

Injury and Prevention of Knee Meniscus in Sports Training

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Abstract: The knee joint is one of the largest and most complex joints in the human body, and the meniscus plays a vital role in the knee joint. Based on the complex structure of the meniscus and its special function, it is concluded that meniscus injury is the most common and most complex in knee injuries. the position of the meniscus is the fibrocartilage located between the femoral condyle and the tibial plateau, It has the function of cushioning the shock, stabilizing the joints and protecting the joint surface, Competitive sports are intense and uncertain, which leads to athletes being more prone to knee meniscus injuries in competitive sports training and competition, Therefore, for the pathology and mechanism of meniscus injury and meniscus injury and prevention problems, Using sports anatomy, sports injury and rehabilitation, sports training knowledge and reference literature: based on the special structure and mechanism of knee meniscus makes athletes in sports training is more likely to lead to the injury because it is low blood supply makes the knee meniscus damaged after basic cannot repair, In the earliest knee meniscus injury surgery, it was completely removed, which has a great impact on athletes, so modern medical science and technology will suture repair or partial resection even so it is difficult to recover to the normal knee meniscus state, This requires the athletes to deeply master the special sports skills in the daily training and requires the coaches to make a scientific training plan to always observe the state of the athletes to adjust the indicators of the athletes, Therefore, athletes and coaches should understand the injury mechanism of knee meniscus in detail. It is the most effective way to prevent knee meniscus injury to master special sports skills and make scientific and reasonable training plan.

Key words: Meniscus Injury; Knee Joint;

Prevention

1. Selection Basis

With the rapid development of sports career in China and the masses of the body health consciousness and improve the quality of life, whether the development of competitive sports and social leisure sports is very rapid, due to the lack of physical health cognition this leads to the probability of the body damage in sports rose sharply, it will greatly affect the psychology of the movement, especially professional athletes in the body damage will not only lead to the whole training plan upset more serious will lead to the body damage irreversible to end its career, thus better service for sports field.

Running and jumping are indispensable in all sports, So the probability of sports injury increases dramatically, In particular, the knee meniscus produces forces in different directions and in different sizes in motion, the meniscus is a "C" fibrocartilage positioned between the femoral condyle and the tibial plateau, And is divided into the medial meniscus and the lateral meniscus, When the knee joint is in the flexion position and has internal and external rotation of the femur, it is easy to have laceration and even fracture, In the basketball movement, the emergency stop change to make the knee joint in the flexion position and with the calf as the fixed point of the thigh internal abduction or abduction, In such a position, the meniscus is subjected to both extrusion pressure and shear forces leading to damage to the meniscus, Because the blood supply to the meniscus is extremely scarce, it is almost impossible to repair it after the damage occurs. In order to comply with the national policy of sports power, we need to improve the professional quality of coaches and pay the attention of professional athletes and sports fans to the scientific prevention of scientific sports. the study in the sports cause of knee meniscus injury and prevention of athletes and the vast number of sports

enthusiasts do detail targeted questionnaire survey, formulate corresponding preventive measures and summarizes the meniscus injury mechanism help athletes to a certain extent, reduce the risk of meniscus injury, so as to achieve the ideal level of sports.

2. Literature Review

2.1 Studies on Meniscus Injury

2.2 2.1.1 Overview of the meniscal injuries

Meniscal injury is the knee pain and ringing, serious can cause limited knee joint lock and even a series of sports injury, meniscus injury often accompanied by the tibial collateral ligament lateral ligament and cruciate ligament injury, when the knee pain, swelling, ringing, locking phenomenon or quadriceps atrophy can cooperate with MRI image determine the knee meniscus injury is positive.

2.1.2 Meniscal injury mechanism

Meniscal injury is not incidental, and the meniscus is the fibrocartilage that buffers it between the femoral condyle and the tibial plateau. [1] Meniscal injury is caused in the movement of the knee meniscus contradictory movement and movement of the knee sudden changes, when the meniscus to meet the flexion and internal and external rotation will cause the meniscus injury, such as tibia fixed knee flexion at the same time, thigh external rotation can cause lateral meniscus injury, sometimes a casual bounce landing can lead to meniscus injury.

2.1.3 Anatomic structure of the meniscus

The shape of the meniscus is a crescent-shaped structure. the medial meniscus and lateral meniscus are "C" shaped fibrocartilage located between the femoral condyle and the tibia, with a thick and thin wedge around the inner edge. the medial meniscus covers about 60% of the femorotibial articular surface, and the lateral meniscus covers 90% of the articular surface. According to the blood supply situation, meniscus can be divided into: white area (no blood supply area) mainly provided by joint fluid to provide nutrition is extremely difficult to recover after injury, red-white area (edge of blood supply area) has a certain recovery ability after injury, red area (with relatively rich blood supply) has a strong recovery ability after injury. [2]

2.2 Prevention and Treatment of Knee Joint

Meniscus Injury

2.2.1 Prevention of knee joint meniscal injury

The injury of the meniscus is caused by long wear, semi-flexion of the knee joint, internal rotation, external rotation, violent impact, gravity extrusion, etc. Enhancing the strength of the quadriceps hamstring allows for more stability of the knee joint. According to the mechanism of meniscus injury, the following methods can be used to prevent meniscus injury. (1) Athletes should master special sports skills in daily training activities and flexibly and skillfully respond to emergencies in order to avoid meniscus damage caused by unreasonable technical movements. (2) Strengthen the stability and flexibility of the knee joint, and pay attention to the training of the quadriceps hamstring muscle and the physical coordination training, so as to strengthen the stability and flexibility of the knee joint. (3) Before training and competition, adequate warm-up activities should be carried out to promote blood circulation and reduce the viscosity of muscles, so that the joint muscles and ligaments of the body can coordinate to reduce the probability of injury. (4) After sports training, the muscles and ligaments should be relaxed in time so that the body can keep a healthy state to avoid unnecessary effects on the later training. (5) reasonable training plan for athletes according to their aptitude, excessive sports load will make the athletes too fatigue in training and game slow many sports competitions process is quickly fierce once the slow wrong action or body coordination ability is easy to lead to knee meniscus injury.

2.2.2 Treatment of knee joint meniscus injury

Table 1. How Well Do You Think That Modern Medical Technology Treats Meniscus Injury(N=91)

option	number of people	percentage
fine	28	30.77%
same as	59	65.38%
It didn't work much	4	3.85%

Chronic meniscus injury treatment: can through the external application of traditional Chinese medicine, acupuncture, physical therapy, joint cavity injection drugs, aseptic environment extraction joint effusion method is mainly for the purpose of activating pain swelling, need patients keep injury before healing of the knee brake or crutches make the patients to intermittent regularity of wound

side quadriceps prevention and control of the quadriceps atrophy. [3] In the case of meniscus injury with ligament injury should also be actively treated to prevent ligament injury to prevent ligament relaxation to the meniscus secondary injury, and after quadriceps strength training and hamstring strength training (using sitting and prone posture) to increase the stability of the knee joint.

Acute meniscus injury treatment: such as knee pain, swelling, lag, interlocking should immediately stop movement and with ice packs for cold compress (disposable cold compress in 10min-15min), can reduce the symptoms of pain and swelling, at the same time should keep the injured leg braking or suspended aggravating injury, should seek medical treatment in time with MRI to determine the injury meniscus injury, should accept arthroscopic surgery as soon as possible, meniscus injury with cruciate ligament and tibial collateral ligament and lateral ligament injury should be examined.

Postoperative rehabilitation of meniscus injury: Ankle pump exercises should be done in bed after surgery to avoid thrombosis of the injured lower limb artery. Appropriate activities can be performed 4-6 weeks after surgery. the most important thing is to conduct quadriceps strength training and hamstring strength training. Weight-bearing squat is not recommended to avoid secondary injury to the injured meniscus. the training of quadriceps strength can be trained on the quadriceps muscles in the supine position, and the hamstring strength can be trained with the prone position of the hamstring muscles.

3 Research Methods

3.1 Research Methods Used

3.1.1 Literature and data method

This paper by consulting "China" a large number of dissertations, journals and combined with the author during the university of sports anatomy, sports injury and rehabilitation, sports training of competitive athletes in the knee meniscus injury mechanism and prevent rehabilitation is summarized and summarized, in order to facilitate the athletes in sports training after prevent knee meniscus injury and competition to provide theoretical basis.

3.1.2 Questionnaire survey method

Through the investigation of some special athletes, we understood the causes, types, preventive measures and rehabilitation measures of knee joint meniscus injury in sports training and competitive competition. At the same time, we also invite relevant experts to conduct an empirical analysis of the questionnaire survey. A total of 100 questionnaires were issued, and 91 questionnaires were effectively recovered with a recovery rate of 91%.

Table 2. Questionnaire Distribution and Recovery Situation

Sex	Recover	Valid	Invalid	Effective percentage(%)
Man	68	65	3	96
Woman	32	26	6	81

3.1.3 Statistical method

Organize and analyze the collected data, and make descriptive statistics on the basic situation by using the Microsoft Excel Table 3.

Table 3. Injury of the Meniscus in the Knee (N=91)

option	number of people	percentage
Knee meniscus injury was associated with injuries in other areas	49	53.85%
Knee meniscus injury was not accompanied by other site injuries	42	46.15%

4 Results and Analysis

4.1 Causes of Knee Joint Meniscus Injury

According to the survey results of various athletes, it is believed that overload training, insufficient knee stability, insufficient special sports skills, injury training and insufficient preparation activity before exercise are the main causes of knee meniscus injury.

Table 4. Knowledge of knee meniscal injuries (N=91)

option	number of people	percentage
understand	28	30.77%
probably understand	49	53.85%
do not understand	14	15.38%

4.2 Analysis of the Causes of Knee Joint Meniscus Injury

Table 5. Do you Know the Cause of the Pain When You Have Knee Pain(N=91)

option	number of people	percentage
yes	42	46.15%
deny	49	53.85%

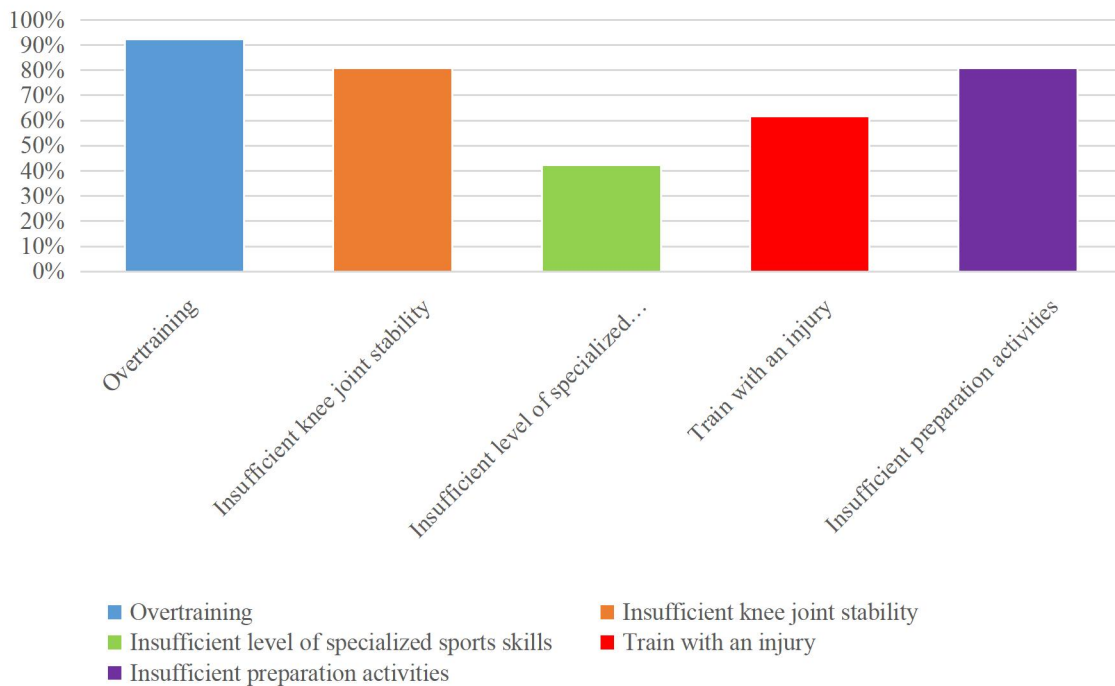


Figure 1. Causes of the Meniscal Injury

4.2.1 Overload training

Timely, moderate amount of overload training helps to improve the sports ability, long-term unscientific overload training will lead to athletes quickly into fatigue period, mainly for the decline in sports ability, body fatigue is very high for nerve activity reduces the athletes training enthusiasm and increase the risk of sports injury probability. the reduction of athletic ability makes the athletes unable to adapt to the daily training activities, which leads to excessive body fatigue. Excessive compression of the knee joint leads to the injury of the knee joint meniscus. the decrease in neural activity is manifested by the decrease in the reaction ability of muscles and joints during the training and competition, which greatly increases the risk of knee meniscus injury.

4.2.2 Insufficient knee stability

Table 6. Do You Have Relaxation Activities after the Exercise(N=91)

option	number of people	percentage
yes	84	92.31%
deny	7	7.69%

Competitive sports to the requirement of the body is extremely demanding, negligence for quadriceps, hamstring muscle strength training and body coordination training lead to knee strength stability so unable to bear more exercise load, in high load training due to insufficient stability of knee joint buffer ability

to drop, when the knee joint pressure more than athletes own physiological capacity, leading to the knee meniscus injury. Insufficient stability of the knee leads to excessive movement of the knee joint, and the force applied to the meniscus when the knee range exceeds the normal range, it will greatly increase the risk of knee meniscus injury.

4.2.3 Level of specific sports skills

Special skills in the characteristics of competitive sports are complex, often have run, jump, stop, variable technology, in the face of such technical action, because of such technical action is not deep not easy to comprehensive in the training and game to make non-standard technical action such as: basketball players in the ball fast breakthrough suddenly stop action on the knee joint rotation and shear direction force leading to the knee joint meniscus injury.

4.2.4 Training with injuries

Table 7. Do You Believe That Sports Injuries in other Sites Will Indirectly Cause Injuries To the Knee Meniscus(N=91)

option	number of people	percentage
yes	70	76.58%
deny	21	23.42%

Athletes do not pay attention to the injury training after the knee meniscus injury. Continue the training activities when the injury is not recovered, leading to the aggravation of the injury and the secondary injury. When

athletes have cruciate ligament injury, fibular collateral ligament injury, tibial collateral ligament injury, quadriceps injury and other threatening injuries to the knee meniscus will also lead to the knee meniscus injury due to a series of chain reactions.

4.2.5 Inadequate preparation activities

Table 8. Do You Warm Up Before You Exercise(N=91)

option	number of people	percentage
yes	77	84.62%
deny	14	15.38%

Full preparation activities can make the muscles and nerves get better activation, and lay a good foundation for the subsequent training and competition. Preparation activity insufficient lead to muscle, ligaments and other body tissue unable to achieve high intensity exercise required state to reduce the muscle viscosity, ligament elasticity and stretch can not reach the ideal level, so that athletes in sports cannot make standard action and rapid response ability lead to increase the probability of knee meniscus injury.

5 Conclusions and suggestions

5.1 Conclusion

5.1.1 There is no sufficient combining theory with practice

Knee meniscus in an important position in human activities, knee meniscus health relationship with the performance of the athletes, athletes, sports life, etc., deep understanding of knee meniscus injury mechanism, the cause of injury and combined with daily training to better prevent knee meniscus injury.

5.1.2 Iniciency of relevant policies in the selected area

There are no relevant institutions and logistics support teams for athletes, which makes athletes unable to conduct timely treatment and rehabilitation in case of knee meniscus injury.

5.2 Suggestions

5.2.1 Suggestions for the coaches

The coach should treat every athlete with a serious and responsible attitude, always pay attention to the psychological and physical conditions of the athletes, look, hear, ask and cut, and timely deal with the emergency of the athletes on the training ground. Coaches should improve their own quality, constantly update their own knowledge structure, learn advanced theoretical knowledge and combine it with practice.

5.2.2 Recommendations for the athletes

Athletes should be strict with themselves and take the training activities seriously, learn scientific and correct technical movements, master the rules of the competition, the rules of work and rest, and learn theoretical knowledge in addition to the training to combine theory with practice.

5.2.3 For local recommendations

Local governments should actively introduce excellent sports professionals and set up institutions related to sports injuries and rehabilitation. If conditions permit, each sports team should be equipped with at least one professional team doctor to provide guarantee for the follow-up training of athletes.

Reference

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