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Research on Causes and Prevention of Knee Joint Sports Injuries in Sports Training

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Abstract: In sports training, it is very common for athletes to get injured. Generally, athletes use lower limbs more. Therefore, knee joints are easily injured. After knee joint injury, it will affect the athlete's athletic ability and performance, and cause certain damage to the athlete's physical health, and even affect the athlete's sports career. In order to reduce the injury of the athlete's knee joint and prolong the athlete's sports career, it is necessary to find the reason and find the prevention method. This article mainly takes 30 athletes as the research object. According to the results of the research, we find out the causes of knee joint sports injuries and do a good job in preventing knee joint sports losses.

Keywords: Sports Training；Knee injury；Prevention research

The knee joint is actually a more complex joint in the human body structure. Although it does not seem to be very large, it bears considerable responsibility and is in a relatively important position of the lower limbs of the human body. So when the human body is moving, it needs to bear more The more power, the most vulnerable. For sports training, although a lot of training does not seem to apply to the knee joint, there are still many uses of the knee joint in actual sports. With the continuous development of new directions in modern sports training, there are often many difficult movements. Therefore, the use of knee joints is also increasing, which also increases the possibility of knee joint injuries. Under such circumstances, it is necessary to investigate the causes of athletes' knee injuries and find some preventive measures for these reasons.

1. Research objects and methods

(1) Research object

Look for 30 athletes, 10 basketball, 10 badminton, and 10 table tennis. (2) Research methods

There are three methods used in the study. One method is the literature method. By consulting relevant information and watching the results, the causes of athletes' knee joint injuries can be learned. One method is the questionnaire survey method, through the survey of 30 athletes, and then observe the data, find the cause of the athlete's knee injury, and study its prevention methods. The last one is logical analysis. Through logical methods such as induction, deduction, analogy, and comprehensive analysis, the data obtained are analyzed in depth, and corresponding conclusions are derived, and reasonable and scientific suggestions are put forward on this basis.

2. Research results

According to a study of 30 athletes, try to let everyone train under the same conditions, and the preparations need to be carried out together. Before exercising, you also need to check the body to exclude athletes who have knee joint injuries. After investigation, it is found that the probabilities of athletes' injuries in various parts are shown in Table 1 below:

Table 1 Probability of athlete's injury

Injury site	neck	shoulder	wrist	knee	waist	finger	toe
Number of injuries	2	2	5	25	6	11	1
percentage	2.58%	2.58%	9.98%	50.91%	11.8%	20.7%	0.83%

As can be seen from the above table, in the process of training or competition, athletes will more or less have some accidents, causing certain injuries on their bodies. However, after analyzing the injuries of 30 athletes, it was found that a total of 7 injuries occurred, namely the neck, shoulders, wrists, knees, waist, fingers and toes. Observing the data, it can be seen that only the knee joint has the greatest probability of injury, accounting for 50.91%. For other parts, although there are damages, it can be seen that the probability is quite small. Although the probability of finger damage is also relatively large, this is within the range visible to the naked eye, and it is easy to be eliminated and will not cause serious Impact.

3. Knee joint structure analysis

(1) Main structure

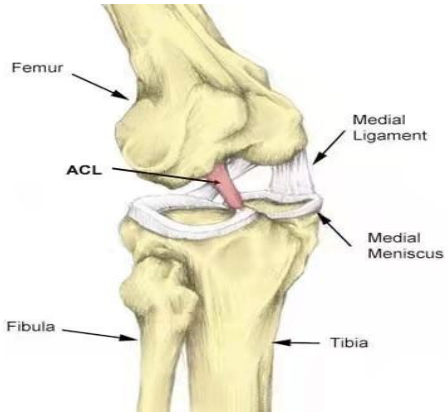

figure 1

The knee joint has a complex structure and is an important part of the human body. As a key part of connecting the lower limbs, when moving and standing, the knee joint does not bear most of the weight of the human body, and there is also internal abrasion. There are many relatively small structures, so they are relatively fragile and easily cause knee joint injuries. The main structure of the knee joint is a compound joint composed of the inner and outer ankle articular surfaces of the femur, the upper articular surface of the tibia, and the articular surface of the patella. In addition, the knee joint can also be divided into four bones, including tibia,

fibula, patella and femur. Although they don't seem to have much connection between them, they are interlocking in the body. The surface of these bones are all articular cartilage, and a certain amount of liquid is secreted at each joint. These liquids mainly play a lubricating role, protect the joints, and ensure the movement of the joints.

(2) Physiological and physical basis

The knee joint is one of the larger joints in the human body. It can be said to be the most complicated joint in the human body structure. It is more prone to injury, and each injury will cause more serious consequences. For athletes, it is usually for the body. The degree of use and frequency of the use will be higher, so it will make the knee joint more vulnerable to injury.

The main characteristics of the knee joint are as follows: the joint capsule is wide, so the stability of the joint is poor; there are ligaments outside the key capsule, inside the joint capsule and on the joint capsule to strengthen the joint, so when you exercise, you will pull the ligament if you don't pay attention. Injury; there are medial meniscus and lateral meniscus (fibrocartilage) in the joint, and athletes often have meniscus injury; there is a synovial sac in the joint, which is the synovial layer of the joint sac protruding into the joint to form an uneven structure. Later, it is filled with fat tissue, so it is also called fat pad. Its function is to fill the joints and make the joints stable.

Any tissue of the human body will have its fixed structure and shape. For joints, although there are certain differences in the body of each person, the general situation is similar. For the knee joint, the shape is a pulley ball joint (or pulley elliptical joint). When the knee joint is in motion, it is generally frontal flexion (the movement of the calf backward, that is, the angle between the upper and lower legs becomes smaller) and extension (the movement of the calf forward, that is, the angle of the upper and lower legs becomes larger). However, when the knee joint is bent about 90 degrees, the calf can directly rotate around the vertical axis and do some internal and external rotations that are not very large. In addition to these sports, the knee joint will not do some other sports, otherwise, the knee joint will be seriously injured.

4. Causes of knee sports injuries

According to the above research results, we can see that for athletes, injuries are very common, but the causes of injuries in different parts are not the same, so in this case, we need to look at this matter in a targeted manner, and Analyze the causes of knee joint injury, and the classification is shown in Table 2:

Table 2 Top causes of knee injury

Causes of knee injury	sequence
Insufficient medical supervision	1
Fatigue	2
Unreasonable preparation	3
Participate in training with injuries	4
Inattention	5
Unreasonable training charge	6
Poor specific quality	7

Unreasonable technical action	8
Venue and equipment conditions	9
Poor self-protection awareness	10

The reasons described above are too many and a bit cumbersome, so in order to analyze the more important reasons in the following, and try to summarize and analyze similar reasons.

(1) Lack of appropriate preparatory activities

Usually before physical exercise, many people will directly enter the state of exercise, such as running directly. But in fact, the human body is relatively relaxed when it is still, but once it enters the state of exercise, it will be more excited and tense. Therefore, if you want to start exercising, you must perform warm-up activities. It can be said to be an excessive stage and will not lead to There is too much damage to the body. For athletes, the training level is greater than that of ordinary people, so more preparation activities are required. However, athletes generally do preparation exercises collectively. Many people do not value this. Therefore, when preparing for exercises, many people do not move properly, which will cause many parts of the body to be unable to move well, resulting in the knee joint It is easy to get injured during exercise.

At present, the preparation activities of exercise mainly have the following problems: first, the content of the preparation activities is not suitable for the sports that need to be carried out later; second, the amount of preparation activities is relatively large, causing the body to be too tired; third, the preparation actions are not quite standardized.

(2) The body is too tired

In order to achieve certain results, many athletes work harder during training, so in many cases it will cause poor physical rest. Although this may improve the athlete's training performance to a certain extent, it will also have a certain impact for some athletes. Their physical functions will decrease, and the training intensity will increase at this time. Probability of knee injury.

There are some athletes who have not been engaged in physical training all the time, they will have some poor sports foundation, and their physical fitness is very weak at the beginning, so when they are training, they cannot fully grasp some movements, or even grasp the essentials of the movements. Because they can't adapt to sports activities for a while, they will cause injuries. And for athletes, gender also has certain problems. Girls' physical fitness will be weaker, so training time needs to be reduced appropriately. Avoid getting too tired of your body, and don't blindly pursue achievements.

(3) Heavy knee load

Although many sports seem to be not great on the lower limbs on the surface, in fact, every kind of sports requires a lot of support for the lower limbs, so for athletes, we must pay attention to training the knee joint. Based on the understanding of the physiological structure of the knee joint, we know that the knee joint is a more complex and fragile part of the human body. Therefore, the weight bearing of the knee joint needs to be considered when exercising, and the knee joint should not be overloaded. However, in the actual exercise process, many people do not pay attention to the study of knee joint load. For example, when doing weight

training, they often just feel that the weight is mainly on the upper body, so as long as the hands can still bear the weight, they will continue to increase, completely forgetting The importance of the legs and knee joints in this.

(4) Psychological problems

People often say that in addition to the athlete's performance has a lot to do with the athlete's own abilities, it also has a lot to do with the athlete's psychological quality. Similarly, athletes' injuries have a lot to do with their psychological quality, and knee injuries are the same. In real life, many athletes pay too much attention to their performance, and they will be more demanding when they are training, and they must be perfect in every movement. This will cause the athletes to be You will feel more stressed and sleep poorly. Although I still work very hard during daytime training, my performance is always unsatisfactory, and even fear, anxiety and other emotions may increase muscle tension, resulting in confusion in movement rhythm, lack of exercise speed and strength, and many thoughts. , Resulting in movement deformation, causing knee joint injury, this situation often occurs in some athletes who have just participated in training, or have achieved good results, and have a strong desire to win.

(5) Site and climate issues

In many cases, habit is a very scary thing. When a person is used to something, after a sudden change, there will be a period of discomfort. Athletes generally do not change the sports venue when they are training, but sometimes they will also change due to some special conditions. This will cause the athlete to be unfamiliar with the venue during training and cause knee joint injuries. Although it is a long time training in a field, after a long time of use, the field will be uneven, but in real life, few people pay attention to this phenomenon and will not pay attention to the maintenance of the field, so the unevenness on the field at this time Or some debris, affecting the athletes.

In addition to the venue, the weather is also very influential on athletes. When the weather temperature is too high, long-term training of athletes will lead to extreme fatigue and lack of water. At this time, heat stroke will also occur and the physical condition will be very poor. When the temperature is too low, frostbite will occur, or muscle stiffness will appear, which will make the body's coordination worse, and this will cause knee joint injuries.

5. Prevention of knee motion loss

Athlete injuries are very common, but injury is not the ultimate goal. The ultimate goal is to allow athletes to have better physical fitness and achieve better results. Therefore, after an athlete is injured, in addition to the treatment of the athlete, it is necessary to prevent the cause of the athlete's injury, so as to prevent the problem before it occurs and minimize the injury to the athlete.

(1) Prepare for exercise before training

For athletes, proper preparations are responsible for their height. However, there needs to be a certain arrangement for the amount of warm-up activities, so as to ensure that everyone gets a sufficient transition before exercise. The amount of warm-up activity needs to be judged according to each athlete's own physical condition. Physical function, meteorological conditions, teaching and training and the specific situation of the

competition need to be considered within the scope. When the excitement is low or the temperature is relatively low, the time for warm-up activities should be appropriately extended, generally with body heat , Sweating slightly is advisable.

For some of the actions that need to be involved in the warm-up activities, these need to be set according to each sport, even the specific situation of each game, after all, the required actions or requirements of each sport The amount is different. There must be both general warm-up activities and preparation exercises for special sports. The time interval between the end of warm-up activities and the official start of training or competition should be 1 to 4 minutes. In this way, the preparatory activities before each exercise will have a certain degree of pertinence, and they will have a certain degree of adaptability to such exercises. It will not be said that they suddenly overuse the knee joint and cause knee joint damage.

(2) Rest properly after training

The degree of training that the human body can accept has a certain limit. When it exceeds this range, it will cause the human body to be very fragile, so every part will be more likely to be injured. After a long period of training, athletes need to take appropriate rest, so as to ensure that their exercise status reaches the best level.

Wipe off sweat from your knees in time during a break or after a training session, and keep warm to prevent wind and cold. Relieve local fatigue in time, massage by pushing, holding, kneading, pinching, pressing, etc., and changing shoes and socks frequently to reduce sweating of the feet and the formation of reflex knee blood circulation disorders, which plays a role in preventing knee joint diseases and injuries Good protection. Some athletes have certain physical injuries and knee joints may be relatively fragile. Therefore, they need to pay more attention to the care of the knee joints after training. When resting at night, apply heat to it.

In the process of training, the instructor must also pay attention to the distribution of movements. Do not allow athletes to maintain the same movements for a long time. This will cause a certain burden to the athletes. They may also follow the rules when training privately. Like the learned movements, this one is mainly aimed at athletes' partial rest.

(3) Technical and action standardization

For any kind of exercise, every action requires certain technical essentials to be completed well. This article is mainly aimed at the prevention of knee joint injuries. All the sports described are also done for the knee joint, mainly for targeted strength and flexibility training for the knee joint. The purpose of knee strength training is to improve the stability and firmness of the knee joint by strengthening the strength of the muscles around the knee joint. Only when the strength of the muscles around the knee joint is improved, can the athletes use the knee for a long time effectively reduce the huge pressure on the knee. In some sports that rely on the knee joint, the flexibility of the knee joint is also very important. For example, in basketball training, the techniques of breakthrough, change of direction, and turning all depend on the flexibility of the knee joint.

For athletes, in muscle training, it is necessary to fully consider each athlete's ability and physical fitness. It is necessary to follow the principle of comprehensive development and gradual progress, based on dynamic training, supplemented by necessary static training. In joint flexibility and flexibility training, static training should be the mainstay, and dynamic training should be auxiliary. This can combine movement and static, and the athlete's muscles will have strong adaptability, and there will be no damage to the knee joint due to the

inability to adapt to the exercise intensity.

In addition to strengthening the technical and movement standardization, for athletes, during training, the load on the athlete's body needs to be within a certain range. For athletes, in order to reduce injuries, participants in physical exercise should be strict In accordance with the principles of sports training, according to age, gender, health status, training level and the characteristics of various sports injuries, individual treatment, gradual progress, and reasonable exercise load.

(4) Improve mental quality

For athletes, psychological quality can be said to be the first, and the influence of psychological quality may not be seen usually, but when you are really on the field, you can see that psychological quality can be said to be the key to the final success or failure. Many athletes will be more excited due to long-term training, and will lead to poor sleep at night, which will make the athletes more tired the next day. In response to this phenomenon, athletes with poor sleep need to listen to some music that helps sleep before going to bed, or perform some other exercises to promote sleep.

When athletes are just getting involved in a sport, they will inevitably have the idea of denying themselves. Therefore, during training, instructors need to have more patience with these new athletes so that they can fully grasp the essentials of an action. You can't just ask for speed. Minimize their anxiety and fear. When necessary, you can ask some psychologists to give them psychological counseling, so that they can gradually let go of their heart knots, find their own training methods, and quickly integrate into the group.

(5) Choose a good venue and time

The venue is the basis of training for athletes, so the venue also needs to be maintained regularly. After each training session, the venue must be cleaned, and some garbage on the venue should be cleaned up in time to prevent damage to athletes after training. Certain influence. When participating in training, be sure to wear some looser clothes, so as not to cause damage to the knee joint, and the athlete will feel more comfortable. After the sports field is used for a long time, damage will occur, so some of the loopholes should be filled regularly. For some sports that require training outdoors, the weather must be considered before training. If the weather is bad, temporary adjustments are needed at this time.

Conclusion

Athletes' careers are relatively limited, often because of their physical conditions. If physical damage can be reduced, their sports career may be prolonged. The knee joint is more prone to injury, but it is difficult to recover, so the impact once injured may be irreparable. Therefore, in the training process, athletes and coaches need to pay attention to minimize the inevitable injury. This article is mainly for research on causes and prevention, hoping to provide a certain reference for athletes.

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