

Research on Knee Injuries and Preventive Measures for University Students in The Context of Healthy China

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Abstract: In recent years, with the continuous promotion of the Healthy China Initiative, the whole society has begun to pay general attention to and pay attention to health problems, and people's health awareness has gradually increased. Scientific and reasonable sports can improve physical fitness, but wrong sports posture and unreasonable sports intensity and methods will cause sports injury. On the basis of analyzing the anatomical structure and function of the knee joint, this study investigates the knee injuries that often occur in university students' sports through questionnaire survey method, comparative analysis method and interview method to find out the causes and characteristics of the injuries and put forward the relevant preventive countermeasures.

Keywords: University students, Knee injuries, Preventive measures.

1. Introduction

With the in-depth promotion of the construction of a healthy China, various sports programs have also been developed rapidly, and the health level of the whole population has been improved significantly. Regular participation in sports can not only enhance the body's cardiorespiratory function and muscle strength, but also improve their physical coordination and immunity. However, the probability of sports injury is close to 92% under insufficient preparatory activities, weak physical quality and long-term large-load sports. And among all the sports injury parts, knee joint injury is the high incidence part. This paper mainly explores the influencing factors of knee injuries from the two levels of body sports function index and external sports technology performance, to provide theoretical support and practical basis for the prevention and rehabilitation of university students' knee injuries.

2. Overview of Knee Sports Injuries

2.1. Common types of knee injuries

Knee joint consists of the lower end of the femur, the upper end of the tibia and the patella, which is the largest and one of the most complex joints in the human body, and its main collateral structures include meniscus, tendons, ligaments such as anterior and posterior cruciate ligaments and medial and lateral collateral ligaments. Its main forms of motion are flexion and extension, as well as small rotations. Knee injuries can be categorized into acute and chronic injuries. Acute injuries mainly include acute arthritis, ligament sprains, joint dislocations and separations; chronic injuries mainly include meniscus injuries, chondromalacia patella, fat pad injuries, bursitis and so on.

2.2. Exercise rehabilitation goals for patients with knee injuries at different stages

It is found that the goal and principle of rehabilitation for knee meniscus injury, ligament, articular cartilage or cruciate ligament injury is to allow the injured tissue structure to heal

without losing the stability of the knee joint. After reviewing domestic and international literature, it is believed that, regardless of acute or chronic injuries, diseases of the musculoskeletal system tend to show the following changes: decrease in local stability, decrease in motor sensory function, decrease in muscular endurance, decrease in muscle strength and so on. The development of muscle strength training, joint mobility training, balance training and proprioceptive training can effectively promote the recovery of knee joint injury, and at the same time, can also prevent adhesion in the joint capsule and accelerate the functional recovery.

3. Survey and Analysis of University Students' Knee Injuries

In order to deeply understand the situation of university students' knee injuries in sports, the authors take the students participating in physical education courses as the object of investigation, and use the questionnaire star to randomly select 500 students for the investigation according to the selection of different classes, different majors, and different projects. After distributing and recovering the questionnaires, they were subjected to data analysis and relevant information collation and calibration to ensure the authenticity and validity of the sampling results. 493 valid questionnaires were recovered and the results were analyzed as follows:

3.1. Survey on the basic situation of students

Through the questionnaire analysis, the basic situation is as follows: among the 493 students surveyed, 96 students had a history of knee injury, accounting for 19.47%. In order to get a true and comprehensive picture of the students' knee injuries, this study analyzed the statistical analysis of 96 students by separate sampling.

3.2. Analysis of students' knee injury types

According to the results of the survey, the types of students' knee injuries were divided into the following categories: meniscus injury, patellar tip end disease, medial collateral ligament injury, lateral collateral ligament injury, anterior

cruciate ligament injury and knee bursitis. Of these, meniscus injuries and medial collateral ligament injuries appeared more frequently, at 29% and 20%, respectively. Knee bursitis was 18%, anterior cruciate ligament injuries 15%, and lateral collateral ligament injuries 11%. End patellar tip disease occurred relatively infrequently at 7%.

3.3. Analysis of students' knee joint injuries

3.3.1. Analysis of the nature of knee injuries

Sports injuries can be divided into three types according to the nature of the injury: acute injury, chronic injury, acute injury to chronic injury. As shown in Table 1, there are 42

athletes with acute injuries, accounting for 43.8% of the total proportion; there are 31 athletes with chronic injuries, accounting for 32.3% of the total proportion; there are 23 athletes with both chronic and acute injuries, accounting for 23.9% of the total proportion. From this data, it can be seen that most of the students' knee injuries are acute injuries, and a few are chronic injuries, which is in line with the law of the occurrence of knee sports injuries. In addition, the scientific diagnosis and timely treatment of acute and chronic injuries are closely related to the treatment effect. It prevents further increase in the degree of injury due to improper or untimely treatment after injury, which affects future sports.

Table 1. Survey on the nature of students' knee injuries (N=96)

Nature of injury	Acute injury	Chronic injury	Both acute and chronic
Number	42	31	23
Percentage	43.8%	32.3%	23.9%

3.3.2. Analysis of the degree of knee injury

Sports injuries are categorized according to the severity of the injury, which can generally be divided into three kinds of injuries: mild injury, moderate injury and severe injury. As can be seen in Table 2, the majority of the degree of students' knee injuries are mild injuries, which accounted for 55.2% of the total number of injuries; followed by moderate injuries, which accounted for 37.5% of the total number of injuries;

and severe injuries, which accounted for 7.3%. From the above findings, it can be seen that mild injuries are mainly medial collateral ligament and patellar apical end disease, moderate injuries anterior cruciate ligament and meniscus injuries, and severe injuries are mainly lateral collateral ligament injuries of the knee joint. It can be seen that the degree of students' knee injuries is dominated by mild and moderate.

Table 2. Survey of students' knee joint injury degree (N=96)

Nature of injury	Slight injury	Moderate Impairment	Severe Injury	Total
Number	53	36	7	96
Percentage	55.2	37.5	7.3	100%

4. Analysis of Students' Knee Injury Factors

Through the statistics of 96 students who filled out the questionnaire on the causes of knee injuries, 58 students thought that the lack of preparatory activities was the main cause of knee injuries, accounting for 60.4% of the total proportion, 9 students chose unreasonable training loads, accounting for 9.4% of the total proportion, 15 students with poor self-protection awareness, accounting for 15.6% of the

total proportion, 4 students chose foul play or physical impact, accounting for 3 students with inadequate finishing and relaxation, accounting for 3.1% of the total proportion, 2 students with poor physical fitness as the main cause of knee injuries, accounting for 3.1% of the total proportion. of 4.2%, 3 students with insufficient organizing and relaxation, 3.1% of the total proportion, 2 students with poor physical fitness as the main cause of knee injuries, 2.1% of the total proportion, and 5 students choosing the problems of field equipment and sports equipment, 5.2% of the total proportion, the results are shown in Table 3.

Table 3. Survey table of students' causes of knee injuries (N=96)

Technical movements	Number	Percentage
Lack of preparatory activities	58	60.4
Poor self-protection awareness	15	15.6
Unreasonable training load	9	9.4
Fouls or physical collisions	4	4.2
Inadequate organization and relaxation	3	3.1
Poor physical fitness	2	2.1
Problems with field equipment and sports gear	5	5.2

After comparison, it is found that the main factors leading to students' knee injuries are: unreasonable preparatory activities, unreasonable training load, and poor self-protection awareness.

5. Countermeasures to Prevent Students' Knee Injuries

According to the current situation of students' knee injuries,

we draw on the principles of training, sports medicine, rehabilitation and other disciplines, and on this basis, we put forward countermeasures to prevent knee injuries.

5.1. Preparatory activities should be reasonable

Preparatory activities should be combined with technical movements, etc. The intensity is required to be moderate, and it should be appropriate for the body to feel hot and slightly

sweaty, and the load of the full set of preparatory activities should be determined according to the sportsman's own characteristics, the weather and other conditions. In terms of time control, the preparation time is generally about 15-20 min.

5.2. Reasonable arrangement of exercise load

Reasonable arrangement of exercise load is a problem that teachers and training programs must pay practical attention to. Teachers' judgment of students' fatigue is basically through their own visual inspection and players' self-reporting, without using more scientific methods and means. Therefore, it is recommended that multidisciplinary knowledge and means such as athletic training science and exercise physiology should be fully utilized in physical education classes to accurately diagnose the degree of student fatigue so that exercise intensity and exercise load can be better arranged.

5.3. Increase knee joint strength and flexibility training

The preparatory posture for various actions in sports almost always starts with bending the knee. At this time, the stabilizing effect of the knee joint is completely dependent on the quadriceps muscle, patella and patellofemoral ligament to maintain, which makes the knee joint bear a lot of pressure, and due to the braking support reaction force will inevitably lead to an increase in the burden of the knee joint. If the strength of the muscles around the knee joint is insufficient, it is difficult to bear the great pressure from the long-term knee bending action.

5.4. Cultivate self-protection awareness

In sports, there are collective projects with fierce competition, fast transition between offense and defense, and rapid movement. The use of protective gear that restricts the extension of the knee joint can reduce the flexion angle of the knee joint when landing, thus helping to prevent anterior cruciate ligament injuries in sports; protective gear can restrict the tibia from being subjected to the force in the horizontal direction, thus preventing anterior cruciate ligament rupture, which shows that the use of protective gear in sports can avoid the occurrence of sports injuries.

5.5. Strengthen the study of first aid and treatment method after knee injury

"Prevention first, active treatment second" is the principle of treating all sports injuries, when the students' knee injuries should be timely treatment and active treatment. The appropriate treatment method should be chosen based on the RICE principle. Although there are many kinds of knee injuries, but in the acute stage, the main focus is on braking and resting, local cold compresses, anti-inflammatory drugs, anti-inflammatory and analgesic, as well as traditional Chinese medicine internal and external, etc. At the same time, through the physical examination and auxiliary means of examination to clarify the degree of injury as soon as possible, to take effective treatment and rehabilitation measures.

6. Conclusions and Recommendations

6.1. Conclusion

(1) The type of students' knee injuries is mainly dominated by meniscus and medial collateral ligament injuries, followed by knee bursitis, and finally anterior cruciate ligament injuries, and the degree of injuries mostly belongs to mild and moderate acute injuries.

(2) Knee injuries are mainly due to poor awareness of self-protection, irrational sports load, lack of targeted preparatory activities, lack of post-injury reasonable means of disposal and other factors.

(3) Sports injury prevention methods are mainly composed of a system of methods such as muscle mobilization, nervous system activation, dynamic stretching, trunk pillar preparation, etc. Regeneration and recovery exercises are an important way to effectively prevent sports injuries from occurring.

6.2. Recommendations

(1) Emphasize preparatory activities and improve self-protection ability. Reasonable and sufficient preparatory activities can improve athletic ability, reduce the occurrence of sports injuries, and improve self-protection ability at the same time.

(2) Strengthen the theoretical knowledge and arrange the training program scientifically. Follow the training principles of sports training science, use scientific training methods and means, and reasonably arrange the sports load.

(3) Cultivate students' awareness of self-protection. Provide relevant sports injury theory courses, strengthen students' knowledge of sports injury prevention education, and improve students' self-protection awareness and ability to prevent injury.

(4) Attaching great importance to the development of physical function training. In sports, corresponding body function training should be carried out according to the content and load intensity of special training to maximize the mobilization of students' enthusiasm.

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