

CAUSES AND PREVENTION OF SPORTS INJURIES IN YOUTH BASKETBALL

CAUSAS E PREVENÇÃO DE LESÕES ESPORTIVAS NO BASQUETEBOL JUVENIL

CAUSAS Y PREVENCIÓN DE LESIONES DEPORTIVAS EN EL BALONCESTO JUVENIL



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ABSTRACT

Introduction: Basketball is a fast, intense sport requiring much reasoning and dexterity. It comprises running, jumping, throwing, and other injuries. Students and sports fans deeply love this sport. However, due to the characteristics of basketball, there are many risks of sports injuries in basketball. **Objective:** Investigate the causes of sports injuries in youth basketball training and evaluate preventive countermeasures. **Methods:** This paper analyzes basketball's injury mechanism, causes, and occurrence rules through survey questionnaires. Statistical analysis and recent literature research are performed to support a preventive protocol. **Results:** A protocol for injury prevention and mitigation in basketball was presented. **Conclusion:** To ensure normal training and competition in basketball, one must pay attention to the intrinsic characteristics of injuries in its players, considering the multiple variables that integrate the risks to the athletes' health. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Physical Education and Training; Athletic Injuries; Primary Prevention.

RESUMO

Introdução: O basquetebol é um esporte rápido, intenso, que exige muita destreza e raciocínio. Ele é composto de corrida, salto, arremesso e outras lesões diversas. Este esporte é profundamente amado por estudantes e fãs do esporte. Entretanto, devido às características do basquetebol, há muitos riscos de lesões esportivas no basquetebol. **Objetivo:** Investigar as causas das lesões esportivas no treinamento do basquetebol juvenil e avaliar contramedidas preventivas. **Métodos:** Este artigo analisa o mecanismo de lesões, causas e regras de ocorrência do basquetebol através de questionários de pesquisa. São efetuadas análises estatísticas e pesquisa na literatura recente para embasar um protocolo preventivo. **Resultados:** Foi apresentado um protocolo para prevenção e mitigação de danos nas lesões no esporte do basquetebol. **Conclusão:** Para garantir o treinamento e a competição normal do basquetebol deve-se atentar às características intrínsecas de lesões em seus jogadores, considerando as múltiplas variáveis que integram os riscos à saúde dos atletas. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Educação Física e Treinamento; Traumatismos em Atletas; Prevenção Primária.

RESUMEN

Introducción: El baloncesto es un deporte rápido e intenso que exige mucha destreza y razonamiento. Se compone de carreras, saltos, lanzamientos y otras lesiones diversas. Este deporte es muy querido por los estudiantes y los aficionados al deporte. Sin embargo, debido a las características del baloncesto, existen muchos riesgos de lesiones deportivas en este deporte. **Objetivo:** Investigar las causas de las lesiones deportivas en el entrenamiento del baloncesto juvenil y evaluar las contramedidas preventivas. **Métodos:** Este trabajo analiza el mecanismo de las lesiones, las causas y las reglas de ocurrencia en el baloncesto a través de cuestionarios de investigación. Se realiza un análisis estadístico y una investigación bibliográfica reciente para apoyar un protocolo preventivo. **Resultados:** Se presentó un protocolo de prevención y mitigación de lesiones en el deporte del baloncesto. **Conclusión:** Para garantizar el normal entrenamiento y la competición en el baloncesto es necesario prestar atención a las características intrínsecas de las lesiones en sus jugadores, considerando las múltiples variables que integran los riesgos para la salud de los deportistas.

Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.

Descriptores: Educación y Entrenamiento Físico; Traumatismos en Atletas; Prevención Primaria.



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INTRODUCTION

There are many kinds of movements in basketball, such as running, jumping, throwing, etc., whose structure is very complex, and is restricted by the field conditions and the opponent's movements.¹ Because it is a high-intensity sport that requires jumping, running, and colliding, it has high requirements on all parts of the body. If you don't strengthen your

physical fitness, teenagers are easily injured when playing basketball, and even teenagers will be injured. Self-inflicted great damage.² Moreover, if the athlete makes the wrong action during the competition, which violates the anatomy and sports biomechanics of the knee joint, it will cause the "passive deficiency" of the joint, resulting in serious strain of the muscles and ligaments of the knee joint.³ Basketball is a national fitness

program that is popular among young people. Therefore, this paper proposes a research on the cause of sports injuries in youth basketball training and its preventive countermeasures. Through the analysis of the injury mechanism and causes of basketball sports, as well as the law of injury occurrence, it can ensure that teenagers can carry out basketball training normally and games.

Mechanism and inducement of sports injury

The mechanism of sports injury

Muscle injury caused by long-term muscle contraction or elongation is called muscle strain.⁴ In basketball games, such injuries are very common, mainly in the thigh muscles, calf gastrocnemius, psoas and shoulder muscles. The high probability is because the training level is not high enough, or there is a lack of special preparation activities; in addition, there is another reason that his muscles and strength are relatively weak, and muscle damage is likely to occur in fierce battles.⁵

Causes of sports injuries and their laws

Anyone who knows basketball will find that injuries to the joints of the human body are very common. The cause of the injury: frequent switching of offense and defense makes the athlete's running speed become faster, such as dunks, pull-up jump shots and other technical actions cause injuries to the knees; disguised performances, breakthroughs and other actions will cause damage to the ankle. Greater damage, fingers are likely to be injured when defending.⁶ In addition, some technical movements are also very dangerous, such as blocking shots, forcing breakthroughs and confrontation with the basket, which can cause knee and meniscus injuries. These damages not only cause damage to athletes' bodies, but also to their minds.

Investigation on the Causes of Sports Injuries in Youth Basketball Training

Survey design

A total of 512 young students participating in basketball training in 6 middle schools were selected as the observation objects. The 512 observation objects selected in this study were aged from 15 to 19, including 433 male students and 79 female students. All the subjects participated in a 12 week basketball training course. Through a 12 week follow-up observation, the sports injuries of the observed objects in basketball training were recorded.

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 Hainan Medical College, China (NO. 2021006)

Observation of experimental results

After 12 weeks of follow-up observation, the total number of sports injuries in the training process was 51, accounting for 9.57% of all observation objects. All students with sports injuries should withdraw from training at the first time to ensure personal safety. According to the final statistical analysis, the main sports injuries include knee joint (18 people), twist joint (15 people), waist (9 people), ankle joint (7 people) and others (2 people), as shown in Table 1.

Cause analysis of sports injury

In the observation experiment, it was found that sports injuries with high frequency mainly include knee joint, twist joint, waist and ankle joint. Through interviews with training teachers and injured students, the mainly reasons for sports injuries are summarized in Table 2.

Preventive countermeasures for sports injuries in youth basketball training

1. Improve awareness of prevention: In basketball training, we can't just focus on physical fitness and technology. In order to effectively protect the

Table 1. Types and frequency of sports injuries of the subjects.

Part	Frequency
Knee joint	18
Wrist joint	15
Waist	9
Ankle joint	7
Else	2

Table 2. Location of sports injuries.

Part	Briefly
Knee joint	The knee joint is the most injured part in basketball. The reason for this is the need to lower the body's center of gravity and keep the lower limbs flexed during the exercise.
Wrist joint	In the process of basketball, the passing of basketball is completed by relying on the action of passing the ball. Therefore, when players catch the ball, they will use the power of their wrists to transmit power. If the power is too large, it is easy to cause wrist injuries.
Waist	Waist is the main activity center of teenagers. In basketball training, movements such as turning backwards, jumping, jumping, and stealing from the basket often occur, resulting in waist injuries.
Ankle joint	In basketball, ankle injuries are second only to the knee. Generally, it refers to acute sprains when grabbing a basketball, jumping, or falling on someone's foot.

personal safety of young people, maintain order and standardize training, we must first cultivate the safety awareness of young people, and during this period, warm-up preparation is the top priority.⁷ For certain dangerous and dangerous actions, the teacher should focus on safety issues after the explanation, improve the self-protection awareness of young people, and ensure that they can use correct and standardized actions to truly protect the safety of young people. And although basketball attaches great importance to competition, in sports activities, behaviors that violate the rules of competition shall not occur. There is a certain gap in basketball teaching. In order to improve the effectiveness of basketball teaching, teachers should carry out targeted teaching according to the specific situation of teenagers, so as to achieve the purpose of "teaching according to their aptitude", and gradually increase the difficulty from simple to difficult, so as to improve the quality of basketball teaching. The teaching quality of basketball teaching.⁸

2. Inspection work: Basketball has high requirements on venues and equipment, which is closely related to whether training can be carried out in an orderly manner, and the obsolescence of basketball venues and equipment is also an important factor leading to injuries to athletes.⁹ Teachers and related personnel should conduct regular inspections of the venue and equipment to eliminate potential safety hazards, try their best to ensure the personal safety of young people, and prevent unreasonable injuries caused by venues and equipment. If the field is hard, smooth, cracked and uneven, it is likely to cause knee injuries during the jumping process, which will lead to knee lesions in the long run, thus affecting the healthy development of young people. Therefore, it is necessary to regularly inspect the site and equipment to ensure that they meet the requirements of use, and repair the damaged equipment. At the same time, it is necessary to fully consider the area of the sports field and the distance between the ball rack and the ball rack. If the sports field is too small, teenagers are prone to accidents in the process of grabbing the ball, which should be highly concerned.

3. Pay attention to preparation activities: Preparation before exercise can improve the pleasure of motor organs and promote the exertion of various functions of the body. For example, activities such as stretching muscles and joints can increase the flexibility of ligaments, joints and muscles, thereby reducing injuries in formal basketball games. During the warm-up phase, teenagers can jog, do aerobics, leg lifts, and strides.

Before the official start of basketball, some students have not entered the warm-up stage. Teachers should organize young people to conduct warm-up activities in an orderly manner and explain the functions and benefits of warm-up. During the warm-up phase, each student is checked to ensure they are prepared and less likely to be injured. At the same time, the warm-up after playing the ball cannot be ignored, because a lot of lactic acid will be produced in the body after exercise, which will cause muscle pain. After moderate relaxation, such as running or stretching, it can help teenagers break down lactic acid in the body, so that their physical fatigue can be relieved and the body can recover better.

4. Reasonable arrangement of sports: Basketball is a sports event that combines training and teaching to ensure that training goals and objectives can be achieved without causing sports injuries. In order to minimize the occurrence of sports injuries, the following matters should be noted. First of all, in the daily training, we should organically combine various factors such as physical quality, special skills, and psychological quality. People with poor basic quality will lead to the decline of muscles and strength; and in the usual training, the psychological quality of young people is not noticed, and they often lack courage and fighting spirit. Therefore, teachers should pay attention to cultivate their will, so that they can be competent for basic training. Secondly, different adolescents have different physiques and personality characteristics. We should respect the differences in personality and adopt targeted exercise methods according to their specific conditions.¹⁰ Appropriately reduce the amount of exercise of adolescents with poor physical fitness, strengthen the practice of adolescents with irregular understanding and movement, and improve their movement proficiency and standards. When teens are tired and their body functions decline, at the same time, their nervous systems become sluggish. So, make appropriate adjustments to sports, even pauses, to prevent injury.

5. Standardize standard actions: No matter what you do, you must start with basic skills. Moreover, basketball is more complex, and more attention needs to be paid to the basics of action. In its teaching, the most important thing is not antagonism, excellence and competitiveness of movements, but the standardization of movements should be put first to ensure that the basic movements of young people are correct, so as to effectively prevent the occurrence of safety accidents. In the early stage of teaching, teachers should teach young people correct movements and operating norms to achieve a correct understanding of basketball. Without the guidance of teachers, it is easy to produce wrong cognition and behavior, which makes it difficult to correct in future training, wastes a lot of time and energy, and affects the quality and effectiveness of teaching. In youth basketball, attention should be paid to safety and standardization technology, so that problems can be solved in a timely and effective manner in emergencies, and corresponding emergency rescue agencies should be established to deal with injuries in a timely manner.

6. Strengthen physical training, as shown in Table 3.

Table 3. Physical training items.

Physical training program	Briefly
Speed training	In basketball, the requirements for speed are also getting higher and higher. Fast teens can often get ahead in the race, breaking barriers and winning the final game. Therefore, in the daily training of youth basketball, the exercise of speed is also indispensable. Teachers should focus on teaching teenagers the correct running technique with the ball, improve their running speed, and prevent falls and trampling.
Coordination and agility training	Sensitivity refers to the rapid response of young people to body movements according to the real situation of the movements. Because there are many uncertain factors in basketball, and it will be affected by other factors during a specific game, basketball should not only test the technical level of teenagers, but also pay attention to the flexibility of the body. Strengthening the flexibility and coordination of young people can not only improve the quality of competition, but also effectively protect the personal safety of young people and prevent major safety accidents. In a regular basketball game, teenagers should judge the situation on the court according to their own situation and find the best way to make reasonable adjustments, so as to improve the overall score of the team and win the final victory of the game.
Strength Training	In basketball, strength is an important factor in determining victory and defeat, and it plays an important role in the safety of young people. In order to improve the safety protection awareness of young people, it is necessary to take targeted strength exercises according to the actual training conditions of young people. Because there are many unstable factors in basketball, it will have a direct impact on the athlete's strength, so that the athlete's strength cannot be fully exerted, thus causing the athlete's physical function to be damaged. In order to improve the strength and stability of teenagers and prevent sports injuries caused by lack of comprehensive mastery of movement skills, students can be organized to train in an unstable environment by simulating the action scene of basketball.

CONCLUSIONS

In a word, basketball is very popular among students and is conducive to promoting the healthy development of students' physical and mental health. However, due to the characteristics of basketball, there is more danger of sports injuries in basketball. Therefore, in basketball teaching, attention should be paid to cultivating young people's abilities in strength, speed, coordination, flexibility and other aspects. In the usual training and teaching, it is necessary to strengthen safety education for young people, establish and improve teaching procedures, reasonably arrange the intensity of physical exercise, and prevent young people from being injured. In addition, after the training, teachers should guide the teenagers to relax and stretch to reduce their physical fatigue and prevent them from sports injuries caused by the accumulation of fatigue.

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