

# Causes and Countermeasures of Common Sports Injuries in Track and Field

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**Abstract:** The position of track and field in competitive sports is very important. As a huge resistance in track and field training and competition, sports injuries can affect athletes' training, performance and even sports career. Understanding the common causes of sports injuries and countermeasures for track and field athletes is of great significance to the development of sports in my country. The purpose of this article is to study the common causes and countermeasures of sports injuries in track and field sports. This article uses literature research, questionnaire surveys and other methods to study sports injuries of high-level track and field athletes in colleges and universities, summarizes the rules, and obtains the reasons for the injuries, and further proposes targeted prevention and treatment methods to provide athletes with more scientific theories in accordance with. In this article, through interviews with experts and teachers in the track and field direction of the Provincial Sports University, to understand the basic situation of track and field athletes and other related content. In this article, through interviews with specialists and doctors of the Department of Sports Medicine in the hospitals of the province, the relevant content such as professional knowledge of sports injury treatment is proposed. This article asks questions about the current situation and characteristics of students' sports injuries, the causes of their injuries and their understanding of track and field sports injuries. A questionnaire for high-level track and field athletes in colleges and universities based on the research purpose and content of this article was formulated. The survey results show that about 89% of athletes have suffered sports injuries due to unskilled techniques. Therefore, colleges and universities should master technical movements proficiently during track and field training or competitions to avoid sports injuries as much as possible.

**Keywords:** Track and Field Athlete, Sports Injuries, Causes of Injuries, Countermeasures

## 1. Introduction

For almost all track and field athletes, sports injuries are inevitable obstacles in sports life [1-2]. Once an athlete is injured, it will cause inconvenience in action at a small amount, affect the training effect and competition performance, and at the worst, it will affect the normal life and cause great pain to the athlete [3-4]. In order to reduce as much as possible the sports injuries caused by track and field athletes in training and competitions, sports workers are obliged to develop scientific and targeted protection measures and prevention methods [5-6]. Facing some established sports injuries, it is also necessary to have a set of scientific and convenient rehabilitation methods [7-8].

In the research on common causes of sports injuries and countermeasures in track and field sports, many scholars have studied them and achieved good results. For example, Angeline has used risk management to conduct theoretical studies on athletes' injuries. In his research, he pointed out that the occurrence of acute sports injury must be able to determine the source of the risk and the source of the condition, and further enable the risk to be controlled and transferred[9]. Reidar, P conducted research on gymnastics, football, and running. In the overall data survey, the characteristics and types of athletes with different sports events when they have sports injuries[10].

In the research process of this article, through telephone interviews and actual visits to relevant experts, scholars, coaches, etc., to understand the status quo of sports injuries of high-level track and field athletes in colleges and universities from different perspectives. Explore the rules and characteristics of sports injuries of high-level athletes in colleges and universities, analyze the causes of injuries, and put forward effective preventive measures and suggestions to avoid and reduce the

occurrence of sports injuries to the greatest extent, thereby contributing to the development of college competitive sports.

## **2. Causes and Countermeasures of Sports Injuries in Track and Field**

### ***2.1 Reasons for Track and Field Sports Injuries***

#### **(1) Training factors**

The potential factors that cause sports injuries in track and field events are the special requirements of special techniques and local physiological and anatomical weaknesses. When the two exist at the same time, there is a potential possibility of sports injury. For example, the injury of the internal and external ankle ligaments of the foot occurs more frequently in long jump, high jump and straddle athletes. The ankle joint is the most important weight-bearing joint of the human body. Jumping events in track and field are dominated by running and jumping. If the weight of the strong leg does not move when landing, it is easy to sprain the ankle ligament.

#### **(2) Physiological factors**

Inattention is the second major factor in the psychological factors that cause sports injuries to high-level track and field athletes in colleges and universities. This is because track and field mainly rely on the athlete's own physical fitness for training or competition, and the technical movements of various track and field events It is more complicated and requires a high degree of concentration of the athlete. If you are absent, it will inevitably affect the completion of the action quality.

#### **(3) Other objective factors**

Weather is the second major factor among other objective factors that cause sports injuries to high-level track and field athletes in colleges and universities. This is because the weather conditions have a lot to do with the physical structure of people. Unreasonable clothing and referees can also cause sports injuries. During sports, the unfit or unfitting of clothing, footwear and socks causes sports injuries. The unfair judgment of the referees causes dissatisfaction among athletes and can also lead to sports injuries.

### ***2.2 Measures to Prevent Sports Injuries of High-Level Track And Field Athletes In Colleges And Universities***

#### **(1) Pay attention to warm-up activities and strengthen the protection of vulnerable parts**

Adequate and reasonable preparation activities can rapidly increase the excitability of the central nervous system, speed up blood circulation, weaken the viscosity between muscles and ligaments, increase the stretchability of joints and ligaments, and improve the functions of various organs of the body. Exercise stress. Therefore, adequate and reasonable warm-up activities can not only make the body gradually enter the working state, reduce the inertia of muscle activity, improve athletic ability, but also reduce the occurrence of sports injuries.

#### **(2) Arrange training content scientifically and reasonably**

Coaches should arrange training content reasonably and make adjustments according to the athlete's mental state. The arrangement of training content should reflect the scientific nature, and should be progressive and gradually improved to avoid local overload, excessive training, excessive physical fatigue, and muscle strength. Insufficient, excessive exercise load, etc. Everything must have a certain degree, and the body's ability to be stimulated has a certain limit. It is not that the greater the intensity or amount of exercise, the better. Therefore, the coach should fully consider the athlete's personal physiological characteristics during training and scientifically arrange the exercise load.

#### **(3) Strengthen medical supervision and institutionalized management**

Due to the lack of medical supervision, many athletes and coaches did not make timely diagnosis and treatment after injuries, which led to some athletes' injury training or competition, which increased the reoccurrence and aggravation of sports injuries. Therefore, strengthen medical supervision and establish Institutionalized management, establishing a strict, scientific, and complete medical supervision system. Coaches, physicians, psychologists and other scientific research personnel should formulate reasonable training plans and arrange certain rehabilitation exercises according to the actual

situation of athletes. Carry out detailed and patient rehabilitation training in a planned way.

(4) Pay attention to fatigue recovery and dietary nutrition

Many events in track and field sports have the characteristics of high intensity, fast speed, and large amount of exercise. After high-intensity and large-volume training, if athletes do not take effective recovery measures, they will easily lead to accumulation of fatigue and cause excessive fatigue. And local exercise is too large, which leads to sports injuries. Therefore, after training or competition, athletes should pay special attention to physical recovery and nutritional supplementation. On the basis of ensuring adequate sleep, supplementation of trace elements and minerals, they can eat more fresh vegetables and fruits, which is beneficial to the exercise process.

(5) Strengthen the training of athletes' technical movements

The correct and reasonable technical essentials are in line with human movement science, the principles of movement mechanics and the law of biological development. Therefore, athletes must master the correct movement technique proficiently during training or competition, pay attention to the details of the movement, and avoid the stereotype of the wrong movement. Coach Players should use effective practice methods and means to correct athletes' wrong actions in time, reduce the occurrence of sports injuries, and promote the improvement of athletes' sports performance.

### 2.3 Regression Learning Algorithm Based on Non-Uniformly Distributed Sampling

For a real-valued random sequence  $\{z_i\}_{i=1}^{\infty}$ , note that  $\mathcal{M}_n^b$  is a  $\sigma$  algebra generated by random variables  $z_a, z_{a+1}, \dots, z_b$ . The strong mixing conditions are defined as follows:

For any two  $\sigma$  domains  $\mathcal{J}$  and  $\mathcal{D}$  in the probability space  $Z$ , the  $\alpha$  coefficient is defined as:

$$\alpha(\mathcal{J}, \mathcal{D}) = \sup_{A \in \mathcal{J}, B \in \mathcal{D}} |P(A \cap B) - P(A)P(B)| \quad (1)$$

If when  $i \rightarrow \infty$  is yes,  $\alpha_i = \sup_{k \geq 1} \alpha(\mathcal{M}_1^k, \mathcal{M}_{k+i}^{\infty}) \rightarrow 0$ , then any sequence  $z_i, i \geq 1$  satisfies the  $\alpha$  mixing condition (or Strong mixing conditions). If for some positive constants  $a, b, c$ :

$$\alpha(i) \leq a \exp(-ci^b), \quad \forall i \geq 1 \quad (2)$$

It is said that any sequence  $z_i, i \geq 1$  satisfies the exponential strong mixing condition. If for some positive constants  $a, b$ , there are:

$$\alpha(i) \leq ai^{-b}, \quad \forall i \geq 1 \quad (3)$$

It is said that any sequence  $z_i, i \geq 1$  satisfies the strong mixing condition of polynomials.

## 3. Experimental Research on the Causes of Sports Injuries in Track and Field

### 3.1 Age and Gender Characteristics of Survey Respondents

According to the survey, among the 300 high-level athletes in colleges and universities surveyed, 200 are male athletes and 100 are female athletes. The average age of male athletes is  $18.4 \pm 1.2$  years, and the average age of female athletes is  $18.1 \pm 1.3$  years.

### 3.2 Factors Causing Injury to High-Level Track and Field Athletes in Colleges and Universities

Based on the characteristics of track and field events, this study conducted a thorough, comprehensive and detailed analysis and research on the injury of high-level track and field athletes in colleges and universities from the aspect of technical factors on the basis of understanding the characteristics of sports injuries of high-level track and field athletes in colleges and universities.

### 3.3 Issuance and Recovery of Questionnaires and Mathematical Statistics

A total of 300 athlete questionnaires were distributed in this study, and 282 were retrieved, with a recovery rate of 94%, of which 278 were valid questionnaires, and the effective rate of the

questionnaire was 98.6%. The effective data collected from consultations, surveys, and interviews are based on sociological statistical methods. And the principle, use EXCELL and SPSS statistical software to analyze and process on the computer.

#### 4. Experimental Research and Analysis on the Causes of Sports Injuries in Track and Field

##### 4.1 Distribution of Sports Injury Parts of High-Level Track and Field Athletes in Colleges and Universities

The investigation found that among the 350 high-level track and field athletes surveyed in colleges and universities, 336 athletes had been injured, of which 92 were injured in the thigh, accounting for 27.4% of the total number of injuries, ranking first; the ankle There were 81 injuries, accounting for 24.1% of the total injuries, ranking second; 78 calf injuries, accounting for 23.2% of the total injuries, ranking third; 35 injuries to the waist and back. It accounts for 10.4% of the total number of injuries, ranking fourth; 29 people have knee injuries, accounting for 8.6% of the total number of injuries, and 21 people have wrist injuries, accounting for 6.2% of the total number of injuries, ranking sixth.

Table 1 Distribution of sports injury parts of high-level track and field athletes in colleges and universities

Injury site	Male	Female
Thigh	63	29
Ankle	51	30
Calf	49	29
Back	22	13
Lap	18	11
Wrist	14	7

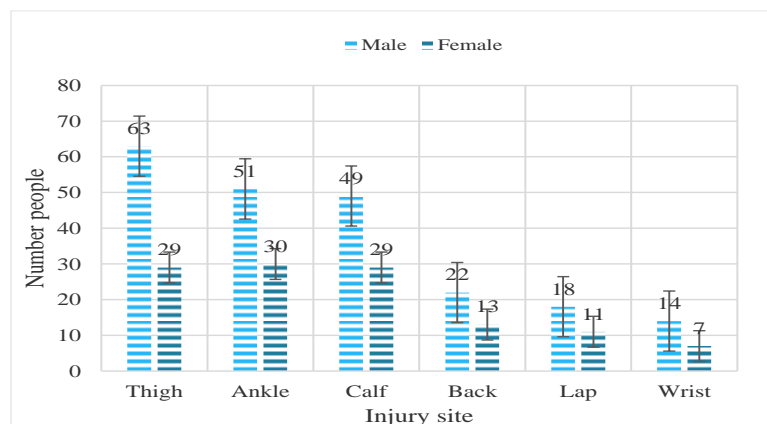


Figure. 1 Distribution map of sports injuries of high-level track and field athletes in colleges and universities

As shown in Figure 1, it can be seen that the thigh is the most important part of sports injuries in college track and field athletes. The main reasons for its easy injury are: active strain, active and violent contraction of the thigh muscles, and its contraction force exceeds the muscle itself. Ability to withstand, and damage to the motif and synergistic muscles that occur when muscle fibers are shortened, such as: sprinting with a strong back push to strain the back muscles of the thigh; passive strain: the muscle is stretched and stretched beyond the muscle itself Stretching limit occurs when the muscle fibers are elongated. For example, when a hurdler swings his leg to cross the hurdle during exercise, the back muscles of the thigh are strained.

##### 4.2 Technical Factors

According to the needs of the research, this research believes that the technical factors that cause sports injuries are foul action, unskilled technical use, technical mistakes, lack of self-protection, etc. The survey results of high-level track and field athletes in colleges and universities are shown in Table 2.

Table 2 Statistics of technical factors causing injuries to high-level track and field athletes in colleges and universities

Technical factors	Male	Female
Action error	42	27
Unskilled	51	36
Opponent action	18	11
Lack of self-protection	40	26
Other	5	2

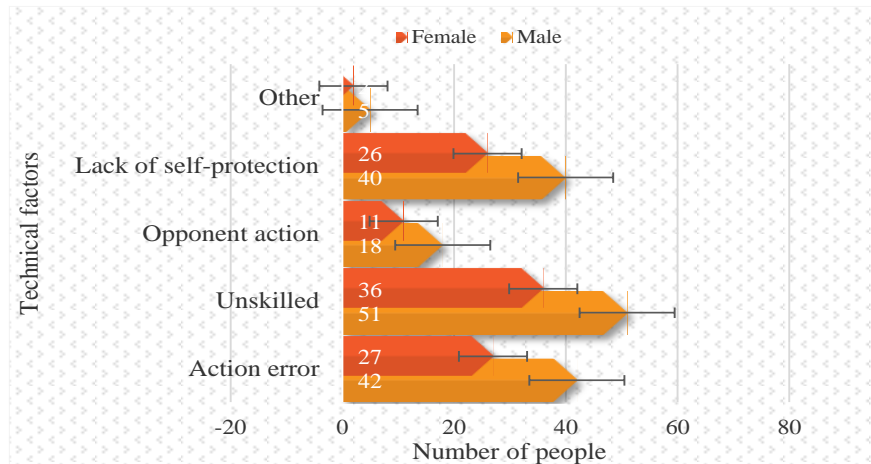


Figure. 2 Statistics of technical factors causing injuries to high-level track and field athletes in colleges and universities

As shown in Figure 2, about 89% of athletes have suffered sports injuries due to unskilled techniques. Unskilled technical use is the most important factor that causes sports injuries to high-level track and field athletes in colleges and universities. Track and field technical movements follow the human body. Formed by the principles of structure and mechanics, unskilled technical use will inevitably lead to poor physical and psychological conditions. Therefore, in the process of track and field training or competition, athletes should be proficient in technical movements to avoid sports injuries as much as possible.

## 5. Conclusions

The investigation in this paper finds that the lack of self-protection actions is the third major factor in the technical factors that cause high-level track and field athletes' sports injuries. Lack of self-protection action refers to the athlete's lack of protection awareness. During training or competition, when sudden situations or sports injuries come, athletes fail to take corresponding preventive measures to protect themselves. Therefore, in the process of track and field training or competition, athletes should continuously strengthen their own protection awareness and purposefully train their own defense capabilities. Coaches should also train athletes' self-protection capabilities in a targeted manner to minimize the occurrence of sports injuries.

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