	5.6
Total	89	100

There are 89 cases of sports injuries, among which 12 cases are caused by physical dysfunction, accounting for 13.4% of the total cases. There are 8 cases of injuries caused by unreasonable movement techniques, accounting for about 9% of the total cases. There were 4 cases of injuries caused by excessive concentration or distraction, accounting for about 4.5% of the total cases. Ten cases were injured due to poor self-protection consciousness, accounting for about 11.2% of the total cases. There were 10 cases of injuries caused by inadequate preparation activities, accounting for about 11.2% of the total cases. There are 10 cases of injuries caused by excessive training amount and training load, accounting for about 11.2% of the total cases. There are 8 cases of injuries caused by improper protective measures, accounting for about 9% of the total cases. There are 17 cases of injuries caused by accidents and emergencies, accounting for about 19.1% of the total cases. See Table 2 for details.

After 8-week physical training, the sports injuries of the experimental students in group A were significantly reduced. In the experimental group, most of the students with sports injuries are very light and light, accounting for 44.4% and 36.1% respectively. And the students in the experimental group did not have serious injuries that could not continue training. The occurrence of sports injuries of two groups of students is shown in Table 3.

### Analysis and discussion

Any sport requires extra high physical endurance. If endurance is not enough, a complete basketball game can't be sustained or barely sustained, then there is no skill at all. As far as basketball players are concerned, their physical function is directly related to their athletic ability. Therefore, in order to improve the sports ability of basketball players, it is necessary to carry out necessary physical function training. Scientific physical function training can improve the ability of athletes in all parts of the body, especially in the cardiovascular system and respiratory system, and this effect is more obvious. Basketball is an entertainment activity that makes college students relax, so if you want college students to get a better experience of basketball and improve their basketball skills, you need to strengthen their endurance first. Only when you have endurance can you keep up with the rhythm can you play and improve your basketball level. Because basketball sports bags contain many kinds of sports modes, the movement changes at a very fast speed during the training process, and the muscle activities of all parts of the basketball players' bodies have strong unity and variability. In this environment, the nervous system of athletes must be in a state of flexible operation, so as to adjust the muscles of various parts of athletes' bodies in time according to the actual needs and effectively reduce the occurrence of sports injuries.

Basketball is a fierce antagonistic sport. Therefore, in order to ensure confrontation in sports, strength quality training is essential. If we want to play basketball better, we must pay attention to the role of basketball players' strength in the whole basketball game. If basketball players have strong strength, their physical balance, stability and antagonism will be guaranteed. In basketball, when athletes make sprinting or quick aggressive movements, they will stretch the posterior thigh muscles to a certain extent. If the strength of this part can't meet the relevant standards, it is very easy to strain the posterior thigh muscles. Strengthening

**Table 2.** Causes of sports injuries.

Cause	Example number	Proportion (%)
Physical dysfunction	12	13.5
The action technique is unreasonable.	8	9.0
Excessive concentration or distraction	4	4.5
Poor self-protection consciousness	10	11.2
Inadequate preparation	10	11.2
The amount of training and training load are too heavy	20	22.4
Improper protection measures	8	9.0
Accidents and emergencies	17	19.1
Total	89	100

**Table 3.** Comparison of sports injuries among experimental students.

Degree of injury	Control group		Experimental group	
	Example number	Proportion (%)	Example number	Proportion (%)
Very light, does not affect normal training	15	28.3	16	44.4
Light, does not affect normal training	18	34.0	13	36.1
Generally, it does not affect normal training	15	28.3	7	19.4
Heavy, completely unable to train	5	9.4	0	0
Total	53	100	36	100

students' strength training can improve students' ability to resist attacks, thus reducing the harm caused by basketball. At the same time, the improvement of strength quality has a certain positive influence on the coordination of students' dribbling, and it can also make students have strong ball control ability, which also has a certain degree of influence on students' physical flexibility. Systematic physical training can not only improve the strength, but also help college students to practice and guide them to make better use of their whole body strength and concentrate their strength on basketball, so that they can cooperate with their teammates more smoothly and shoot successfully. And when you have enough strength, you will feel that your body becomes more in control, and you can accomplish some difficult movements more easily.

On the basketball court, not only strength and patience compete, but also basketball requires high flexibility and speed, and college students' brains need to run fast. How to break through the enemy's defense or how to prevent the opponent's attack in different situations need to be considered at all times. The fast attack and defense of speed basketball can play a prominent role. If you have good speed, you can occupy a favorable position and time point in basketball and create conditions for scoring. The speed and sensitivity of students' bodies affect the probability of sports injuries to a certain extent. For example, in the process of basketball, athletes are often prone to physical imbalance. In this state, students must quickly change their positions, flexibly control and adjust their bodies, and effectively avoid ankle sprain. Improving the speed in physical training is equivalent to being more flexible and agile in basketball, and you can turn around and pass the ball to your teammates in time. In basketball special speed training, continuous high-speed running training can effectively strengthen the function of knee, ankle, hip and other joints, and improve the explosive force, so as to avoid joint injuries caused by the outbreak of strength during sports.

### CONCLUSIONS

Basketball is a competitive sport, and the process of sports is fierce. Students can cause physical injuries if they don't pay attention. To avoid sports injuries, physical training plays an important role. Basketball has high requirements for all aspects of physical quality. Once one aspect

of physical quality is weak, sports injuries will probably occur in basketball. When basketball is carried out in schools, if students' functions and qualities are not up to standard, it will not only harm the students themselves, but also hinder the school's education. Therefore, it is hoped that the school will continuously pay more attention to students' physical training, so as to reduce the harm to students' bodies. In order to ensure the safety of college students' participation in basketball, teachers must

attach great importance to it. In the process of daily sports, we should analyze the actual situation of different students and formulate scientific and reasonable training programs for them, so as to effectively reduce the probability of sports injuries.

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The author declare no potential conflict of interest related to this article

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## REFERENCES

1. Li H. The effect of physical training on the prevention of basketball injuries in colleges and universities. *Journal of Heze University*. 2018;40(2):4.
2. Yuan Y. The effect of physical training on preventing basketball injuries in colleges and universities. *Chinese Journal of Multimedia and Network Teaching: Electronic Edition*. 2017;(6):2.
3. Zhang Y. The effect and application of physical fitness training on preventing basketball injuries in colleges and universities. *Contemporary Sports Science and Technology*. 2021;11(24):3.
4. Wang W. Analysis of the relationship between functional physical training and sports injuries of college basketball players. *Youth Sports*. 2020;(4):2.
5. Luo K. Analysis of the effect of physical training on the prevention of basketball injuries in colleges and universities. *Sports Fashion*. 2020;(4):1.
6. Yuan Y. Analysis and recovery methods of sports injuries in college sports training. *Contemporary Sports Science and Technology*. 2017;(7):12.
7. Wang T. Exploring the positive role of physical fitness training in preventing basketball injuries. *Youth Times*. 2019;000(14):117-8.
8. Su S. On the effect of physical fitness training on preventing basketball injuries in colleges and universities. *Contemporary Sports Science and Technology*. 2018;8(24):3.
9. Feng Y. The effect of physical training on the prevention of basketball injuries. *Stationery and Technology*. 2021;(16):2.
10. Zheng H. Exploring the effect and measures of physical fitness training on the prevention and treatment of track and field injuries. *Contemporary Sports: Basketball Channel*. 2019;000(22):P.1-2.