

## Research on the Prevention and Measures for the Processing of Sports Injuries in Youth Discus Players

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v12-i4/12983>

DOI:10.6007/IJARBSS/v12-i4/12983

**Published Date:** 15 April 2022

### Abstract

Sports injury is a variety of injuries and diseases that occur during physical education and training activities. It not only affects the athletes' academic life and physical exercise, but also easily causes bad psychology to the athletes. [Objective]: In this paper, the prevention and treatment measures of sports injuries in youth discus players are studied. [Methods]: Based on the collection and collation of relevant literature, the situation of sports injuries in youth discus players is analysed through questionnaires, and the main parts, nature, types and degrees of sports injuries in youth discus players are summarised, and the causes of the injuries are discussed. [Subjects]: Forty youth discus players ( $16.8 \pm 1.6$  yrs) from secondary schools were selected as the subjects of this study. [Results]: The prevention and control measures of sports injuries in youth discus athletes were discussed, the characteristics and causes of sports injuries in youth discus athletes were summarized, and the corresponding prevention and control measures were proposed to provide some reference and reference for the development of youth discus athletes' sports.

**Keywords:** Sports Injuries, Discus Sports, Preventive Measures.

### Introduction

Discus throwing is an ancient sport that has been included in the competition of the ancient Greek Olympic Games. In those days, the discus was made of stone and bronze and was thrown head-on on a pedestal. The accumulation of practical experience, changes in apparatus, venues, rules and the continuous development of science have led to the development of throwing techniques from frontal standing, side standing and step-change rotational throwing in the past to backward rotational throwing techniques, which now appear as wide standing, low stance and backward rotational throwing (Liu, 2018).

The throwing event is an important item in China's athletics program, and plays an important role in the process of China's athletics movement to the world. In recent years, the development of China's throwing sports has rapidly reached the world level, and has gained a better ranking in the international arena. The performance of the athletes' technical, tactical, psychological and physical characteristics in the event is also extremely important (Fisker et al., 2017) that will affect their final performance in a significant way. However, due to various reasons, many athletes have suffered from sports-related injuries, which affect their normal training, shorten or even terminate their sports career, and seriously hinder the improvement of the level of throwing sports (Yu, 2021).

Discus is an athletic sport that combines strength and technical acceleration, and its athletic ability structure is characterised by a focus on maximum strength and an emphasis on the combination of strength with speed and technique. During competition, an athlete's physiological potential needs to be developed in order to improve physical function and optimize performance (Smith, 2003). Therefore, failure to achieve an appropriate level of physiological adaptation during training can compromise the efficiency of tactical and tactical abilities and increase the risk of poor performance. As the athlete's level of rapid strength is a decisive factor in the composition of his or her athletic ability, training in this sport is mainly focused on the development of specific explosive power (Liu, 2018). It is important to explore the characteristics of sports injuries and the causes of injuries in youth discus athletes, and to put forward corresponding prevention and treatment plans and suggestions according to the actual situation, in order to promote the competitive level and development of youth discus sports.

## **Methods**

### *Experimental approach to the problem*

The aim of this study is to investigate the characteristics of sports injuries and the causes of injuries in young discus players, and to propose corresponding prevention and treatment programmes and recommendations according to the actual situation. In the first step, a large amount of literature was searched through the China Knowledge Network to obtain a more comprehensive understanding of the teaching mode of youth discus sports and the various conditions of sports injuries that occur during the teaching process. In the second step, a questionnaire survey was conducted to understand the causes of injuries among youth discus players in city A. The third step was to logically analyse the various characteristics and factors that lead to sports injuries during discus sports, and then summarise the patterns of sports injuries according to the specific characteristics of discus sports.

## **Objective**

In this paper, the prevention and treatment measures of sports injuries in youth discus players are studied.

## **Subjects**

Forty youth discus players (16.8±1.6 years) from secondary schools were selected as the subjects of this study. Most of the respondents had some knowledge of sports injuries, which ensured the objectivity of the collected data.

## Results

### *Analysis of Sports Injuries in Youth Discus Players*

Injuries are often sustained in discus sports due to technique, strength and fitness. Discus is a complex sport that requires coordination between different joints and muscles (Zhang, 2017). The results were derived through practice to find out the causes of injuries in young athletes in discus events and to avoid sports injuries. According to the questionnaire statistics, the location, nature, type and degree of injury of athletes are as follows.

#### 1) Sites of Sports Injuries among Youth Discus Athletes

According to the survey, the main areas of injury for youth discus athletes were the knees and lower back, accounting for 35.5% and 25.0%. Details are shown in the table below.

Table 1. Statistics on the main areas of injury in youth discus athletes

Type	Knees	Ankles	Waist	Back	Shoulders	Total
<i>n</i>	14	4	10	4	8	40
Percent (%)	35.0%	10.0%	25.0%	10.0%	20.0%	100.0%

#### 2) Characteristics of Sports Injuries of Youth Discus Players

According to the survey, the injuries of youth discus players were mainly ligament strains, joint injuries, muscle sprains and strain injuries, accounting for 30.0%, 25.0% and 20.0% of the injuries, as shown in Table 2.

Table 2. Statistics on the nature of injuries in youth discus athletes

Type	Ligaments	Joints	Muscles	Strain	Dislocations	Total
<i>n</i>	12	10	6	8	2	2
Percent (%)	30.0%	25.0%	15.0%	20.0%	5.0%	5.0%

#### 3) Types of sports injuries among youth discus players

According to the survey, the types of injuries sustained by youth discus players were mostly acute, accounting for 60.0% of the injuries, of which 40.0% were chronic. The types of injury differed according to the location of the injury, as shown in the table below.

Table 3. Types of Injuries among youth discus athletes

Type	Frequency	Percentage (%)
Acute	12	60.0
Chronic	8	40.0
Total	20	100

#### 4) The Degree of Sports Injuries among Youth Discus Players

After statistical analysis, the degree of injury of youth discus athletes was divided into mild and moderate injuries, accounting for 40.0% and 60.0%; moderate injuries were dominated by athletes, as shown in Table 4.

Table 4. Statistics on the extent of injuries sustained by youth discus throwers

Level	Frequency	Percentage (%)
Minor	8	40.0%
Moderate	12	60.0%
Severe	0	0
Total	20	100.0%

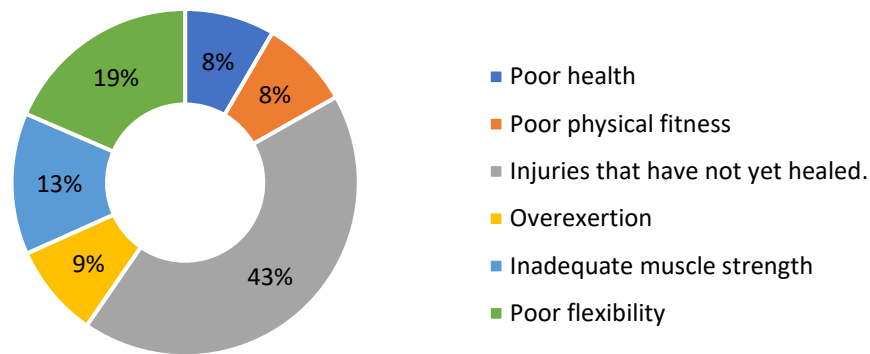
The discus is divided into three phases, the first phase (the starting spin phase), the second phase is the vacating phase and the last phase is the power phase. From the above survey data, it can be seen that the main areas of injury for youth discus players are the knee and lower back, which are the areas with a higher injury rate for specialised athletes (Pan, 2016). As the right leg rotates during the discus event, the knee joint may cause anterior and posterior cruciate ligament injuries during left support. So the right leg keeps rotating, prompting the left foot to land quickly so that the knee ligaments are under high tension, which can prevent knee injuries. When the technical movements are correct, the lack of joint strength and core strength, the strength of other large muscle groups in the body, resulting in insufficient joint support and poor trunk stability are also major factors in knee injuries in discus athletes (He, 2018).

#### **Analysis of the Main Causes of Injury in Youth Discus Throwers**

The throwing event is a sport in which performance is evaluated by distance, the equipment differs in structure, weight and other aspects, and the throwing method is also different (Guo, 2018). The discus uses rotational acceleration with rapid rotation of the lower limbs, and when the right foot hits the ground, a quick turn to form a movement beyond the apparatus and a left brace to complete the final forceful movement. In discus, the most vulnerable part of the body is the knee joint, which is the final force. The discus is a fast and explosive sport, and according to the survey, the initial injury in each sport is acute, with injuries occurring in small muscle groups (Ma, 2019). Once an acute injury occurs, it cannot be treated effectively in time to become a chronic injury, causing the injury to remain untreated and can also trigger the emergence of new injuries.

#### *Physiological Factors*

The main physiological factors for sports injuries in youth discus athletes were: Poor health, Poor physical fitness, Injuries that have not yet healed, Overexertion, Inadequate muscle strength, Poor flexibility, which accounted for 8.4%, 8.4%, 42.8%, 8.7%, 13.2% and 18.5% of the total respectively. The most important reason was untreated old injuries, which accounted for 42.8% of the total, as shown in the chart below.



**Figure 1.** Survey of physiological factors

According to the survey, youth discus athletes before college (middle and high school) are all throwing events, depending on the special body parts have different degrees of sports injuries, sports injuries used to occur in the main parts of the wrist, back, knee, ankle and waist, etc., sports injury parts as shown in the table 5.

**Table 5.** List of areas of previous injury in youth discus players

Parts	Participants (n=20)	Percentage (%)
Wrist	10	25.0
Knee	4	10.0
Ankle	12	30.0
Thigh	-	-
Calf	2	5.0
Thighs	-	-
Neck	-	-
Waist	8	20.0
Back	2	5.0
Shoulder	2	5.0
Total	20	100%

The results of the table above show that the majority of youth discus athletes have old injuries. According to Figure 1, a significant factor affecting the athletic performance of discus athletes is an old injury that has not healed. The study showed that the athletes' injury site is related to the once injured site, when the physical fatigue, a minor injury occurred, did not do timely adjustment and relief, but also continue to carry out high-intensity training, inducing a new site injury, making the previous minor injury become more serious, therefore becoming a moderate injury, due to the aggravation of the injury and unable to carry out normal systematic training, after the long-term injury torture, the athletes' psychological will develop anxiety and even say goodbye to their sporting career (Wei, 2019). Therefore, coaches should be aware of whether athletes are injured during training, and must keep an eye on each athlete's training status during training, and visit athletes regularly to develop a reasonable and scientific training plan. Athletes must also develop a sense of self-protection, and if they are unwell, they must communicate with their coaches, deal with and adjust their training load in a timely manner, and use scientific means of recovery to handle injured parts carefully

to avoid injuries that have not healed and will continue to participate in training and competition, which will affect the athletes' sporting life and performance.

#### *Training Time and Intensity*

Based on a survey of youth discus players, it was found that during the school year, training sessions were 3-4 times per week, 10 times in the summer and 12 times during the winter break with 1 day off, 5-7 times in the summer for technical training and 4-5 times per week for physical fitness training. Winter technical training 2-3 times a week, physical and specific quality 8-10 times a week, with an average of 1-2 hours training time per session. The average number of times athletes train per week is 56 times during the school year, 2-3 times for physical training, 8-10 times during winter, 8-10 times for physical training, 5-6 times for physical and special quality training and 2 days off per week. The athletes are trained in technique and strength, the training content and intensity are not fixed, the training content and number of sets are not fixed, the amount and intensity of the athletes' training depends on their own physical sensations, there is no set of systematic training plan, and the athletes who have undergone such long-term training will develop fatigue. youth discus athletes have different degrees of injury in their shoulders, knees and ankles, which manifests itself in different degrees. After investigation, every athlete had a back injury or sprain, all accumulated from prolonged fatigue.

#### *Seasonal Factors*

Temperature changes are also evident with the seasons. Therefore, seasonal changes are one of the main causes of injury in discus athletes. It was found through the survey that coaches believe that winter and spring are the seasons where the most injuries occur, with fewer sports injuries occurring in summer and autumn. Winter clothing increases the heaviness of the body is more awkward and preparation activities are harder to master, therefore winter is a high season for discus athletes to get injured. In spring, as temperatures rise and clothing decreases, athletes have a lot of energy stored in their bodies after a winter of strength and conditioning training, and as the weather warms up and outdoor training increases, poor mastery of exercise intensity can lead to acute injuries (Zhu, 2019). Summer and autumn are the competition seasons for discus sports, coaches will emphasise measures and techniques to prevent sports injuries, athletes will also pay great attention to sports injuries and will avoid them, so the injury rate is lower in summer and autumn, individual athletes may also cause injuries due to other objective factors. Therefore, a scientific and systematic training programme can reduce the occurrence of sports injuries.

#### *Technical movement factors*

Discus is an articulation of joints, muscles and technical movements, and the sequence of force is from bottom to top. The technical causes of sports injuries in youth discus players are: unskilled use of technique causing injury (24.0%), incorrect technical elements causing injury (32.1%), difficult technical movements causing injury (10.8%), not practising according to standard technique causing injury (25.8%) and lack of scientific basis for technical training plans by coaches (7.3%). 7.3%. The results show that the main reasons for sports injuries caused by youth discus players due to technical reasons are inaccurate technical essentials, irregular techniques, unskilled technical application and unskilled technical operation.

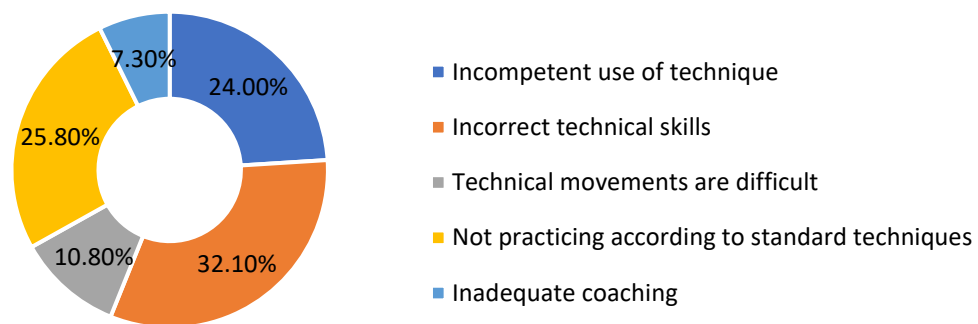


Figure 2. Survey of technical movement factors

*Training factors*

The results show that the training factors that cause sports injuries in youth discus athletes are: sports fatigue, inadequate preparation activities, excessive sports load, unreasonable training competition arrangements, unreasonable training plans and unreasonable recovery content. The main factors contributing to injury in youth discus athletes were exercise fatigue and inadequate preparation activities. In the discus event, 1 in 10 athletes suffered injuries caused by sports fatigue and 6 by poor preparation activities.

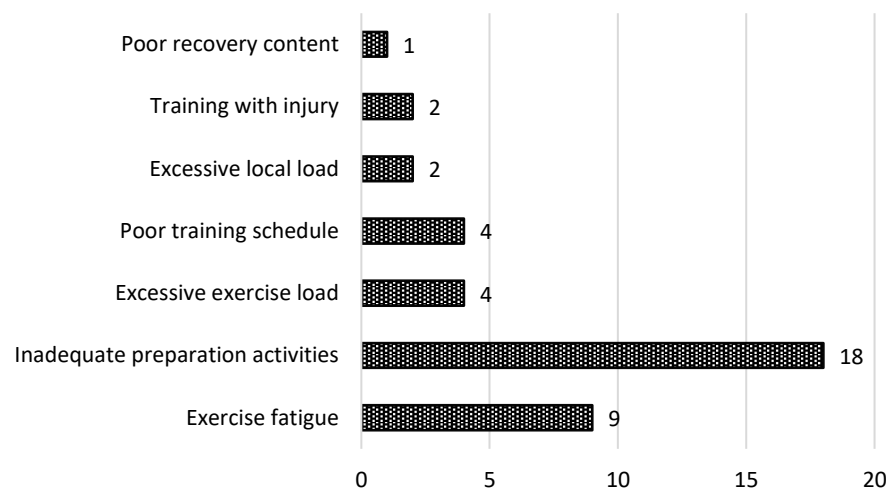


Figure 2. Survey of training factors

Based on the results of the above graph, combined with the analysis of constant training and observation of throwers' competitions at various universities, the time for athletes to do preparation activities is very short in both training and competitions, and most throwers perform strength technique training directly without warming up at all. This can easily lead to physical decline and injuries such as muscle strains. The discus is an apparatus used in the throwing circle with the slide and spin technique. Athletes tend to think that the slide and spin have a short distance of action and do not need to do preparation activities, thus creating a situation where they have very little or no preparation time for either training or competition, and simply do not realise the importance of preparation activities. In addition, most coaches do not particularly emphasise the importance of preparation activities, while others usually

shorten them in order to finish training as quickly as possible. During high-intensity technical and strength training, preparation activities do not sufficiently influence and stimulate muscle vitality and toughness, and are more likely to cause muscle damage and affect muscle sensation during technical training (Hao, 2018). Post-training stretching and relaxation activities correspond to preparatory activities. Rest is the end of training and competition and is an important part of it. Adequate relaxation allows the muscles to be more resilient and allows the technique to be done to perfection.

Stretching reduces the lactic acid in the muscles so that they are not stiff and reduces the incidence of injury. Many university students do not realise the importance of relaxation for their muscles, coupled with their own inertia, physical and mental exhaustion after training, rarely doing relaxation activities, long hours of training without relaxation and excessive muscle tension are also important factors in causing sports injuries.

### **Discussion**

The discus throw emphasises explosive power, which requires athletes to focus on their own strength and joint ligament strength in their regular training and competition to reduce the chance of injury. In numerous sport programs, greater physical quality can be more effective in reducing the risk of injury (Gabbett & Domrow, 2005). At present, there are still many problems in discus training and competition for our athletes, which lead to injuries and have various adverse effects on them (Ye, 2018). Therefore, taking various measures to reduce the injury rate during training and competition has become an important issue that needs to be addressed. By analysing the sports injuries of youth discus players, the following suggestions are made to prevent injuries in youth discus players from the following aspects in combination with the professional knowledge learned.

#### *Learn the Standard Technical Movements*

Discus training process often occurs due to athletes' technical inappropriateness, resulting in excessive strength, thus causing sports injuries, which is due to athletes usually do not pay attention to learning, fatigue training. As a sport that combines technique, strength and speed, discus is a skill that can only be truly mastered by careful study, repeated training and careful comprehension to avoid injuries to athletes due to technical errors (Zhang, 2019). When the coach explains the technical movements of discus, the athlete must study and record them carefully: during the training process, they should figure out the main points of the movements and ask the coach for advice and correction in time when they encounter any unclear points. As the psychological burden before the competition can lead to deviations and mistakes in sports techniques, it is important to review the movement essentials and details repeatedly before the competition, so strengthening the discus technical concepts is the best way to avoid injuries.

#### *Enhancing General Ability*

The effects of training volume, intensity and frequency on exercise performance have been evaluated in some research, with performance typically improving with increasing training load (Mujika et al., 1996; Stewart et al., 2000; Foster, 1998). The coach is the instructor and guide of discus training for the athletes. There are several relevant studies that also show that injuries occurring during sports training are also load-related, with the highest incidence of illness and injury occurring when the training load is highest (Huxley et al., 2014; Colby et al.,



2014; Cross et al., 2015). In the daily training, the quality of the coach itself directly affects the chance of injury of the athletes. If the coach arranges the training contents correctly and rationally during the training or competition, let the athletes master the standard and correct technical movements, arrange the training intensity and training time scientifically, and improve the athletes' technical level step by step, the chance of the athletes being injured can be reduced.

#### *The Importance of Warm-up Exercises*

In daily sports activities, athletes do not fully comply with the physiological rules of human movement, adjust the body state and exercise intensity, etc., so that the body's work can not be maintained in good condition, resulting in a variety of sports injuries. Athletes, especially inexperienced athletes, fail to prepare for discus training or competitions and do not fully understand the importance of preparatory activities. Discus is a sport that highlights power, and athletes should do the corresponding preparation activities according to the characteristics of discus to prevent sports injury accidents.

#### *Improved Medical Facilities and Self-Monitoring*

Athletes' injuries are directly related to the intensity of the sport, especially after athletes are injured, it is important to strengthen the medical guidance and self-monitoring by professional medical staff. By monitoring the health status of athletes, it is possible to high athletes' performance in sports (Gastin et al., 2013 & Wehbe et al., 2015). During training or competition, a sound professional supervision mechanism for athletes should be established to guide injured athletes in targeted recovery training, develop rehabilitation plans and assist in self-monitoring to reduce the occurrence of sports injuries, improve the physical and mental health of injured athletes and ensure sustainable development by observing physical conditions and training organism reactions. Through the mastery of the above knowledge and careful protection during sports, sports injuries can be avoided as much as possible, thus getting timely and effective treatment after the injury and reducing the occurrence of complications and after-effects.

#### **Conclusion**

With the continuous development of China's comprehensive national power, its influence in culture, sports, science and technology has also become greater and greater. A strong sporting nation has always been the development goal of China, and discus is a highly technical and explosive athletic sport, and youths are often more prone to injuries during training and competition. Reducing sports injuries can not only reduce the pain of athletes, but also significantly improve sports performance. This paper discusses the prevention and treatment measures of sports injuries in youth discus athletes, summarises the characteristics and causes of sports injuries in youth discus athletes, and proposes corresponding prevention and treatment measures to provide some reference and reference for the development of youth discus athletes' sports.

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