

Symptoms of a torn meniscus may include pain, popping, locking, or giving way of the knee. The tibiofemoral joint spaces may be tender.

Treatment

Immediate care should include ice and compressive wrap. If the athlete cannot walk with stability, crutches may be needed. Knee supports, such as a neoprene sleeve, may make the athlete feel more comfortable. Knees showing indications of meniscal tears should be evaluated by a sports physician. Depending on the type and location of the tear and the severity of the symptoms, nonsurgical management can be tried. For meniscal injuries, this includes physical therapy to maintain or increase muscle strength and range of motion, activity modification, anti-inflammatory medications, support sleeves, and time. Generally, one to three months is a reasonable time expectation for significant improvement. Because meniscal tears show up on magnetic resonance imaging, the physician can use MRI to confirm the existence of a tear, if necessary.

Special Tests

Figures 18-21A and B show a test for meniscal tears.



Figure 18-21A-B With the athlete lying supine, the examiner applies an internal and external tibial rotation while moving the knee from flexion to extension. A click that is felt while manipulation is being performed is a positive sign.

Epiphyseal (G

The knee is subject to growth in skeletal growth of long bones, called epiphysis. The growth plate is formed. The joint spaces are two to five times the epiphysis is responsible for epiphyseal growth plate. Therefore, forces that have the potential to injure younger athletes.

Because this test is late, return to play requires approval.

Osgood-Schlatter

Osgood-Schlatter is a condition of the tubercle epiphysis of the tibia where the patellar tendon attachment is a result of the epiphysis or epiphysis of the tibia (Figure 18-22 of 12 to 16 and females).

Figure 18-22 Osgood-Schlatter

Epiphyseal (Growth-Plate) Injuries

The knee is subject to sports-induced trauma at the centers of bone growth in skeletally immature athletes. The growth plates at the end of long bones, called **epiphyseal plates**, are at risk from direct trauma. The growth plate is a zone of cartilage cells from which new bone is formed. The joint capsule and ligaments near these growth plates are two to five times stronger than the growth plate itself. Because the epiphysis is responsible for bone growth, injuries involving the epiphyseal growth plate may alter the length of the involved bone. Therefore, forces that would result in ligamentous injuries in adults have the potential to cause growth-plate injuries in children and younger athletes.

Because this type of injury can be quite serious in a growing athlete, return to play should be permitted only with a physician's approval.

epiphyseal plate The growth plate on the end of a bone.

Osgood-Schlatter Condition

Osgood-Schlatter condition is a group of symptoms involving the tibial tubercle epiphysis. The tibial tubercle is a small bump on the tibia where the patellar tendon of the quadriceps muscle attaches. This condition is a result of traction. The tibial tubercle is a growth center (apophysis or epiphysis) located just below the knee joint on the front of the tibia (Figure 18-22). This condition will most likely affect males of 12 to 16 and females of 10 to 14 years of age.

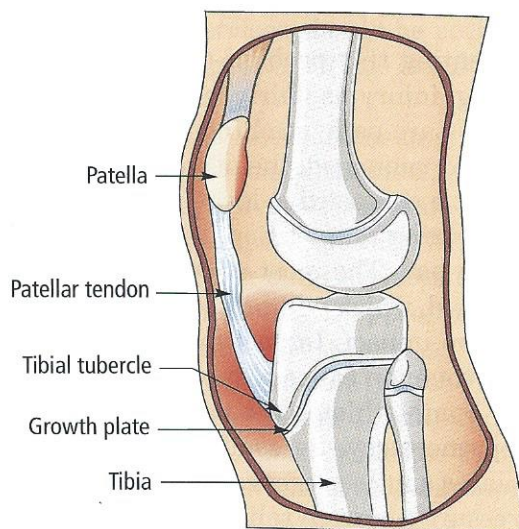


Figure 18-22 Osgood-Schlatter condition

To control inflammation after activity, ice should be applied. This should be done every day, even for those without pain. The ice will control the swelling associated with activity and control pain on a daily basis. Nonsteroidal anti-inflammatory medications will also help to control these symptoms. All medications should be taken in accordance with instructions from the athlete's personal physician.

Improving flexibility is one of the most important treatments for controlling symptoms for the duration of the growth spurt. At first glance, one might expect that stretching the quadriceps muscles would be beneficial. In reality, stretching the hamstrings is more important. Increased hamstring tightness causes the quadriceps to pull harder during athletic activities. This places more traction force on the tibial tubercle. Increasing hamstring flexibility will help to alleviate the pain. Quadricep stretching will only increase the traction forces on the quadricep attachment, possibly increasing pain and swelling. Quadricep stretching should be performed with caution, so as not to exacerbate any pain, but gentle stretching is appropriate and useful.

Stretching should be done at least four times daily. Ideally, the suffering athlete should stretch six times a day. At the minimum, every athlete should stretch after waking, before athletic activities, after athletic activities, and before bedtime. These stretching sessions should address all major muscle groups, with added time emphasizing tight spots. Each stretch should be held for 10 to 30 seconds and repeated 3 to 5 times.

If the athlete continues to have increasing pain (or if pain increases) and cannot participate on a daily basis, the athlete should return to a physician for further consultation. Removal from athletics for a short period of time may help relieve the pain enough to allow the athlete to return to competition. If the athlete has to be removed from competition, rehabilitation exercises should be performed to maintain aerobic fitness and strength. These exercises should not exacerbate the symptoms.

Exercises to avoid include knee extensions, heavy squats, power cleans, and plyometrics. Any exercise that involves explosive use of the quadricep mechanism may aggravate symptoms. Appropriate exercises for improving aerobic fitness are cycling (with a high seat post), slide board, and swimming. Stair-climbing activities may or may not aggravate symptoms, so do them only if appropriate. For maintaining muscular strength, perform exercises such as straight leg raises, body weight squats, hamstring curls, and calf raises. These should be performed to minimize strength loss rather than to increase strength.

Allowing an athlete with Osgood-Schlatter condition to continue to lift weights and compete at a high level is appropriate if participation in these activities does not increase pain. Decreasing the intensity of training may be all the adjustment needed to control the pain and swelling associated with this condition.

Iliotibial Band Syndrome

Iliotibial band syndrome occurs when there is inflammation of the iliotibial band (a thick band of fibrous tissue that runs down the outside of the leg). This band begins at the hip and extends to the outer side of the tibia just below the knee joint (Figure 18-24). The band functions in coordination with several of the thigh muscles to provide stability to the outside of the knee joint.

The irritation usually occurs over the outside of the knee joint, at the lateral epicondyle (lateral end of the femur). The iliotibial band crosses bone and muscle at this point. Between these structures is a bursa that should facilitate a smooth gliding motion. However, when inflamed, the iliotibial band does not glide easily, and pain associated with movement results. As noted, the function of the iliotibial band is to provide stability and to assist in flexion of the knee joint. When irritated, movement of the knee joint becomes painful. Usually the pain worsens with continued movement and resolves with rest.

People who suddenly increase their level of activity, such as runners who increase their mileage, often develop iliotibial band syndrome. Others who are prone to iliotibial band syndrome include individuals

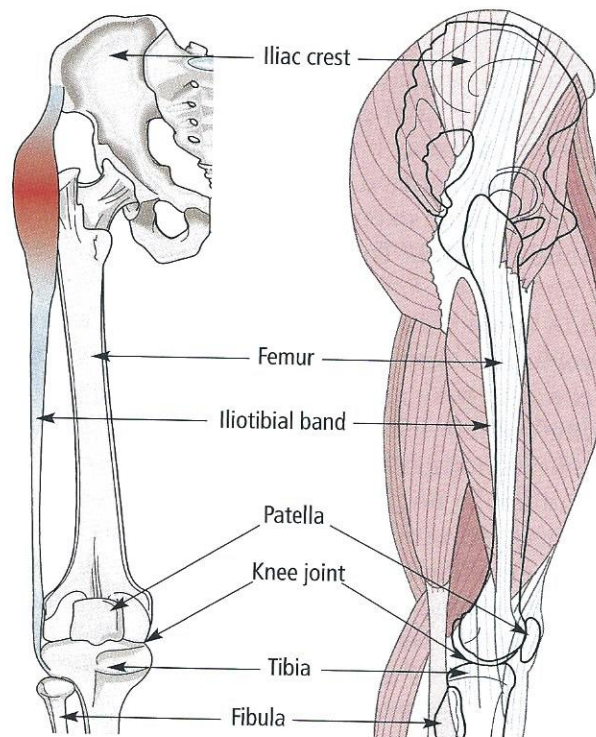


Figure 18-24 Iliotibial band

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Special Test

Demonstration
Figures 18-25

Fractures

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Figure 18-25 V
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is indicated.

with mechanical problems: people who overpronate, who have leg-length discrepancies, or who are bowlegged.

Treatment

Treatment of iliotibial band syndrome begins with an analysis of the athlete's gait and training program. This will help rule out mechanical problems or training errors that may predispose the athlete to the condition. Proper footwear, icing the area of pain, and stretching will help treat iliotibial band syndrome. Modifying the athlete's training program, as well as cross-training, will be helpful. The athlete will need to reduce his or her activity level until symptoms subside.

Special Tests

Demonstrations of testing for iliotibial band syndrome can be seen in Figures 18-25 and 18-26.

Fractures

Fractures in the area of the knee are the result of high-energy trauma. Fortunately, they are not seen frequently in athletes, especially in younger athletes. Fractures vary in location and severity.



Figure 18-25 With the athlete in a supine position, the examiner passively flexes and extends the knee. This is done while applying pressure with the thumb on the distal iliotibial (IT) band (overlying the lateral femoral epicondyle). If the athlete has pain under the examiner's thumb when the knee is at approximately 20 to 30 degrees of flexion, IT band friction syndrome is indicated.

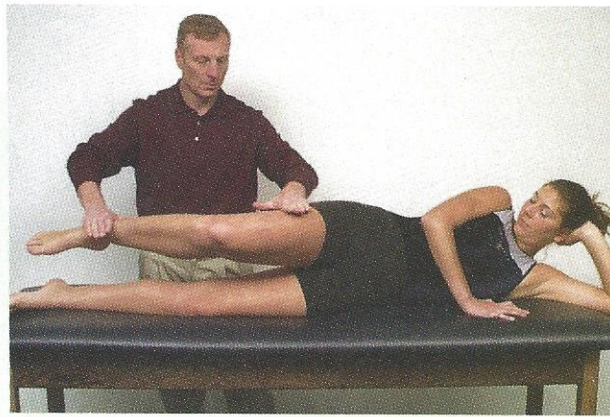


Figure 18-26 The athlete lies on the unaffected side. While the athlete lifts and keeps the affected leg up and moves it in a bicycle-pedaling pattern, the examiner places downward pressure on the leg. If the athlete feels pain over the distal IT band during this test, IT band friction syndrome is indicated.

A fracture of the patella is usually the result of direct impact to the anterior knee. This can occur when the knee strikes hard ground or some other hard sport surface. A football player with a poorly fit knee pad may be vulnerable if the player falls onto the knee. Another example is a tennis player who lands on the knee on concrete or asphalt.

Distal femoral and proximal tibial fractures may occur from violent twisting injuries such as falls from heights (Figure 18-27). A pole vaulter who misses the landing pit may sustain such an injury.



Figure 18-27 Fracture of the distal femur near the knee

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KEY CONCEPT

A wide variety of injuries can occur to the knee. Some of the most common are:

- Patellofemoral problems, characterized by aching pains in the front of the knee. Treatment must focus on correcting the suspected causes.
- Patellar tendonitis, which is inflammation of the patellar tendon and is often seen in sports that involve jumping. Activities must be modified to allow the tendon time to heal.
- Fat pad syndrome, a painful condition affecting the infrapatellar region. Specialized taping, icing, and anti-inflammatory medications may help relieve the pain. Activities that involve full extension of the knee should be avoided.
- Medial collateral ligament sprains, which are caused by application of a force to the outside of the knee that stretches and damages the ligament. Treat with PRICE.
- Lateral collateral ligament sprains, which result from force applied to the medial side of the knee. Treatment is with PRICE.
- Tearing of the anterior cruciate ligament, which usually results from the knee joint being placed in a position of flexion, valgus, and rotation. The athlete usually feels or hears a pop. Treatment includes splinting, icing, and compressive wrapping. Surgery is often indicated.
- Posterior cruciate ligament tears, which result from falling on a flexed knee with the foot pointing downward. Treatment is with PRICE.
- Meniscus tears, which are caused by sudden twisting of the knee. Immediate treatment should be application of ice and a compressive wrap.
- Epiphyseal injuries, which may result in alteration in the length of the bones involved.
- Osgood-Schlatter condition, a group of symptoms involving the tibial tubercle epiphysis. To prevent the problem from worsening, address the pain, swelling, and flexibility.
- Iliotibial band syndrome, an inflammation of the iliotibial band that usually occurs over the knee joint. Treatment for this syndrome involves assessing and correcting problems of gait and training.
- Fractures of the knee, which are the result of high-energy trauma.

