

Overview of Meniscus Injury Repair

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Abstract. In recent decades, the perception of the meniscus has gone from being the most useless structure of the knee joint to one of the most important components. The incidence of meniscus injuries is on the rise, which may be due to the increase in daily physical activity among young people. Meniscus injuries are usually caused by excessive exercise or sudden rotation of the knee and are often accompanied by swelling and pain. There are many ways to diagnose and treat it. In the initial stages of injury, you need to follow (RICE), which can be understood as rest, ice, apply pressure to the knee, and elevate the knee to relieve pain. As the meniscus damage worsens, surgery is needed. Then you can do some endurance training to reduce the load on the knee joint. Quadriceps exercises can improve knee joint function.

Keywords: meniscus, symptom, diagnosis, conclusion.

1. Introduction

The knee joint is one of the largest and most complex joints in the human body. There are a variety of muscles that control movement, ligaments that maintain stability, special cartilage that absorbs pressure and various other structures to ensure smooth and painless movement. Knee pain is a common problem affecting people of all ages.[1] There are a lot of different problems with the knee. The knee is made up of the bones, cartilage and meniscus of the knee, leg and knee muscles, ligaments, tendons, bursa, joint capsule and kneecap.[2]

The meniscus is made up of fibrocartilage, and there are two of them, one located in the joint space of the knee joint. Meniscus can increase the stability and cushioning of the joint. [3]In most cases, meniscus rupture cannot be repaired by itself, and only a part of the damage to the marginal part can be repaired by itself. The meniscus is responsible for most of the load transfer throughout the knee. Some other key features include increased joint consistency to maintain fluid lubrication with synovial fluids.

The knee meniscus is particularly important because it acts as a shock absorber, reducing the force that passes through the bone, reducing friction and allowing the bone to move smoothly.[2]

Meniscus injury is the destruction of the continuity and integrity of the meniscus. These include knee sprains or joint instability resulting in femoral condyle and tibial rotatory compression resulting in meniscus tears. It can also be caused by chronic knee strain. Meniscus tears are one of the most common sports-related injuries and often require surgery due to knee pain and dysfunction.[4]

The incidence of meniscus injury in the general population is not high, about 0.06%-0.07%, but it reaches 50% in knee joint injury. Meniscus injury is most likely to occur when the knee joint is combined with rotation from flexion to extension. It often occurs when a person suddenly stands up after squatting

for a long time, or when an athlete suddenly changes direction and turns when playing basketball, which is most common among young people. It presents as local swelling or pain

After a meniscus tear, it may take 24 hours or longer for pain and swelling to begin. Meniscus tears are often accompanied by pain, swelling, and joint bouncing. Relatively minor tears will have a mild pain feeling, mainly reflected in rotation, walking and other movements that cause injury. Joint snap usually occurs during an acute meniscal tear, and most patients will hear a sound on the affected side during movement. At first, the pain may not be severe. You can even continue to play sports and compete with an injury. But once the inflammation starts, your knee may feel sore. When you squat, lift weights, or get up from a chair, you feel an increased sense of pain. If you have a mild or moderate tear, the pain may go away. But when you perform twisting exercises or continue to overuse your knee without treatment, the pain can return. If you have a large tear, then your knee will immediately swell, you will feel more pain, and it will be difficult to walk or straighten your knee.

The types of meniscal tears include vertical, horizontal and compound. Vertical tearing may be asymptomatic, but may cause longitudinal damage around the meniscus. Horizontal tears are more severe and can result in complete separation of the meniscus edge layer. Complex lesions were associated with knee degeneration and included a complex mix of vertical and horizontal lesions.

Intrasubstance/Incomplete Tear: It is usually a sign of early degenerative changes in the meniscus, resulting from wear and tear that does not require surgery.[5]

Radical Tear: The most common type usually requires surgery.[5]

Horizontal Tear: It may occur in areas with blood flow, and treatment needs to be determined based on the location of the tear.[5]

Flap Tear: An unusual pattern of meniscus tears that require surgical repair.[5]

Complex Tear: It's a combination of meniscal tears, because a combination tear is very responsible and most of the time it's not surgical.[5]

Bucket-Handle Tear: The knee can get stuck because of the tear, causing normal knee movement to be affected and requiring emergency surgery.[5]

Twisting or rotating your knees forcefully, squatting or lifting heavy objects can cause a meniscus tear. Athletes have a higher risk of meniscus tears, especially if they require a lot of rotational activity. Sometimes others occur in conjunction with other knee injuries, such as ACL injuries.[6] The meniscus also weakens with age. The elasticity of the meniscus in the elderly becomes weak, and a slight external force will cause meniscus damage. For those who need to squat with heavy weights for a long time, such as weightlifters, the meniscus will bear more pressure, which will lead to chronic strain in the long term.

Knee meniscus injuries are common, with an incidence of 61 per 100,000 people and a prevalence of 12 to 14 percent.[7] The peak age of onset in men is between 41 and 50, while the peak age of onset in women is somewhat older than in men, between 61 and 70. There are about 850,000 meniscal tears each year, and between 10% and 20% of meniscal-related surgeries are performed.

Degenerative meniscal tears are most common in men between the ages of 40 and 60. More than 40% of people over the age of 70 have a meniscus tear. Age also affects incidence, with a ratio of about 2.5:1 to 4:1 for males. Modifiable risk factors that increase the risk of meniscus tears are high body mass index, certain occupations such as squatting, lifting and weightlifting, stair climbing and athletes, and those who engage in sports-related activities, including soccer players and people who play rugby.[4]

2. Diagnosis

To confirm the presence of a meniscus tear, your doctor will perform a thorough examination and ask you questions about the injury. When examining the knee, the doctor will focus on the area of the joint line where the meniscus is located and use gentle pressure to detect the presence of pain, which is often an important indicator of meniscus damage.

In addition to a direct physical exam, your doctor may recommend a series of complementary tests to get more complete information. First, X-rays may be ordered to rule out potential problems such as fractures, arthritis, etc. that may affect the diagnosis. Second, to further accurately assess the cartilage

and meniscus condition of your knee, your doctor may also recommend an MRI scan, which provides high-resolution images to help your doctor understand the inside of your knee in more detail.

Meniscus tear test. Often doctors will use the McMurray test to check. The doctor will lay the patient flat on a table. They make you bend your knees and spin in both directions. If you have a torn meniscus, you may hear a noise in your knee and feel pain.[7]

Apley's test. It's a procedure to assess meniscus damage. Clinicians often perform this in combination with the appley distraction test, which assesses ligament damage. Meniscus injuries are very common and come with significant pain and morbidity.[8]

Thessaly's tests. Patients need to stand on one leg and twist from side to side to determine if they feel pain or other symptoms during the exercise.[6]

3. Treatments

The treatment and management of meniscal tears depends on many factors, including age, complexity of the tear, tissue quality, severity of symptoms, etiology (traumatic versus non-traumatic tears), and quantified surgical risk. For acute pain and swollen knees, the initial strategy is to follow the R.I.C.E. principle.[4] R for rest, stop all activities that cause pain, limit activities that cause pain as much as possible, and use crutches to assist walking if the pain is unbearable. I put ice on my knee to reduce the pain. Ice every 3-4 hours for no more than 20 minutes at a time. C for pressure on the knee and use some elastic bandages to reduce swelling in the knee. E for elevate your knees, use a pillow or soft object under your heels to elevate your knees. Some medications can also be taken orally to reduce pain and swelling. But these drugs can have side effects, such as a higher risk of bleeding and ulcers.[9] Unless your doctor says otherwise, they should only be used occasionally.

For degenerative tears and simple traumatic meniscus tears, additional treatment is required, such as the use of knee braces, activity adjustment, physical therapy, etc. [10] Physical therapy should begin with a painless range of motion and need to be treated as early as possible, with progressive weight training. Some endurance training, such as cycling and swimming, should also be added to reduce the load on the knee joint. Use stretching and strengthening exercises to help reduce stress on your knees. Ask your doctor to recommend a physical therapist for guidance.[11]

One study found that patients with osteoarthritis who performed quadriceps strengthening exercises three times a week for 10 weeks improved knee function by 35%. Another randomized controlled trial compared the effects of supervised exercise after APM versus exercise therapy alone in patients with degenerative meniscal tears. They found significant improvement in both groups after 8 weeks, but there was no significant difference in outcomes between the two groups.[12]

Surgery is the primary treatment for most meniscal tears. Until 1960, open meniscectomy was the standard surgical treatment for meniscal tears.[13]

Because total meniscectomy can directly lead to increased pressure on the knee joint, accelerate the onset of osteoarthritis, and even symptomatic varus malformation in the elderly, it is now considered almost an outdated treatment option. Arthroscopic partial meniscectomy (APM) is currently the most commonly used orthopedic surgery in the world. Many researchers consider this a "useless" procedure, and recent clinical guidelines have increasingly recommended against it [14].

4. Conclusion

Meniscus tears are a very common injury today, and their incidence is increasing in all ages due to trauma or osteoarthritis. Thorough investigation of the patient's history, physical examination, and characteristics of meniscal tears will help to better understand its pathogenesis and treatment. Therefore, determining the correct location of the lesion helps to formulate the best treatment plan and postoperative rehabilitation. Although conservative treatment is preferred for some patients and has some effect on functional improvement in patients, surgery remains the primary treatment for meniscal tears. Although partial meniscectomy has the advantages of minimally invasive, quick recovery, and fewer complications, in the long term, partial meniscectomy may still lead to osteoarthritis. Greater

efforts in developing modern imaging and technology will continue to provide advanced tools for further development of diagnostic and therapeutic interventions.[3]

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