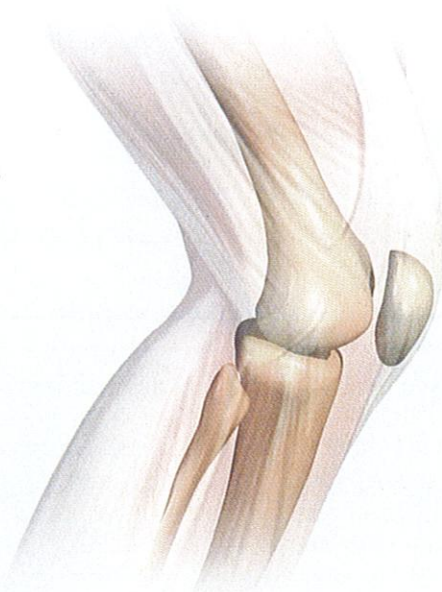


The Knee

- 
- Anterior Cruciate Ligament Injury 172
 - Anterior Cruciate Ligament Reconstruction 176
 - Arthroscopic Meniscectomy 178
 - Baker's Cyst 180
 - Iliotibial Band Syndrome 181
 - Knee Arthroscopy 184
 - Lateral Collateral Ligament Sprain 185
 - Medial Collateral Ligament Sprain 188
 - Meniscal (Cartilage) Tear 191
 - Osgood-Schlatter Disease 195
 - Osteochondritis Dissecans of the Knee 198
 - Patellar Contusion 199
 - Patellar Fracture 202
 - Patellar (Kneecap) Subluxation 205
 - Patellar Tendinopathy (Jumper's Knee) 208
 - Patellofemoral Pain Syndrome (Runner's Knee) 212
 - Pes Anserine Bursitis 216
 - Posterior Cruciate Ligament Injury 218
 - Prepatellar Bursitis 221

ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY

What is an anterior cruciate ligament (ACL) injury?

A sprain is a joint injury that causes a stretch or a tear in a ligament. Ligaments are strong bands of tissue that connect one bone to another. The anterior cruciate ligament (ACL) is one of the major ligaments in the middle of the knee. It connects the thighbone (femur) to the shin bone (tibia). This ligament, along with the posterior cruciate ligament, helps keep the knee stable and protects the femur from sliding or turning on the tibia.

Sprains are graded I, II, or III depending on their severity:

- grade I sprain: pain with minimal damage to the ligaments
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: the ligament is completely torn and the joint is very loose or unstable

How does it occur?

The anterior cruciate ligament is frequently injured in forced twisting motions of the knee. It may also become injured when the knee is straightened further than it normally can straighten (hyperextended). It sometimes occurs when the thigh bone is forcefully pushed across the shin bone, such as with a sudden stop while you are running or a sudden transfer of weight while you are skiing.

What are the symptoms?

There is usually a loud, painful pop when the joint is first injured. This is often followed by a lot of swelling of the knee within the first several hours after the injury. This swelling is called an effusion and is made up of blood in the knee joint. You may find it difficult to fully bend or straighten your knee.

If you have torn your anterior cruciate ligament in an injury that occurred months or years ago and you haven't had reconstructive surgery, you may have the feeling that the knee is giving way during twisting or pivoting movements.

How is it diagnosed?

Your healthcare provider will examine your knee and may find that your knee has become loose. If you have swelling in the joint, he or she may decide to remove the blood in your knee with a needle and syringe. You may need X-rays to see if there is an

injury to the bones in your knee. An MRI (magnetic resonance imaging) scan may also be done and should clearly show the condition of your ACL (as well as that of other ligaments and cartilage).

How is it treated?

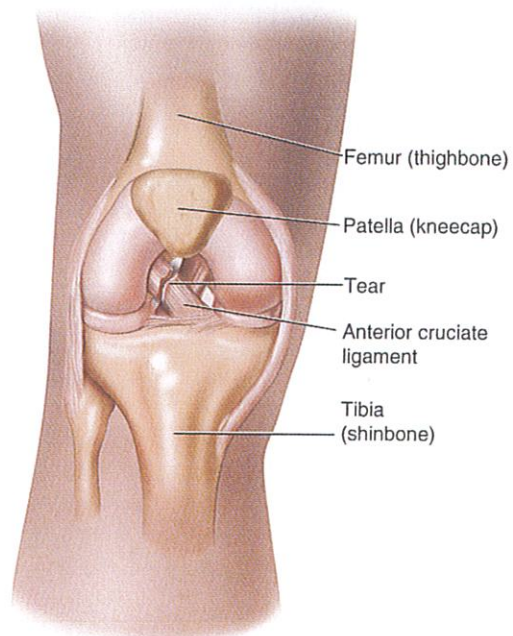
Treatment includes the following:

- Put an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away.
- Keep your knee elevated whenever possible by placing a pillow underneath it until the swelling goes away.
- Take an anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- Do the exercises recommended by your healthcare provider or physical therapist.

Your provider may recommend that you:

- wrap an elastic bandage around your knee to keep the swelling from getting worse
- use a knee immobilizer initially to protect the knee
- use crutches

ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY



For complete tears, you and your healthcare provider will decide if you should have intense rehabilitation or if you should have surgery followed by rehabilitation. The torn anterior cruciate ligament cannot be sewn back together. The ligament must be reconstructed by taking ligaments or tendons from another part of your leg and connecting them to the tibia and femur.

You may consider having reconstructive ACL surgery if:

- your knee is unstable and gives out during routine or athletic activity
- you are a high-level athlete and your knee could be unstable and give out during your sport (for example, basketball, football, or soccer)
- you are a younger person who is not willing to give up an athletic lifestyle
- you want to prevent further injury to your knee. An unstable knee may lead to injuries of the meniscus and arthritis

You may consider not having the surgery if:

- your knee is not unstable and is not painful and you are able to do your chosen activities without symptoms
- you are willing to give up sports that put extra stress on your knee
- you are not involved in sports

If a growing child tears an ACL, the healthcare provider may recommend that surgery be postponed until the child has stopped growing.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your knee recovers,

not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- your injured knee can be fully straightened and bent without pain
- your knee and leg have regained normal strength compared to the uninjured knee and leg
- your knee is not swollen
- you are able to jog straight ahead without limping
- you are able to sprint straight ahead without limping
- you are able to do 45-degree cuts
- you are able to do 90-degree cuts
- you are able to do 20-yard figure-of-eight runs
- you are able to do 10-yard figure-of-eight runs
- you are able to jump on both legs without pain and jump on the injured leg without pain

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider. If you've had surgery, be sure that your provider has told you that you can return to your sport.

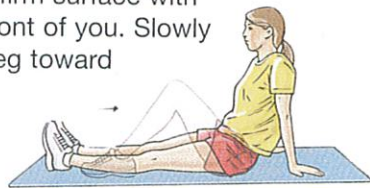
How can I prevent an anterior cruciate ligament sprain?

Unfortunately, most injuries to the anterior cruciate ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles and maintaining a good leg stretching routine. In activities such as skiing, make sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY REHABILITATION EXERCISES

You may begin with the first 2 exercises immediately. When swelling in your knee has gone down and you are able to stand with equal weight on both legs, you may do the remaining exercises.

1. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



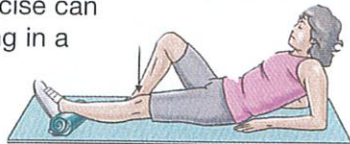
HEEL SLIDE

2. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

3. PASSIVE KNEE EXTENSION: Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



PASSIVE KNEE EXTENSION

4. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

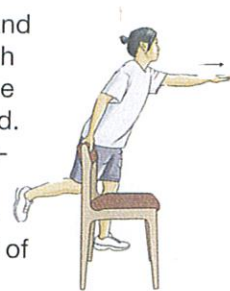


WALL SQUAT WITH A BALL

5. BALANCE AND REACH EXERCISES:

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

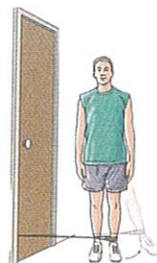
6. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

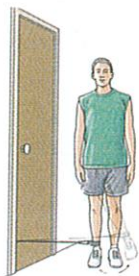


KNEE STABILIZATION

B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



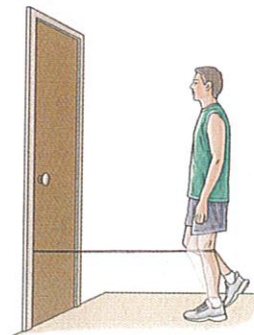
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

7. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

ANTERIOR CRUCIATE LIGAMENT (ACL) RECONSTRUCTION

What is the anterior cruciate ligament (ACL)?

Ligaments are strong bands of tissue that connect one bone to another. The anterior cruciate ligament (ACL) is one of four major ligaments in the knee. It is in the center of the knee joint, connecting the thigh bone (femur) to the shin bone (tibia). The ACL helps keep the knee stable by limiting twisting and forward sliding motions of the knee.

The ACL is commonly injured in sports when there is a forced twisting motion of the knee or when the knee is hit while the foot is planted. It may also be injured during a sudden stop when the femur moves forcefully over the tibia.

What is an ACL reconstruction?

A torn ACL will not heal by itself. In the past, healthcare providers tried to repair the ACL by sewing the torn ends of the ligament together, but this did not work. The ACL must be reconstructed by using ligaments or tendons from another part of the body to replace the torn ACL. Tendons are connective tissue bands that attach muscles to bones. The replacement tissue is called a graft.

The grafts can come from several places. Most often the graft is taken from the patellar tendon, which attaches your kneecap (patella) to your shin bone (tibia). The graft is made up of the middle third of the patellar tendon and small pieces of bone from the kneecap and the shin bone. A graft may also come from your hamstring tendon. The hamstring muscles are in the back of your thigh.

If the graft comes from your own body, it is called an autograft. If the graft comes from someone who has died, it is called an allograft. Providers have tried using some types of synthetic grafts but so far these have not worked well. Research is being done to see if there are better types of grafts that can be used.

Your healthcare provider will discuss the options with you and will help you decide which procedure is best for you.

You may consider having reconstructive ACL surgery if:

- your knee is unstable and gives out during routine or athletic activity
- you are a high-level athlete and your knee could be unstable and give out during your sport (for example, basketball, football, or soccer)

- you are a younger person who is not willing to give up an athletic lifestyle
- you want to prevent further injury to your knee. An unstable knee may lead to injuries of the meniscus and arthritis

You may consider not having the surgery if:

- your knee is not unstable and is not painful and you are able to do your chosen activities without symptoms
- you are willing to give up sports that put extra stress on your knee
- you are not involved in sports

If a growing child tears an ACL, the healthcare provider may recommend that surgery be postponed until the child has stopped growing.

How do I prepare for an ACL reconstruction?

Plan for your care and recovery after surgery. Allow time to rest, and try to find people to help you for a few days.

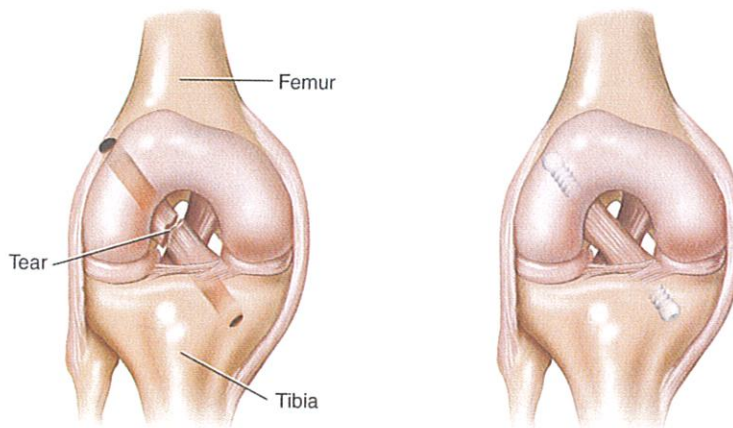
Follow your healthcare provider's instructions. You may be asked not to take aspirin for a week or so before your surgery. Do not eat or drink anything after midnight or the morning before surgery. You may have physical therapy before surgery to begin your rehabilitation.

KNEE

ANTERIOR CRUCIATE LIGAMENT (ACL) RECONSTRUCTION

1. Holes are drilled in the femur and tibia, and the torn ACL is removed.

2. Graft is passed through drill holes and anchored in place with screws or staples.



What happens during surgery?

You will have either general or spinal anesthesia. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. A spinal anesthetic leaves you awake but unable to feel anything from the waist down.

Your healthcare provider will prepare the graft. If your patellar tendon is to be used, the provider will make an incision 1 to 3 inches below your kneecap. Then he or she will remove your torn ACL using an arthroscope. An arthroscope is a thin tube through which your provider can view the inside of your knee joint. Various thin, small instruments are used to perform surgery in the knee. Your provider will drill holes in your femur and tibia where the graft will be attached. The graft will be passed through the holes and anchored in place by screws or staples. The incisions from the graft site and the arthroscopy will be closed with stitches, tape, or staples.

During your surgery, your provider may also treat any other knee injuries such as torn cartilage.

What happens after the surgery?

You may be allowed to go home a few hours after surgery or you may have to spend the night in the hospital. Treatment after surgery may include:

- elevating your knee on a pillow several times a day as long as it is swollen and painful
- putting ice packs on your knee for 20 to 30 minutes 3 to 4 times a day for a few weeks
- taking medicine prescribed by your healthcare provider for pain and swelling
- having physical therapy to rehabilitate your knee

You may be on crutches for a week or two after surgery. You may not be able to drive for at least a few weeks.

What are the complications?

Complications may include:

- loss of range of motion in your knee, joint stiffness
- persistent pain
- a blood clot in the leg
- bleeding
- infection

When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

Rehabilitation from ACL surgery is very complex. Your healthcare provider and therapist will watch your progress very carefully and gradually allow you to be more active. It may take 4 to 9 months of rehabilitation to get back to some activities. It may take 12 months or more for your knee to feel the way it did before your injury.

When should I call my healthcare provider?

Call your healthcare provider immediately if:

- you have a lot of bleeding or a discolored drainage from the puncture sites
- you have a lot of pain in your knee
- you get a fever
- you have swelling in your calf or thigh that does not improve when you elevate your leg

Call your healthcare provider during office hours if:

- you have questions about the surgery or its result

ARTHROSCOPIC MENISCAL SURGERY

What is an arthroscopic meniscal surgery?

An arthroscopic meniscal surgery is a procedure in which a surgeon uses an arthroscope and other tools to remove all or part of a damaged meniscus in the knee or, if possible, to repair a meniscus. A meniscus is a piece of rubbery tissue (fibrocartilage) between the bones of the knee joint. An arthroscope is a tube with a light at the end that projects an image of the inside of your knee onto a TV monitor. The arthroscope is about the diameter of a pencil.

When is it used?

The procedure is used when you have damaged cartilage in your knee.

Examples of alternatives are:

- limiting your activity
- taking medicine to reduce the swelling
- having physical therapy
- having open knee surgery
- choosing not to have treatment, while recognizing the risks of your condition

You should ask your healthcare provider about these choices.

How do I prepare for this procedure?

Plan for your care and recovery after the operation, especially if you are to have general anesthesia. Allow for time to rest and try to find other people to help you with your day-to-day duties.

Follow instructions provided by your healthcare provider. Do not eat or drink anything after midnight or the morning before the procedure. Do not even drink coffee, tea, or water.

What happens during the procedure?

You will be given a general, spinal, or local anesthetic. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. A spinal anesthetic will keep you awake, but numb you from the waist down. A local anesthetic will numb your knee while you are awake (you will also usually be given medicine in your vein to help you relax). All three types of anesthesia should keep you from feeling pain.

The surgeon will put an arthroscope and one or two tools into the knee joint through small cuts. Fluid

is injected into the knee to expand the joint so that the structures and cartilage can be seen. The surgeon will examine the knee to find any damage. She or he may repair any torn cartilage or shave down the cartilage in the knee and remove the pieces of cartilage. The surgeon will then remove the arthroscope and the tools and close the small openings with stitches.

What happens after the procedure?

You will go home the same day. You should keep your leg elevated. Take it easy for at least the next 2 to 3 days. Do not take part in strenuous activities until your healthcare provider feels you are ready.

After surgery:

- Use crutches for several days or until you can walk nearly normally.
- Elevate your leg so that your ankle is higher than your knee and your knee is higher than your hip.
- Put ice on your knee for 20 to 30 minutes 3 or 4 times a day until symptoms are gone.
- Start bending your knee as soon as possible.
- Change your bandage after 4 days and cover the cuts with band-aids or gauze.
- If you have a brace or splint, consult your healthcare provider.
- If the cartilage is repaired and not trimmed, your provider may want you to use crutches longer and to not put weight on your leg.

Ask your healthcare provider what other steps you should take and when you should come back for a checkup.

What are the benefits of this procedure?

The arthroscopy may treat the knee without the need for open knee surgery with bigger incisions. There is more rapid recovery than with open knee surgery.

What are the risks associated with this procedure?

- There are some risks when you have general anesthesia. Discuss these risks with your healthcare provider.
- Local anesthesia may not numb the area quite enough and you may feel some minor discomfort. Also, in rare cases, you may have an allergic reaction to the drug used in this type of anesthesia.

Local anesthesia is considered safer than general anesthesia in older people and in people with certain medical conditions.

- The blood vessels and nerves around the knee may be injured causing numbness or weakness in the leg below the knee.
- There is a risk of deep vein thrombosis, a condition in which a blood clot forms within a deep-lying vein.
- There is a risk of infection and bleeding.

You should ask your healthcare provider how these risks apply to you.

When should I call my healthcare provider?

Call IMMEDIATELY if:

- there is excessive drainage from the puncture sites
- there is unusual pain
- your knee locks
- you develop a fever
- you develop swelling in your calf or thigh that is not relieved by elevating your leg
- you develop signs of infection

Call during office hours if:

- you have questions about the procedure or its result
- you want to make an appointment for a follow-up visit

BAKER'S CYST

What is a Baker's cyst?

A Baker's cyst is an abnormal swelling of a bursa (a fluid-filled sac) behind the knee.

How does it occur?

No one really knows what causes a Baker's cyst. However, a cyst can occur when the lining of the knee joint produces too much fluid after an injury or in certain kinds of arthritis.

What are the symptoms?

You may have pain, swelling, or a feeling of fullness in the area behind the knee.

How is it diagnosed?

Your healthcare provider will examine your knee and find a bulge in the back of your knee. You may need to have a magnetic resonance image (MRI) to help the healthcare provider determine if you have a Baker's cyst.

How is it treated?

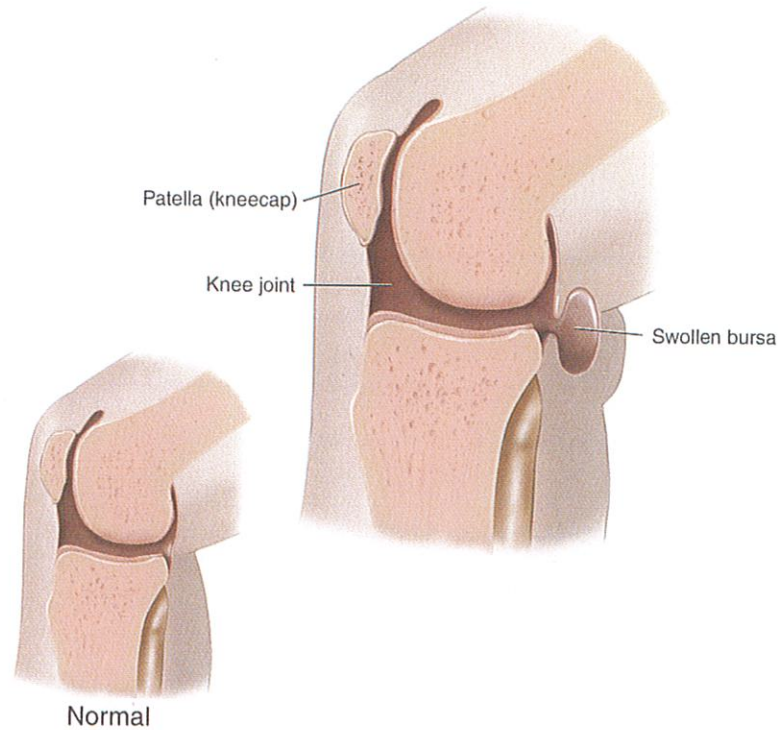
The initial discomfort of a Baker's cyst may be treated by wearing an elastic bandage or a sleeve around your knee. Your provider may prescribe anti-inflammatory medicine, the cyst may be drained, or an operation may be performed to remove the cyst. Sometimes the cyst goes away on its own. If the cyst does not cause bothersome symptoms, it may not be treated (adults

aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

How can a Baker's cyst be prevented?

There is really no way to prevent a Baker's cyst from forming.

BAKER'S CYST



ILIOTIBIAL BAND SYNDROME

What is iliotibial band syndrome?

Iliotibial band syndrome is inflammation and pain on the outer side of the knee. The iliotibial band is a layer of connective tissue. It begins at a muscle near the outer side of your hip, travels down the outer side of your thigh, crosses the outer side of the knee, and attaches to the outer side of your upper shin bone (tibia).

How does it occur?

Iliotibial band syndrome occurs when this band repeatedly rubs over the bump of the thigh bone (femur) near the knee, causing the band to be irritated. This most often occurs in running.

This condition can result from:

- having a tight iliotibial band
- having tight muscles in your hip, pelvis, or leg
- your legs not being the same length
- running on sloped surfaces
- running in shoes with a lot of wear on the outside of the heel

What are the symptoms?

The symptom is pain on the outer side of the knee.

How is it diagnosed?

Your healthcare provider will examine your knee and find tenderness where the band passes over the bump on the outer side of your knee. Your iliotibial band may be tight.

How is it treated?

Treatment includes the following:

- Place an ice pack over your iliotibial band for 20 to 30 minutes every 3 or 4 hours for 2 to 3 days or until the pain goes away.
- You can also do ice massage. Massage your knee with ice by freezing water in a Styrofoam cup. Peel the top of the cup away to expose the ice and hold onto the bottom of the cup while you rub ice over your knee for 5 to 10 minutes.
- Take an anti-inflammatory medicine, according to your healthcare provider's prescription (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

- Do the stretching and strengthening exercises recommended by your healthcare provider or physical therapist.

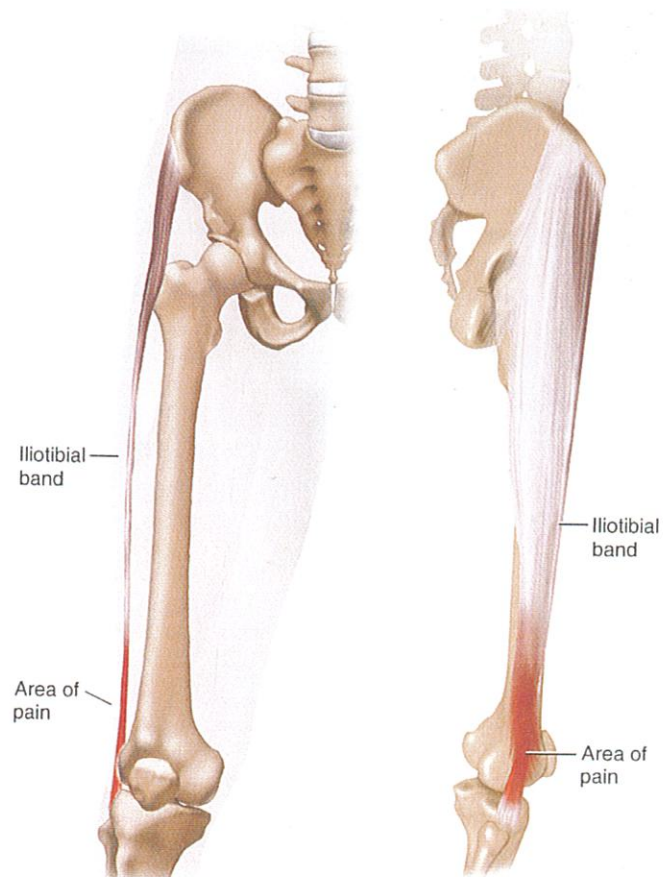
Your provider may give you an injection of a corticosteroid medicine to reduce the inflammation and pain.

While your knee is healing, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle instead of run.

How long will the effects last?

The length of recovery depends on many factors such as your age, health, and if you have had a previous injury. Recovery time also depends on the severity of the injury. A mild injury may recover within a few weeks, whereas a severe injury may take 6 weeks or longer to recover. You need to stop doing the activities that cause pain until your iliotibial band has healed. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

ILIOTIBIAL BAND SYNDROME



When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- your injured knee can be fully straightened and bent without pain
- your knee and leg have regained normal strength compared to the uninjured knee and leg
- you are able to walk or jog straight ahead without limping

How can I prevent iliotibial band syndrome?

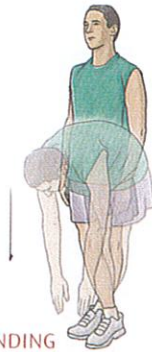
Iliotibial band syndrome is best prevented by warming up properly and doing stretching exercises before sports or other physical activity.

ILIOTIBIAL BAND SYNDROME REHABILITATION EXERCISES

You may do all of these exercises right away.

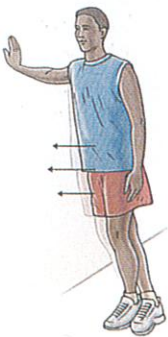
1. ILIOTIBIAL BAND STRETCH: STANDING:

Cross one leg in front of the other leg and bend down and touch your toes. You can move your hands across the floor toward the front leg and you will feel more stretch on the outside of your thigh on the other side. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times. Reverse the positions of your legs and repeat.



ILIOTIBIAL BAND STRETCH: STANDING

2. ILIOTIBIAL BAND STRETCH: SIDE-LEANING: Stand sideways near a wall. Place one hand on the wall for support. Cross the leg farthest from the wall over the other leg, keeping the foot closest to the wall flat on the floor. Lean your hips into the wall. Hold the stretch for 15 seconds, repeat 3 times, and then switch legs and repeat the exercise another 3 times.



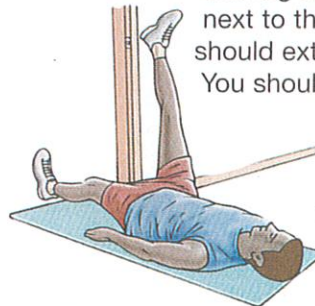
ILIOTIBIAL BAND STRETCH: SIDE-LEANING

3. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times and then switch the position of your legs and repeat the exercise 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

4. HAMSTRING STRETCH ON WALL: Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times and then switch legs and do the exercise again.



HAMSTRING STRETCH ON WALL



QUADRICEPS STRETCH

5. QUADRICEPS STRETCH: Stand an arm's length away from the wall with your injured leg farthest from the wall. Facing straight ahead, brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of your injured leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds.

6. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your back upright, slowly squat down to a 45-degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

7. SIDE-LYING LEG LIFT: Lying on your uninjured side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight and lower slowly. Do 3 sets of 10.



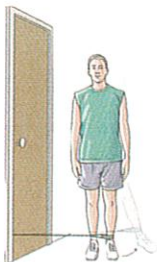
SIDE-LYING LEG LIFT

8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of the uninjured leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

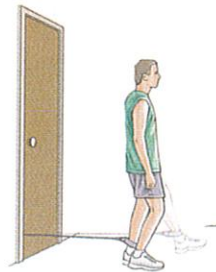


KNEE STABILIZATION



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.

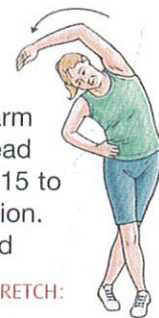


KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

9. ILIOTIBIAL BAND STRETCH: SIDE-BENDING: Cross one leg in front of the other leg and lean in the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times and then switch legs and repeat the exercise.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

10. CLAM EXERCISE: Lie on your uninjured side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels touching each other. Hold for 2 seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

KNEE

KNEE ARTHROSCOPY

What is an arthroscopy?

Arthroscopy is a procedure that allows a surgeon to look at the inside and repair joints without having to cut open the joint. Orthopedic surgeons are bone, joint, and muscle specialists who perform this surgery.

When is it used?

Arthroscopy is often done to:

- see what is causing a joint problem in a joint
- see if a diseased joint is worsening
- see how well treatment is working
- repair a problem found in a joint, such as removing small pieces of bone from the joint or repairing a tear in the cartilage or ligaments

Arthroscopy can be used for most joints. The six joints most frequently examined are the knee, shoulder, elbow, ankle, hip, and wrist.

How do I prepare for an arthroscopy?

Plan for your care and recovery after the operation by:

- allowing for time to rest
- finding other people to help you with your day-to-day duties
- following instructions provided by your healthcare provider

If you are to have general anesthesia, do not eat or drink anything after midnight or the morning before the procedure. Do not even drink coffee, tea, or water.

What happens during the procedure?

You are given a local, regional, or general anesthesia. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. It will prevent you from feeling pain during the operation.

A tube about the size of a straw, called an arthroscope, is inserted into a small cut near the joint. The arthroscope has a light on it as well as a magnifying lens. A tiny camera is attached to the scope so the surgeon can see inside your knee by looking at a TV monitor. Other small tools can be inserted into other small cuts to repair the joint.

What happens after the procedure?

Arthroscopy is considered a minor surgical procedure and usually does not require a hospital stay. You can go home the same day as your surgery. The recovery time depends on the type of procedure. Even though the joint may not return to normal for a few weeks, you may be able to go back to your regular daily activities within a few days. Athletes having this surgery may be able to return to their sport within a few weeks depending on their particular situation. You may need to do physical therapy exercises for a few months to help make the joint strong again. Ask your healthcare provider when you can safely return to your daily activities and when you can start exercising again.

What are the benefits?

The recovery for arthroscopy is faster than if a full open incision were made to correct or diagnose the problem. Most people do very well after arthroscopy and have a rapid recovery.

What are the risks associated with this procedure?

Complications are rare. Possible complications include:

- bleeding in the joint
- an infection in the joint
- a blood clot in a vein
- damage to the surrounding blood vessels or nerves
- too much swelling or bleeding
- damage to muscles, ligaments, tendons, or cartilage

When should I call my healthcare provider?

Call your healthcare provider during office hours if:

- your joint has signs of infection such as warmth, swelling, redness, or drainage
- you have a fever or chills
- you have numbness or severe swelling and pain
- you have bleeding
- there is increased tenderness in the joint

LATERAL COLLATERAL LIGAMENT SPRAIN

What is a lateral collateral ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament, a strong band of tissue connecting one bone to another. The lateral collateral ligament is located on the outer side of the knee. It attaches the thighbone (femur) to the outside bone in the lower leg (fibula).

Sprains are graded I, II, or III depending on their severity:

- Grade I sprain: pain with minimal damage to the ligaments.
- Grade II sprain: more ligament damage and mild looseness of the joint.
- Grade III sprain: the ligament is completely torn and the joint is very loose or unstable.

How does it occur?

The lateral collateral ligament can be injured by a twisting motion or from a blow to the inner side of the knee.

What are the symptoms?

Symptoms may include the following:

- You have pain on the outer side of your knee.
- Your knee is swollen and tender.
- You have the feeling of your knee giving way.
- You hear or feel a pop or snap at the time of injury.

How is it diagnosed?

Your healthcare provider will ask how you injured your knee. He or she will examine your knee for tenderness on the outer side of your knee. He or she will gently move your knee around to see if the joint is stable and if the ligament is stretched or torn. Your provider may order X-rays or a magnetic resonance image (MRI) of your knee.

How is it treated?

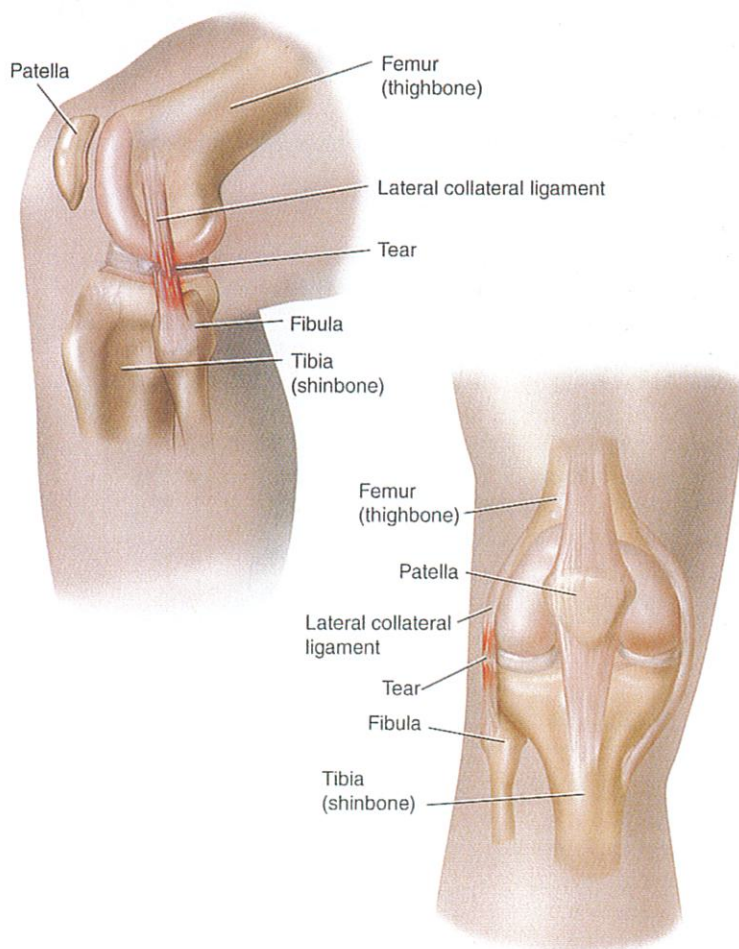
Treatment may include:

- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away
- elevating your knee by placing a pillow underneath it (to help reduce swelling)

- taking anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wrapping an elastic bandage around your knee to keep the swelling from getting worse
- using crutches until you can walk without pain
- doing rehabilitation exercises
- surgery to repair a complete tear

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run. Your provider may give you a brace to wear if you need to participate in sports or other activities while you are recovering.

LATERAL COLLATERAL LIGAMENT SPRAIN



When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.

- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

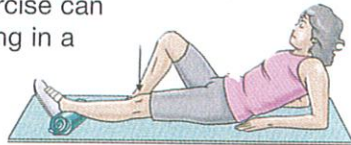
How can I prevent a lateral collateral ligament sprain?

Unfortunately, most injuries to the lateral collateral ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles, as well as by gently stretching your legs before and after exercising. In activities such as skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

LATERAL COLLATERAL LIGAMENT SPRAIN REHABILITATION EXERCISES

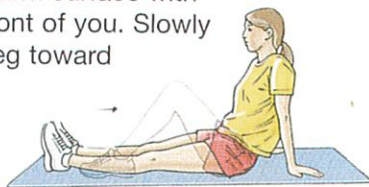
You may do the first 4 exercises right away. You may do the remaining exercises when your knee pain has decreased.

1. PASSIVE KNEE EXTENSION: Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



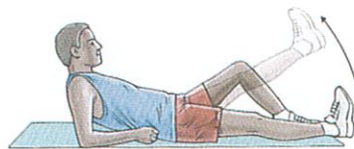
PASSIVE KNEE EXTENSION

2. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

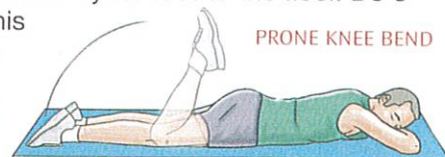
3. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg



STRAIGHT LEG RAISE

about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.

4. PRONE KNEE BEND: Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.



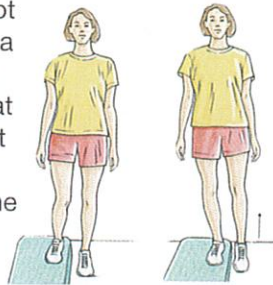
PRONE KNEE BEND

5. WALL SQUAT: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



WALL SQUAT

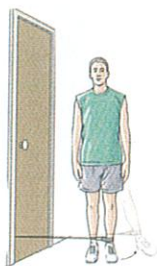
6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

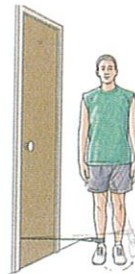
7. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



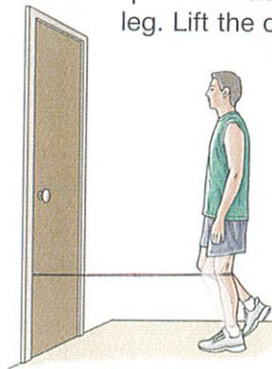
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

8. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

MEDIAL COLLATERAL LIGAMENT SPRAIN

What is a medial collateral ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament, a strong band of tissue connecting one bone to the other. The medial collateral ligament is located on the inner side of the knee. It attaches the thighbone (femur) to the shinbone (tibia).

Sprains vary from minor tears in a few fibers of ligament to complete tears of entire ligaments. Complete tears make the joint very loose and unstable.

How does it occur?

This injury usually occurs when a blow to the outer side of the knee causes stretching or tearing of the medial collateral ligament. It can also be caused by twisting the knee.

What are the symptoms?

Symptoms may include the following:

- You have pain on the inner side of your knee.
- Your knee is swollen and tender.
- You have the feeling of your knee giving way.
- You hear or feel a pop or snap at the time of injury.

How is it diagnosed?

Your healthcare provider will ask how you injured yourself and will examine your knee. He or she will gently move your knee around to see if the joint is stable and if the ligament is stretched or torn. Your provider may order X-rays or a magnetic resonance image (MRI) of your knee.

How is it treated?

Treatment may include:

- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away
- elevating your knee by placing a pillow underneath it (to help reduce swelling)
- taking an anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wrapping an elastic bandage around your knee to keep the swelling from getting worse

- wearing a knee immobilizer or knee brace to keep you from moving and further injuring your knee and to minimize the pain of moving your knee
- using crutches until you can walk without pain
- doing rehabilitation exercises

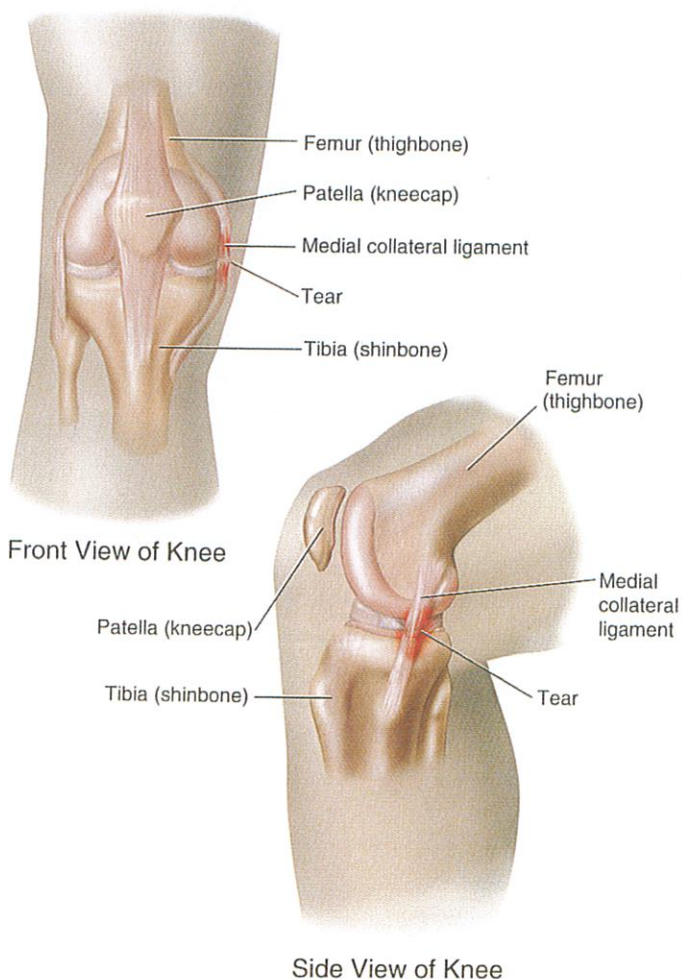
Torn medial collateral ligaments rarely need surgery.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run. Your provider may give you a brace to wear if you need to participate in sports or other activities while you are recovering.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

MEDIAL COLLATERAL LIGAMENT SPRAIN



return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.

- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

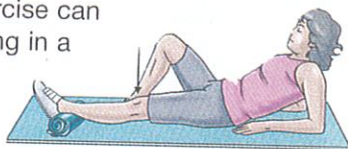
How can I prevent a medial collateral ligament sprain?

Unfortunately, most injuries to the medial collateral ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles, as well as by gently stretching your legs before and after exercising. In activities such as skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

MEDIAL COLLATERAL LIGAMENT SPRAIN REHABILITATION EXERCISES

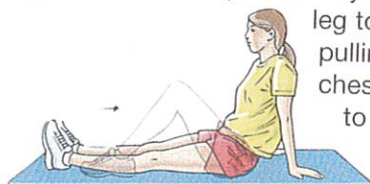
You may do the first 6 exercises right away. You may do the remaining exercises when the pain and swelling in your knee has decreased.

1. PASSIVE KNEE EXTENSION: Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



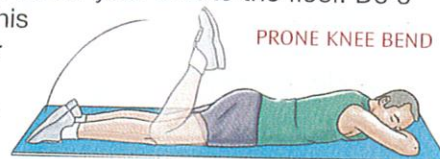
PASSIVE KNEE EXTENSION

2. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



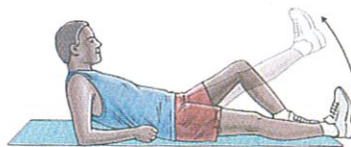
HEEL SLIDE

3. PRONE KNEE BEND: Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.



PRONE KNEE BEND

4. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

KNEE

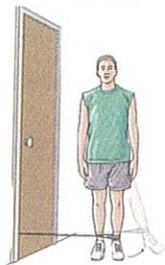
5. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

6. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

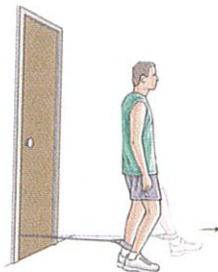
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



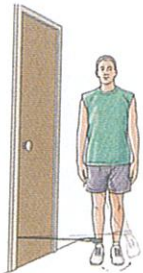
B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

KNEE

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

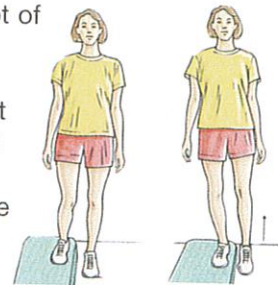
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

7. WALL SQUAT: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



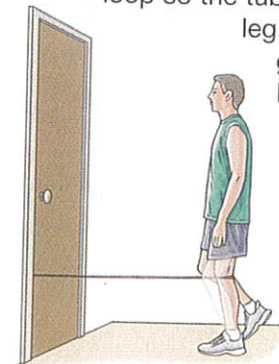
WALL SQUAT

8. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

MENISCAL (CARTILAGE) TEAR

What is a meniscal (cartilage) tear?

The meniscus is a piece of cartilage in the middle of your knee. Cartilage is tough, smooth, rubbery tissue that lines and cushions the surface of the joints. You have a meniscus on the inner side of your knee (the medial meniscus) and a meniscus on the outer side of the knee (the lateral meniscus). Each meniscus attaches to the top of the shinbone (tibia), makes contact with the thighbone (femur), and acts as a shock absorber during weight-bearing activities. If a meniscus tears, it can cause knee pain and can limit motion.

How does it occur?

A meniscal tear can occur when the knee is forcefully twisted or sometimes with minimal or no trauma, such as when you are squatting.

What are the symptoms?

Symptoms may include the following:

- You have pain in your knee joint.
- You have immediate swelling with fluid in the joint, called an effusion.
- You can't fully bend or straighten your leg.
- Your knee locks or gets stuck in one place.
- You hear a snap or pop at the time of the injury.

A chronic (old) meniscal tear may give you pain on and off during activities, with or without swelling. Your knee may sometimes lock, and you may have stiffness in the knee.

How is it diagnosed?

Your healthcare provider will review your symptoms and how the injury occurred. He or she will ask about your medical history and examine your knee. Your provider will move your knee in several ways that may cause pain along the injured meniscal surface. You may have X-rays to see if the bones in your knee are injured, but a meniscal tear will not show on an X-ray. An MRI scan (magnetic resonance imaging) can help diagnose a meniscal tear.

How is it treated?

Treatment may include:

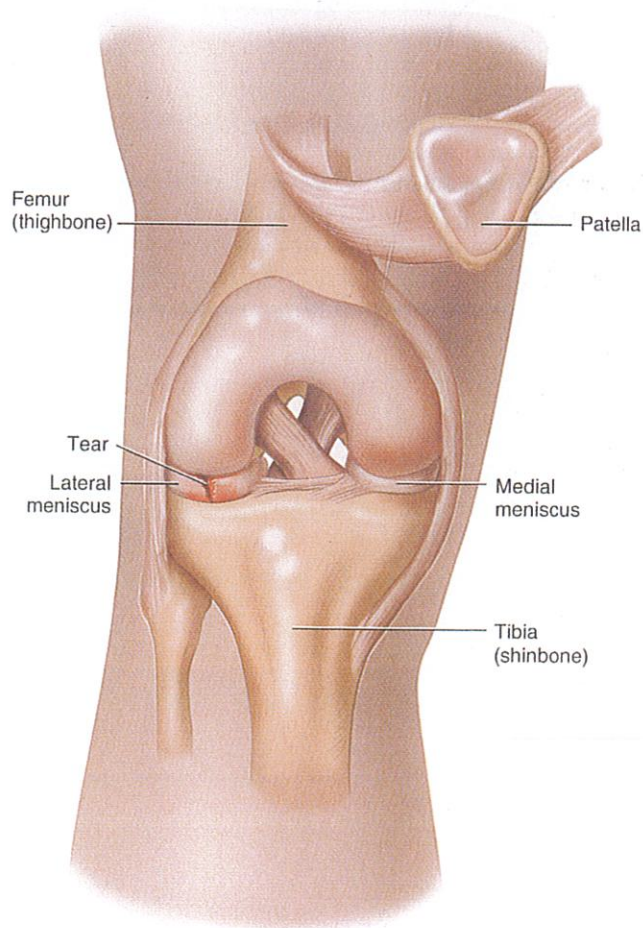
- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain and swelling are gone
- elevating your knee by placing a pillow underneath your leg (to help reduce swelling)

- wrapping an elastic bandage around your knee to keep the swelling from getting worse
- wearing a knee immobilizer or other brace to prevent further injury
- using crutches
- taking anti-inflammatory or pain medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.

Arthroscopic surgery is needed to repair or remove large torn pieces of cartilage. The surgery usually takes about an hour. An arthroscope is a tube

MENISCAL (CARTILAGE) TEAR



Front View of Knee

KNEE

with a light on the end that projects an image of the inside of your knee onto a TV screen. By putting tools through the end of the arthroscope, the doctor can usually repair or remove the damaged meniscus. Because the meniscus is a valuable shock absorber, the doctor will leave as much of the healthy portion of the meniscus as possible during surgery.

You will go home the day of the surgery. You should keep your leg elevated. Take it easy for at least the next 2 to 3 days.

Do not take part in strenuous activities until your healthcare provider feels you are ready.

How long will the effects last?

If you have a small tear that has not been repaired or removed, you may still be able to function well and be active. However, your knee may sometimes swell, lock, be stiff, or hurt during activities.

If you have surgery, you will need to spend time rehabilitating your knee. Everyone recovers at a different rate, depending on the severity of the injury and their general health. Many people return to their previous level of activity within a month or so after surgery.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your provider.

How can a meniscal tear be prevented?

Unfortunately, most injuries to knee cartilage occur during accidents that are not preventable. However, you may be able to avoid these injuries by:

- having strong thigh and hamstring muscles
- gently stretching your legs before and after exercise
- wearing shoes that fit properly when you exercise and that are right for the activity you're doing

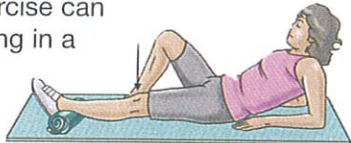
When skiing, be sure that your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

MENISCAL (CARTILAGE) TEAR REHABILITATION EXERCISES

You may do the first 5 exercises right away. You may do the rest of the exercises when the pain in your knee has decreased.

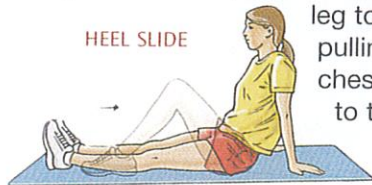
1. PASSIVE KNEE EXTENSION: Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.

PASSIVE KNEE EXTENSION

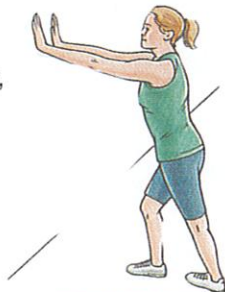


2. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.

HEEL SLIDE

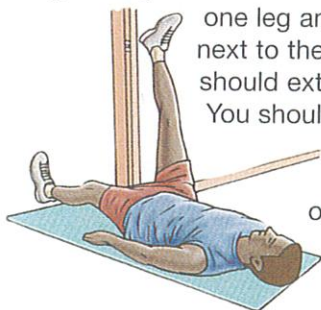


3. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



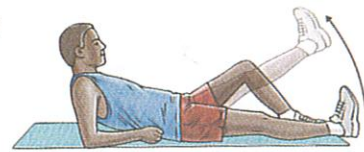
STANDING CALF STRETCH

4. HAMSTRING STRETCH ON WALL: Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

5. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



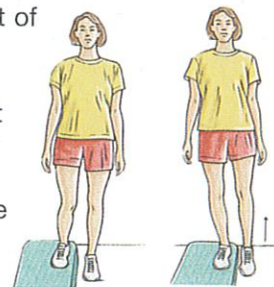
STRAIGHT LEG RAISE

6. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

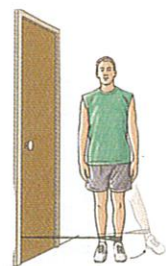
7. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

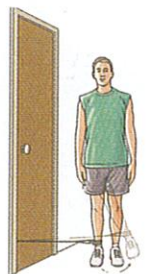
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



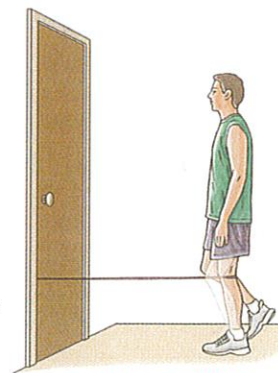
C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

OSGOOD-SCHLATTER DISEASE

What is Osgood-Schlatter disease?

Osgood-Schlatter disease is a painful enlargement of the bump of the shin bone (tibia) just below the knee. This bump is called the tibial tuberosity. The tendon that attaches the kneecap to the shin bone attaches at the tibial tuberosity. Osgood-Schlatter disease is most often seen in children between the ages of 10 and 15 and usually appears during a period of rapid growth.

How does it occur?

Osgood-Schlatter disease is caused by overuse of the knee in normal childhood and sporting activities. It is possible that muscles are too tight in the front of the thigh, the back of the thigh, or in the calf.

What are the symptoms?

Your child will complain of a painful bump below the kneecap. You or your child may notice a bony enlargement at the top of the shin bone. The pain will sometimes come and go and usually is gone by the time your child has stopped growing. Sometimes the pain still lasts into adulthood. The bump may remain painful and some activities, such as kneeling, may be difficult.

How is it diagnosed?

Your child's healthcare provider will examine the knee and review your child's symptoms. Your child may need an X-ray. X-rays show an enlarged tibial tuberosity. An X-ray may also show irregular or loose bony fragments from the tibial tuberosity.

How is it treated?

Your child may need to rest or do activities that do not cause knee pain. Ice packs should be put on the knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. If the knee is swollen, it should be elevated by placing a pillow under it. Your child's healthcare provider may prescribe a special padded brace. He or she may prescribe an anti-inflammatory medicine and may recommend exercises.

How long will the effects last?

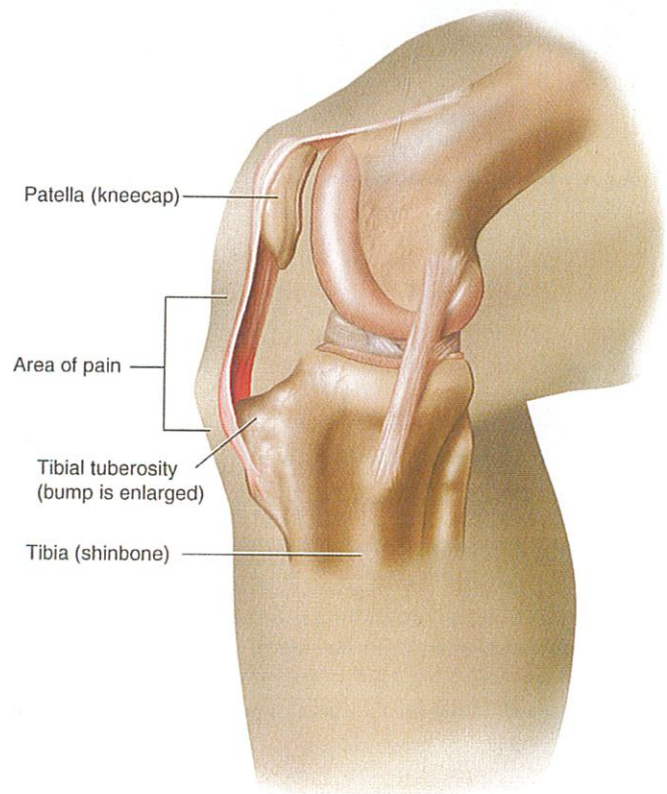
As your child gets older and past the growth spurt, symptoms of Osgood-Schlatter disease go away and there is usually no longer a problem. It commonly takes about 6 to 24 months from the start of the symptoms. The best way to avoid the pain of Osgood-Schlatter disease is to use exercise to build muscle strength and avoid overtraining.

Your child will always have a bump even after the pain has gone away. It is possible for your child to sometimes have pain in the area of the bump even after he or she is an adult. Adults with persistent pain from bony fragments around the knee need to have the fragments surgically removed.

When can my child return to his or her sport or activity?

The goal of rehabilitation is to return your child to his or her sport or activity as soon as is safely possible. If your child returns too soon the injury may worsen, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to his or her sport or activity will be determined by how soon your child's knee recovers, not by how many days or weeks it has been since the injury occurred. In general, the longer your child has symptoms before starting treatment, the longer it will take to get better.

OSGOOD-SCHLATTER DISEASE



Your child may safely return to his or her sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your child's tibial tuberosity is no longer tender.
- The injured knee can be fully straightened and bent without pain.
- The knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your child is able to jog straight ahead without limping.
- Your child is able to sprint straight ahead without limping.
- Your child is able to do 45-degree cuts.
- Your child is able to do 90-degree cuts.
- Your child is able to do 20-yard figure-of-eight runs.

- Your child is able to do 10-yard figure-of-eight runs.
- Your child is able to jump on both legs without pain and jump on the injured leg without pain.

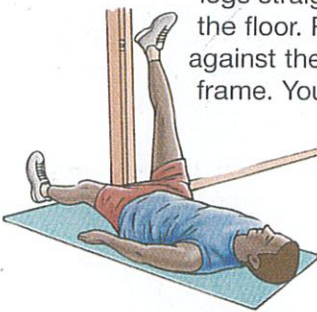
How can Osgood-Schlatter disease be prevented?

Osgood-Schlatter disease may be difficult to prevent. The most important thing to do is to have your child limit activity as soon as he or she notices the painful bump on the top of the shin bone. Proper warm-up and stretching exercises of the thigh, hamstring, and calf muscles may help prevent Osgood-Schlatter disease.

OSGOOD-SCHLATTER DISEASE REHABILITATION EXERCISES

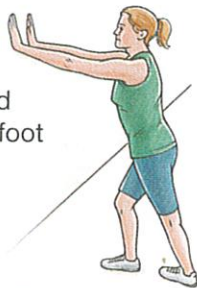
You can start stretching the muscles in the back of your leg using the hamstring and calf stretches right away. When you have only a little discomfort in the upper part of your lower leg bone (tibia), you can do the rest of the exercises.

1. HAMSTRING STRETCH ON WALL: Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

2. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

3. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



QUADRICEPS STRETCH

4. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

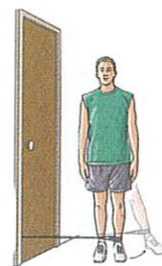
5. PRONE HIP EXTENSION: Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles and lift one leg off the floor about 8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



PRONE HIP EXTENSION

6. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

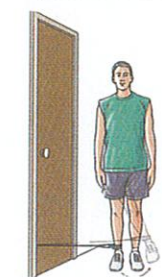
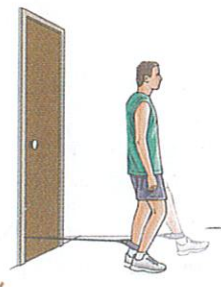
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

KNEE STABILIZATION

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

KNEE

OSTEOCHONDRITIS DISSECANS OF THE KNEE

What is osteochondritis dissecans of the knee?

Osteochondritis dissecans of the knee is a disorder in which there is an injury to the bone or cartilage which make up the knee joint. The cartilage covering the femur (thighbone) or kneecap (patella) are usually affected. There can be fragments of bone or cartilage which come loose and float around in the knee joint. Other terms for this condition are chondral fracture and osteochondral fracture. The fragments may also be referred to as a joint mouse or loose bodies.

How does it occur?

There has usually been a previous injury to the knee that caused a fragment of bone or cartilage to be chipped off the end of the femur or the back of the patella. This may be due to a significant injury or due to repeated minor injuries. A problem with the blood supply to the bone may be part of the cause.

What are the symptoms?

Your knee may lock up from time to time. You may see bulges along the joint surface. You may be able to feel these chips or loose bodies along the surface of your knee joint at various times. Your knee can become swollen and painful. You may not be able to fully bend or straighten your knee.

How is it diagnosed?

Your healthcare provider will examine your knee and may find that it clicks or locks. Fragments may be felt along the joint line. An X-ray or a magnetic resonance imaging (MRI) may show bony fragments or the defects in the femur or patella.

How is it treated?

You may need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. You may also need to rest if your knee is swollen and painful.

How long will the effects last?

The symptoms from osteochondritis dissecans may continue until surgery is done to correct the problem. Ask your healthcare provider when you will be able to return to your normal activities. If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

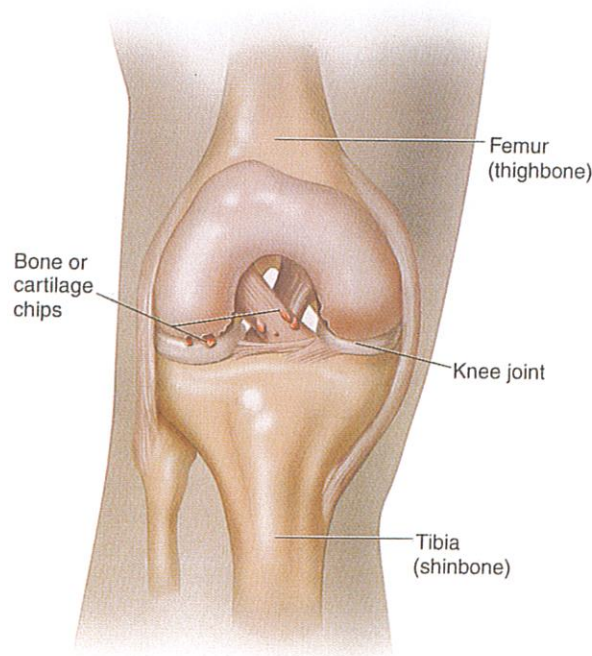
You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to walk, bend, and squat without pain.

How can I prevent osteochondritis dissecans of the knee?

Osteochondritis dissecans is usually caused by trauma to the knee and is not preventable.

OSTEOCHONDRITIS DISSECANS OF THE KNEE



PATELLAR CONTUSION (BRUISED KNEE)

What is a bruised knee (patellar contusion)?

A patellar contusion is a bruise on your kneecap.

How does it occur?

A bruised kneecap occurs from a direct injury to your kneecap. This usually happens from falling onto your knee or by being hit by an object.

What are the symptoms?

You will have pain directly over your kneecap. You may also have pain underneath your kneecap. You may have swelling in your knee. You may have pain walking or running. The outside of your knee may become swollen if the bursa is bruised. The bursa is a fluid filled sac just in front of the patella.

How is it diagnosed?

Your provider will ask you about your symptoms and examine your knee. He or she may order an X-ray.

How is it treated?

Treatment may include:

- putting ice packs on your knee for 20-30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain and swelling goes away
- elevating your knee to help any swelling go away
- taking a medicine such as ibuprofen or acetaminophen
- using crutches if needed

You will be given rehabilitation exercises to help you return to your sport or activity. While you are recovering from your injury, you may need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim or bicycle instead of run.

How long will the effects last?

The effects of a bruised kneecap may last several days to weeks or longer. It may take longer if the back of the kneecap is injured.

When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

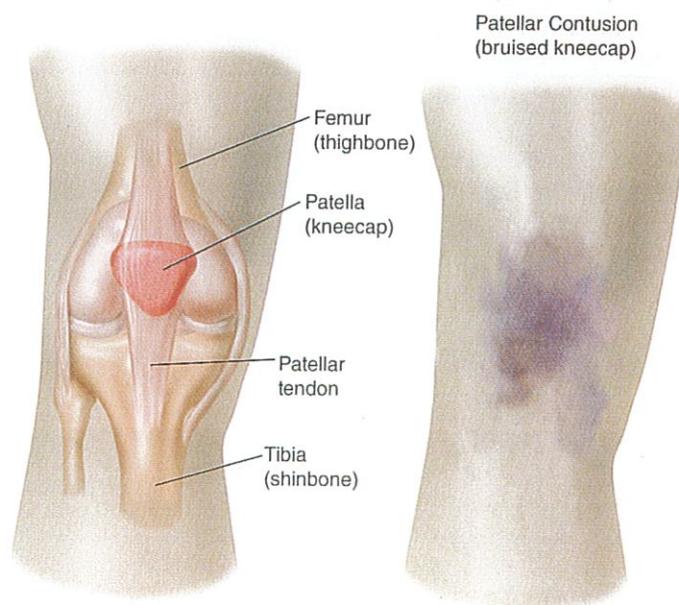
- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- You are able to walk, bend, and squat without pain.

What can I do to prevent a bruised kneecap?

Most bruised kneecaps are caused by accidents that cannot be prevented. If you are in a sport that has knee protection, be sure that your equipment fits properly.

PATELLAR CONTUSION (BRUISED KNEE)

KNEE



PATELLAR CONTUSION REHABILITATION EXERCISES

You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

1. STANDING HAMSTRING STRETCH: Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



STANDING HAMSTRING STRETCH

5. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE



QUADRICEPS STRETCH

2. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



STEP-UP

6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.

3. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

7. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

4. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.

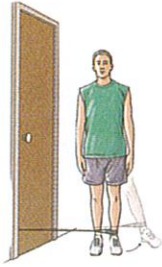


QUAD SETS

8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



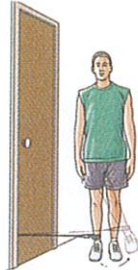


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



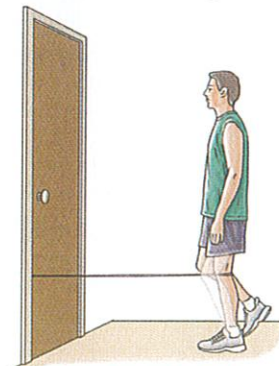
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

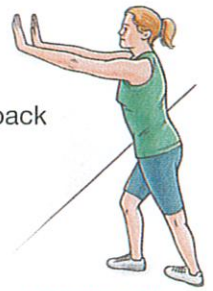
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

10. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



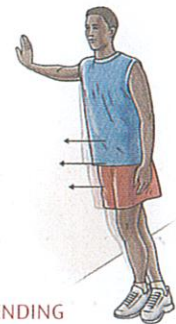
STANDING CALF STRETCH

11. CLAM EXERCISE: Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING: Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

KNEE

PATELLAR FRACTURE (BROKEN KNEECAP)

What is a broken knee (patellar fracture)?

A fracture is a break in a bone. Your patella is your kneecap. A patellar fracture is a broken kneecap.

Patellar fractures may be called:

- Non-displaced: the broken pieces of bone are in line together.
- Displaced: the broken pieces of bone are not together.
- Comminuted: there are more than 2 pieces of bone at the fracture
- Avulsed: the patellar tendon may pull off the bottom part of the kneecap.

How does it occur?

A broken kneecap occurs from a direct injury to your kneecap. This usually happens from falling onto your knee or by being hit by an object. An avulsion fracture of the kneecap can occur from jumping or running.

What are the symptoms?

Symptoms include pain, tenderness, swelling, and difficulty walking or straightening your leg. You may hear a popping or snapping sound at the time of the injury.

How is it diagnosed?

Your provider will review your symptoms, ask how the injury occurred and examine you. He or she will order X-rays.

How is it treated?

Treatment includes pain medicine, ice and elevation. You will be placed in a brace, a knee immobilizer or a cast to prevent your knee from moving. You will not be able to move your knee for 6 to 8 weeks. Some broken kneecaps need surgery. Your provider may prescribe a pain medicine.

Your provider will do follow-up X-rays to make sure your fracture has healed properly. You will begin rehabilitation exercises when the broken kneecap has healed.

How long will the effects last?

The effects of a broken kneecap may last several months. It may

take 6 to 8 weeks for the knee to heal. You will then need to do rehabilitation exercises for several weeks. Sometimes knee pain can come back after your fracture has healed.

When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

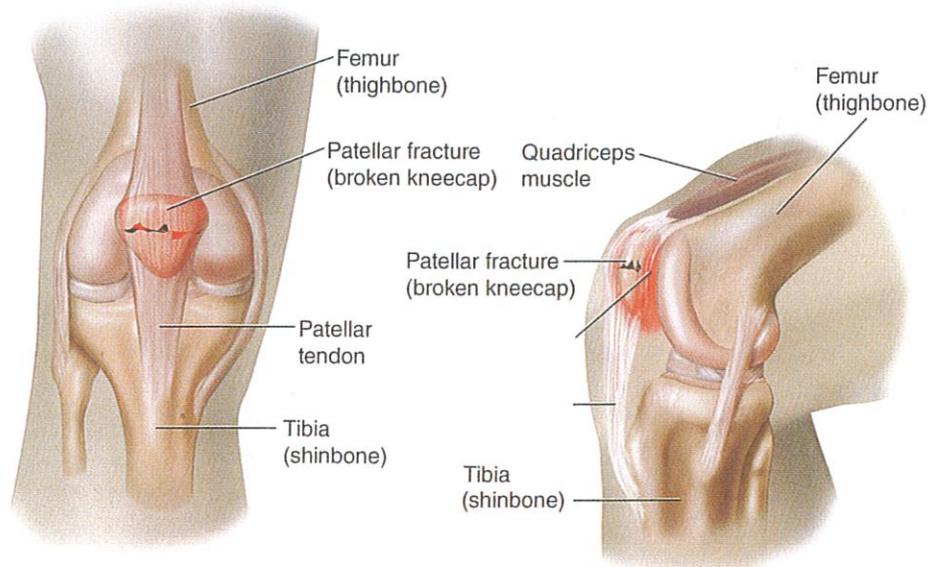
You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- You are able to walk, bend, and squat without pain.

What can I do to prevent a broken kneecap?

Most broken kneecaps are caused by accidents that cannot be prevented. If you are in a sport that has knee protection, be sure that your equipment fits properly.

PATELLAR FRACTURE (BROKEN KNEECAP)



PATELLAR FRACTURE REHABILITATION EXERCISES

You may do these exercises when your healthcare provider says you are ready.

1. STANDING HAMSTRING STRETCH: Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



STANDING HAMSTRING STRETCH

5. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE



QUADRICEPS STRETCH

2. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



STEP-UP

6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.

3. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

7. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

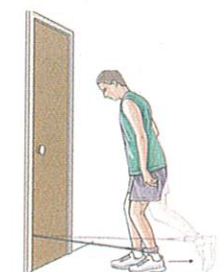
4. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

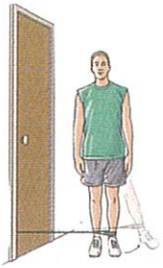
8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



KNEE STABILIZATION

KNEE

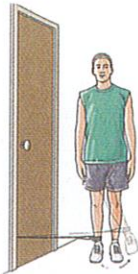


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



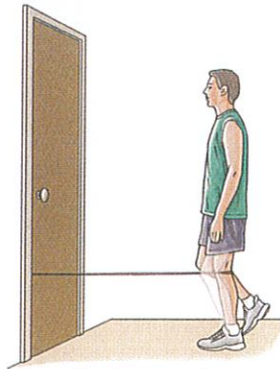
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

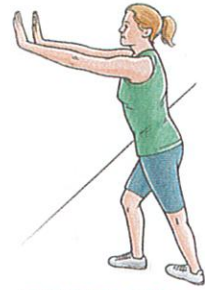
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

10. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



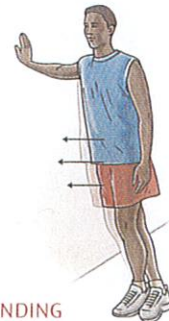
STANDING CALF STRETCH

11. CLAM EXERCISE: Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING: Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

PATELLAR (KNEECAP) SUBLUXATION

What is a subluxing patella?

A subluxing patella (kneecap) is a temporary, partial dislocation of the kneecap from its normal position in the groove in the end of the thigh bone (femur). This groove is located between two bumps at the end of the thigh bone called the femoral condyles.

How does it occur?

This temporary dislocation of the kneecap usually happens during forced leg straightening, with the kneecap moving out of the groove to the outer side of the knee.

The cause is usually an abnormality in the way your legs are built. You may have an underdevelopment of the inner thigh muscle or an overdevelopment of the outer thigh muscle. Your kneecap may be higher in the leg than usual. You may be knock-kneed or have underdevelopment of the outer (lateral) femoral condyle.

What are the symptoms?

You may feel the kneecap moving out of position. You may have swelling and pain behind the kneecap. You may have pain when you bend or straighten your leg.

How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your knee. He or she may be able to feel the kneecap slipping to the outside as you bend and straighten your leg. An X-ray may show underdevelopment of the lateral femoral condyle.

How is it treated?

Treatment may include:

- putting ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 or 3 days or until the pain goes away
- elevating your knee to help any swelling go away
- taking an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing a brace prescribed by your healthcare provider to keep your kneecap in place

- doing exercises to strengthen the inner side of the thigh muscle (quadriceps)

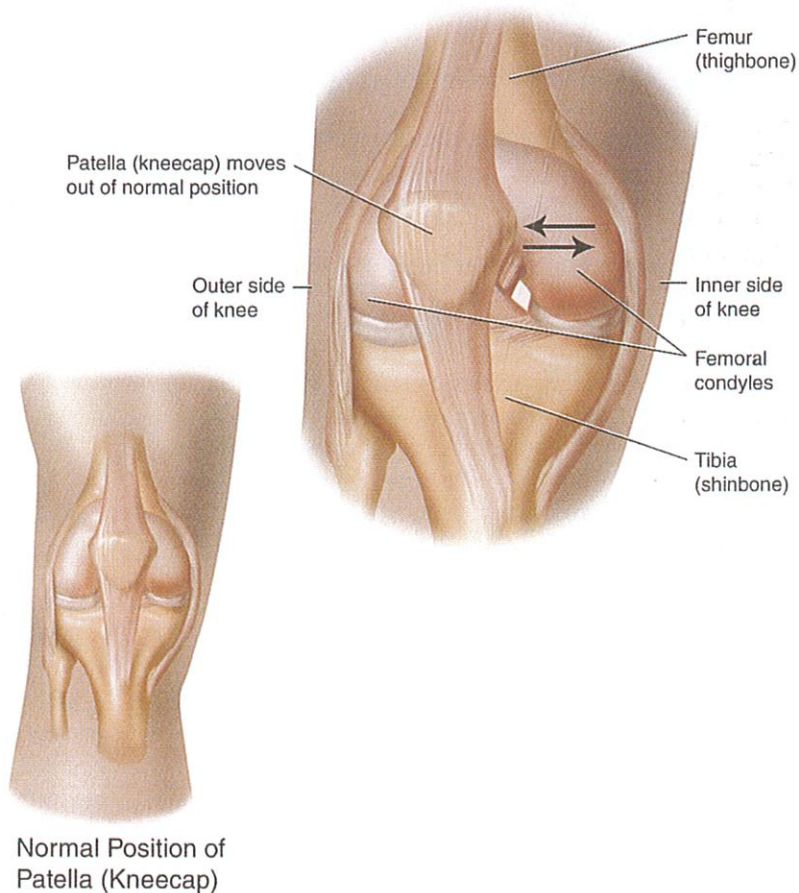
Some people need surgery to keep the kneecap from subluxing.

While you are recovering from your injury you will need to change your sport or activity to one that will not make your condition worse. For example, you may need to bicycle instead of run.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

PATELLAR (KNEECAP) SUBLUXATION



KNEE

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.

- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you develop pain, swelling, or the feeling that your kneecap is moving out of place again, you need to contact your healthcare provider.

How can I prevent a subluxing kneecap?

A subluxing kneecap is best prevented by keeping your thigh muscles strong, especially the group of muscles on the inner side of the thigh.

PATELLAR (KNEECAP) SUBLUXATION REHABILITATION EXERCISES

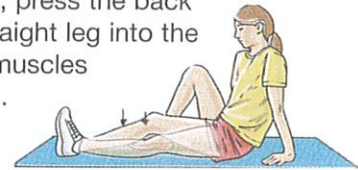
You may do all of these exercises right away. It is important to stretch the muscles in the back of your leg. It is also important to strengthen the muscles on the top of your thigh so your kneecap won't sublux again.

1. STANDING HAMSTRING STRETCH: Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



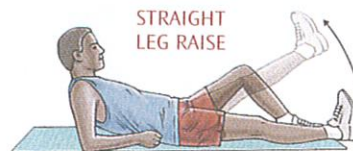
STANDING HAMSTRING STRETCH

4. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

5. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE



QUADRICEPS STRETCH

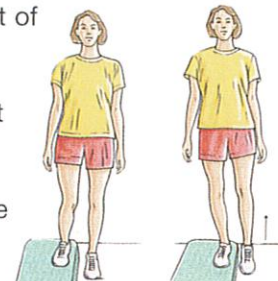
2. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

3. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

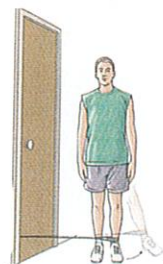
7. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

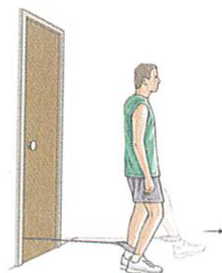
8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

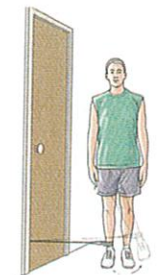


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



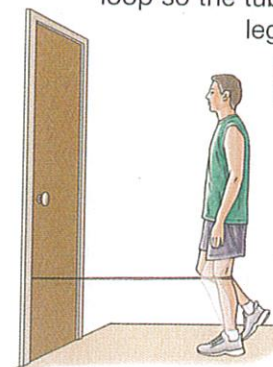
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

10. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



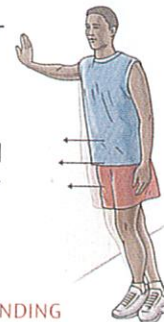
STANDING CALF STRETCH

11. CLAM EXERCISE: Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING: Side-bending: Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

PATELLAR TENDINOPATHY (JUMPER'S KNEE)

What is patellar tendinopathy?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

Patellar tendinopathy, also called jumper's knee, is inflammation in the band of tissue (the patellar tendon) that connects the kneecap (patella) to the shinbone (tibia).

How does it occur?

The most common activity causing patellar tendinopathy is too much jumping. Other repeated activities such as running, walking, or bicycling may lead to patellar tendinopathy. All of these activities put repeated stress on the patellar tendon, causing it to be inflamed.

Patellar tendinopathy can also happen to people who have problems with the way their hips, legs, knees, or feet are aligned. This alignment problem can result from having wide hips, being knock-kneed, or having feet with arches that collapse when you walk or run, a condition called over-pronation.

The patellar tendon may sometimes tear completely, or rupture, during strenuous activity.

What are the symptoms?

Symptoms may include:

- pain and tenderness around the patellar tendon
- swelling in your knee joint or swelling where the patellar tendon attaches to the shinbone
- pain with jumping, running, or walking, especially downhill or downstairs
- pain with bending or straightening the leg
- tenderness behind the kneecap

If your patellar tendon is ruptured, usually you will have sudden severe pain and you will be unable to straighten your leg or walk.

How is it diagnosed?

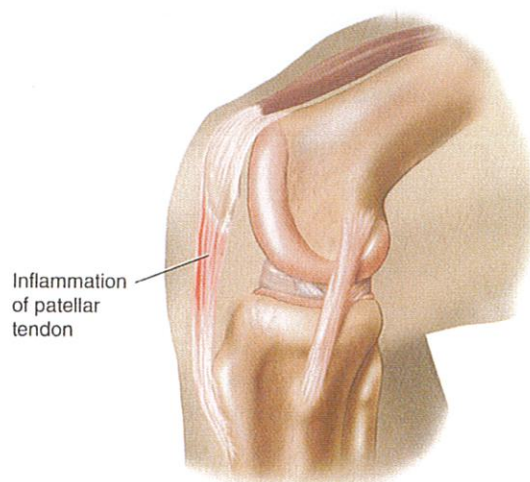
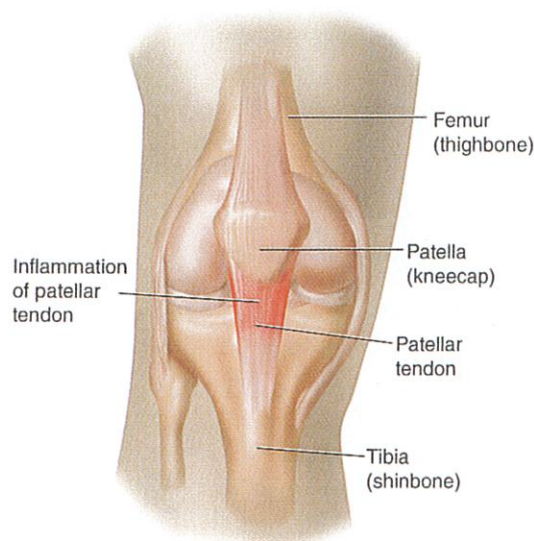
Your healthcare provider will examine your knee to see if you have tenderness at the patellar tendon. He or she will also have you run, jump, or squat to see if this causes pain. Your feet will be examined to see if you have a problem with over-pronation. Your provider may order X-rays or an MRI of your knee.

How is it treated?

Treatment includes the following:

- Place an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away.
- Elevate your knee by placing a pillow underneath your leg when your knee hurts.
- Take anti-inflammatory pain medicine, such as ibuprofen, as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

PATELLAR TENDINOPATHY (JUMPER'S KNEE)



- Do the exercises recommended by your healthcare provider or physical therapist.

Your healthcare provider may recommend that you:

- wear shoe inserts (called orthotics) for over-pronation (you can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made)
- use an infrapatellar strap, a strap placed beneath the kneecap over the patellar tendon.
- wear a neoprene knee sleeve, which supports your knee and patella.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. In cases of severe patellofemoral pain syndrome, surgery may be recommended. Your healthcare provider will show you exercises to help decrease the pain behind your kneecap.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.

- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

How long will the effects it last?

The effects of patellar tendinopathy vary. A tendon that is only mildly inflamed and has just started to hurt may improve within a few weeks. A tendon that is significantly inflamed and has been painful for a long time may take up to a few months to improve. You need to stop doing the activities that cause pain until your tendon has healed. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

How can I prevent patellar tendinopathy?

Patellar tendinopathy is usually caused by overuse during activities such as jumping or running or biking uphill. It can best be prevented by having strong thigh muscles.

The following may also help prevent injury:

- When you exercise, wear shoes that fit properly and are right for the activity.
- Gently stretch before and after exercising.

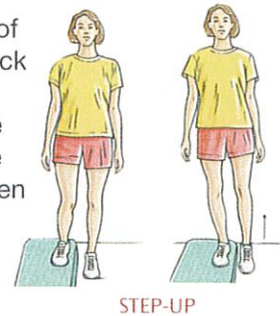
PATELLAR TENDINOPATHY (JUMPER'S KNEE) REHABILITATION EXERCISES

You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

1. STANDING HAMSTRING STRETCH: Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.

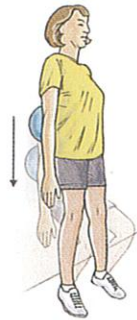


5. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



2. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

6. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



3. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.

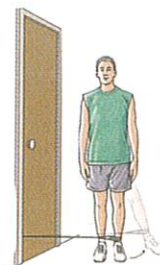


4. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



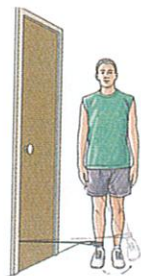
7. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

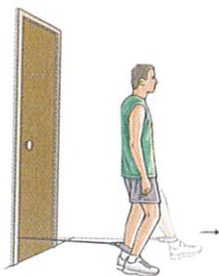


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



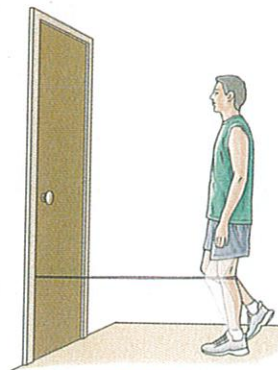
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

8. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION



DECLINE ECCENTRIC SQUAT

9. DECLINE ECCENTRIC SQUAT: Stand with both feet on an angled platform or with your heels on a 3 inch high board. Put all your weight on one leg and squat down to a 45 degree angle. Use your other leg to help you return from the squat. When this exercise becomes easy, hold weights in your hands to make the exercise more difficult. Do 3 sets of 10.

PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE)

What is patellofemoral pain syndrome?

Patellofemoral pain syndrome is pain behind the kneecap. It has been given many names, including patellofemoral disorder, patellar malalignment, runner's knee, and chondromalacia.

How does it occur?

Patellofemoral pain syndrome can occur from overuse of the knee in sports and activities such as running, walking, jumping, or bicycling.

The kneecap (patella) is attached to the large group of muscles in the thigh called the quadriceps. It is also attached to the shin bone by the patellar tendon. The kneecap fits into grooves in the end of the thigh bone (femur) called the femoral condyle. With repeated bending and straightening of the knee, you can irritate the inside surface of the kneecap and cause pain.

Patellofemoral pain syndrome also may result from the way your hips, legs, knees, or feet are aligned. This alignment problem can be caused by your having wide hips or underdeveloped thigh muscles, being knock-kneed, or having feet with arches that collapse when walking or running (a condition called over-pronation).

What are the symptoms?

The main symptom is pain behind the kneecap. You may have pain when you walk, run, or sit for a long time. The pain is generally worse when walking downhill or down stairs. Your knee may swell at times. You may feel or hear snapping, popping, or grinding in the knee.

How is it diagnosed?

Your healthcare provider will review your symptoms, examine your knee, and may order knee X-rays.

How is it treated?

Treatment includes the following:

- Place an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away
- Elevate your knee by placing a pillow underneath your leg when your knee hurts.
- Take anti-inflammatory pain medicine, such as ibuprofen, as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

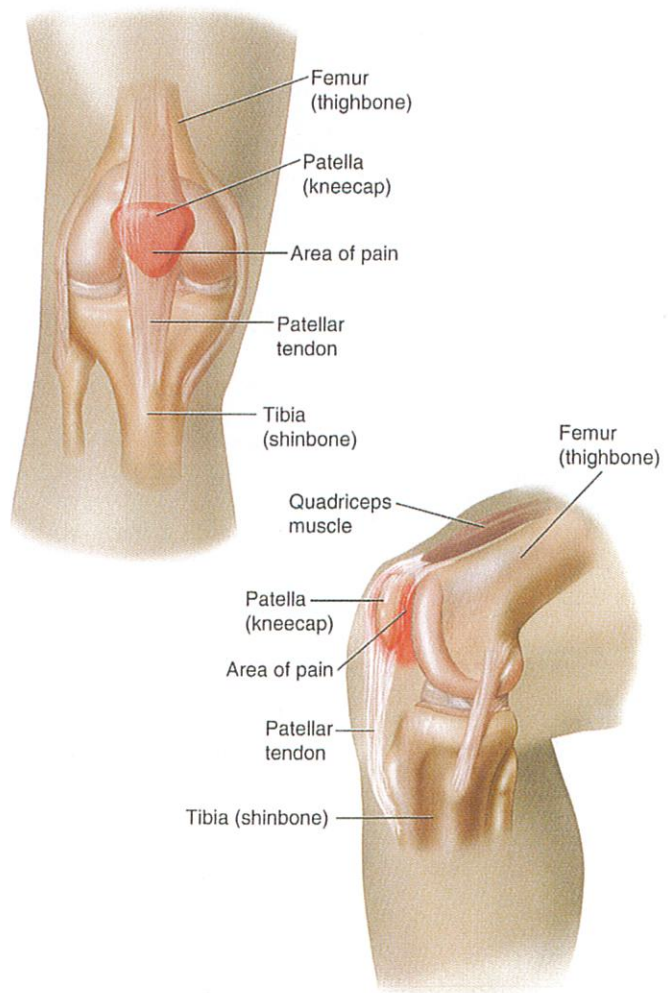
- Do the exercises recommended by your healthcare provider or physical therapist.

Your healthcare provider may recommend that you:

- Wear shoe inserts (called orthotics) for over-pronation. You can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made.
- Use an infrapatellar strap, a strap placed beneath the kneecap over the patellar tendon.
- Wear a neoprene knee sleeve, which will give support to your knee and patella.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. In cases of severe patellofemoral pain syndrome, surgery may be recommended. Your healthcare provider will show

PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE)



you exercises to help decrease the pain behind your kneecap.

When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since you were injured. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.

- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

How can I prevent patellofemoral pain syndrome?

Patellofemoral pain syndrome can best be prevented by strengthening your thigh muscles, particularly the inside part of this muscle group. It is also important to wear shoes that fit well and that have good arch supports.

PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE) REHABILITATION EXERCISES

You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

1. STANDING HAMSTRING STRETCH: Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



QUADRICEPS STRETCH

2. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

3. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

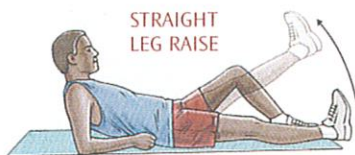
4. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

5. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout.

Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



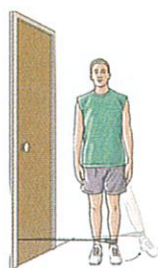
7. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

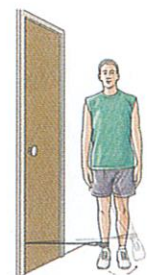
8. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.

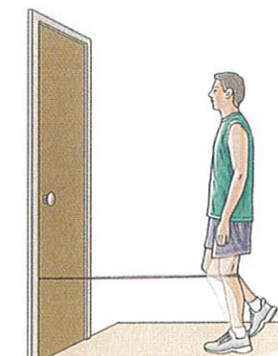


KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

9. RESISTED TERMINAL KNEE EXTENSION: Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



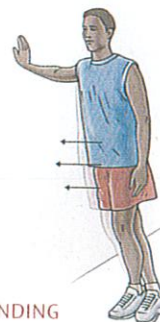
RESISTED TERMINAL KNEE EXTENSION

10. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING: Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

11. CLAM EXERCISE: Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

PES ANSERINE (KNEE) BURSITIS

What is pes anserine bursitis?

Pes anserine bursitis is an irritation or inflammation of a bursa in your knee. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin.

The pes anserine bursa is located on the inner side of the knee just below the knee joint. Tendons of three muscles attach to the shin bone (tibia) over this bursa. These muscles act to bend the knee, bring the knees together, and cross the legs.

Pes anserine bursitis is common in swimmers who do the breaststroke and is sometimes called breast-stroker's knee.

How does it occur?

Pes anserine bursitis can result from:

- overuse, as in breaststroke kicking or kicking a ball repeatedly
- repeated pivoting from a deep knee bend
- a direct blow to the area

What are the symptoms?

Pes anserine bursitis causes pain on the inner side of the knee, just below the joint. You may have pain when you bend or straighten your leg.

How is it diagnosed?

Your healthcare provider examines your knee for tenderness over the pes anserine bursa.

How is it treated?

Treatment may include:

- using ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- wrapping an elastic bandage around your knee to reduce any swelling or to prevent swelling from occurring
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- shot of a medicine like cortisone into the swollen bursa
- leg stretching and strengthening exercises

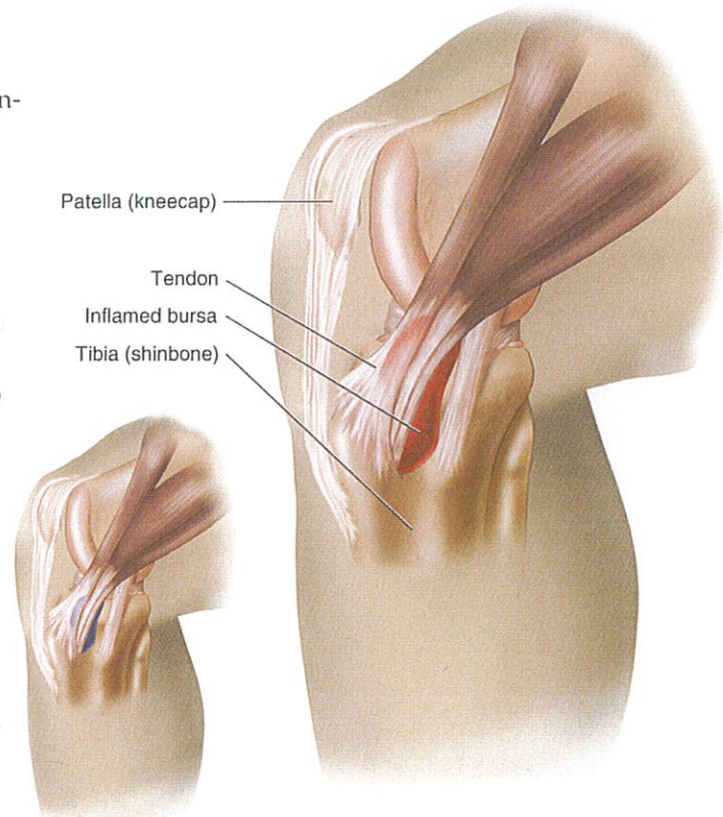
When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to prolonged symptoms. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee bursa is not swollen or tender to touch.
- You are able to jog straight ahead without limping.

PES ANSERINE (KNEE) BURSITIS



Normal Pes Anserine Bursa

- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

- If you are a swimmer, you need to be able to do the breaststroke kick without pain.

How can I prevent pes anserine bursitis?

Pes anserine bursitis is best prevented by a proper warm-up that includes stretching of the hamstring muscles, the inner thigh muscles, and the top thigh muscles. Gradually increasing your activity level, rather than doing everything at once, will also help prevent its development.

PES ANSERINE (KNEE) BURSITIS REHABILITATION EXERCISES

You can stretch your leg right away by doing the first 3 exercises. Start strengthening your leg by doing the last 4 exercises.

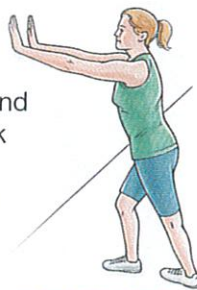
1. HAMSTRING STRETCH ON WALL: Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door



HAMSTRING STRETCH ON WALL

frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.

2. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH



QUADRICEPS STRETCH

3. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

4. HIP ADDUCTOR STRETCH: Lie on your back, bend your knees, and put your feet flat on the floor. Gently spread your knees apart, stretching the muscles on the inside of your thigh. Hold this for 15 to 30 seconds. Repeat 3 times.



HIP ADDUCTOR STRETCH

5. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



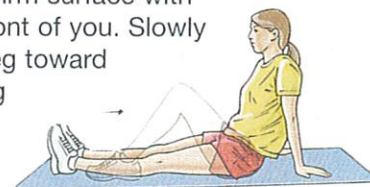
QUAD SETS

6. ISOMETRIC KNEE FLEXION: Sitting on the floor with one leg slightly bent, dig the heel of your other leg into the floor and tighten up the back of your thigh muscles. Hold this position for 5 seconds. Do 3 sets of 10.



ISOMETRIC KNEE FLEXION

7. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

POSTERIOR CRUCIATE LIGAMENT INJURY

What is a posterior cruciate ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament. A ligament is a strong band of tissue that connects one bone to another. The posterior cruciate ligament is one of the major ligaments in the knee. It connects the thigh bone (femur) to the shin bone (tibia). This ligament, along with the anterior cruciate ligament, helps keep the knee stable and protects the femur from sliding or turning on the tibia.

Sprains are graded I, II, or III, depending upon their severity:

- grade I sprain: pain with minimal damage to the ligament
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: complete tearing of the ligament and the joint is very loose or unstable.

How does it occur?

The posterior cruciate ligament can be injured by a direct blow to the front of the knee while the knee is bent and the foot is planted, or from a fall to the ground. It can also occur in a car accident when your knee hits the dashboard. Posterior cruciate ligament tears are not common.

What are the symptoms?

You may recall a direct blow and possibly a painful pop. You may have swelling with fluid (called an effusion) in the knee joint. Your knee may feel loose.

If you have torn your posterior cruciate ligament in an injury that occurred months or years ago and you haven't had reconstructive surgery, you may have the feeling that the knee is giving way during sporting activities.

How is it diagnosed?

Your healthcare provider will examine your knee and may find that it is too loose. An X-ray may be taken to see if there are any injuries to the femur or tibia. An MRI (magnetic resonance imaging) scan may help diagnose posterior cruciate ligament tears.

How is it treated?

Treatment may include:

- applying ice packs to your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your knee by placing a pillow underneath it

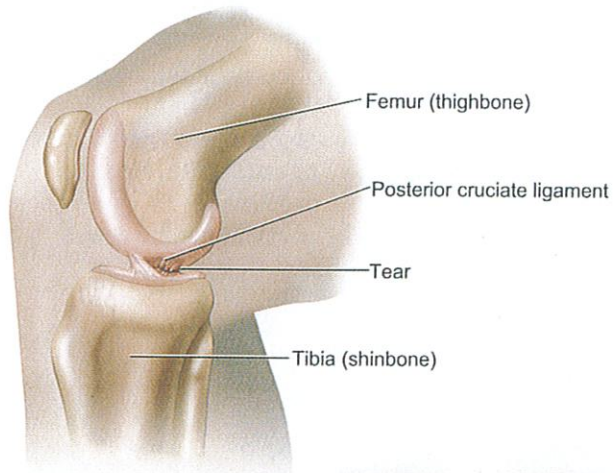
- wrapping an elastic bandage around your leg to keep the swelling from getting worse
- using crutches
- doing knee rehabilitation exercises

You and your healthcare provider will decide if you need to have surgery. The torn posterior cruciate ligament cannot be sewn back together. The ligament must be reconstructed by taking ligaments or tendons from other parts of your leg and connecting them to the tibia and femur.

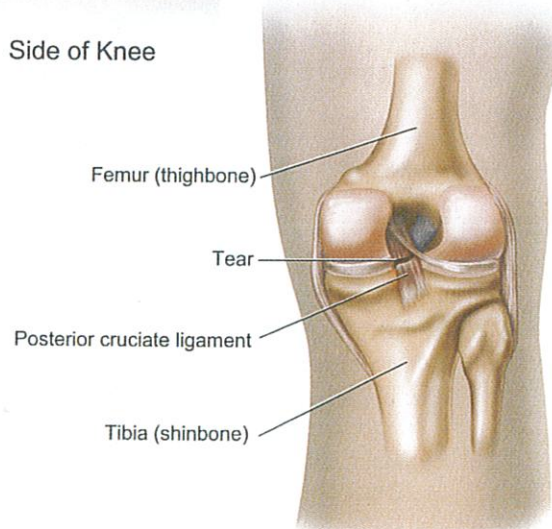
When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

POSTERIOR CRUCIATE LIGAMENT INJURY



Side of Knee



Back of Knee

return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.

- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

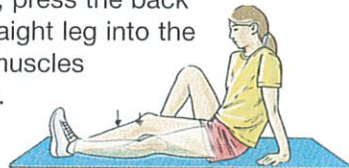
How can I prevent a posterior cruciate ligament sprain?

Unfortunately, most injuries to the posterior cruciate ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles and maintaining a good leg-stretching routine. When you are skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

POSTERIOR CRUCIATE LIGAMENT SPRAIN REHABILITATION EXERCISES

Begin exercising your injured leg when the swelling has decreased and you are able to put about half your weight on that leg.

1. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



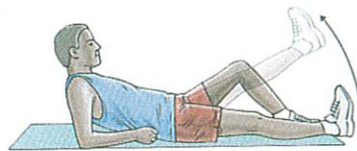
QUAD SETS

3. SEATED QUAD SETS: Sit in a straight-back chair with your knee bent at a 90° angle. Try to tighten the top of your thigh muscles without moving your leg. Hold for 10 seconds. Do 3 sets of 10.



SEATED QUAD SETS

2. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

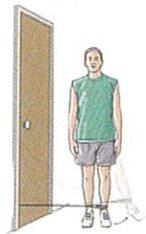
4. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

5. KNEE STABILIZATION: Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

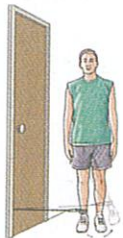
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



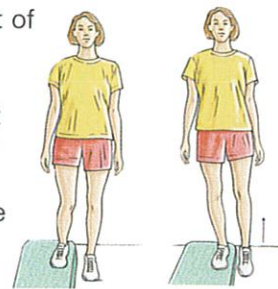
C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

6. STEP-UP: Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

KNEE

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

PREPATELLAR (KNEE) BURSITIS

What is prepatellar bursitis?

Prepatellar bursitis is an irritation or inflammation of a bursa in your knee. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin.

There are several bursae in the knee. The prepatellar bursa is located just in front of the kneecap near the attachment of the kneecap (patellar) tendon. Prepatellar bursitis is also called housemaid's knee from when maids were injured cleaning floors on their knees. The injury is common in wrestlers, who get it from their knees rubbing on the mats. Volleyball players get it from diving onto their knees for the ball.

How does it occur?

Bursitis can result from:

- overuse
- a direct blow to the area
- chronic friction, such as from frequent kneeling

What are the symptoms?

Prepatellar bursitis causes pain and swelling over the front of the knee. You may have pain when you bend or straighten your leg.

How is it diagnosed?

Your healthcare provider will examine your knee for tenderness over the bursa.

How is it treated?

Treatment may include:

- using ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- wrapping an elastic bandage around your knee to reduce any swelling or to prevent swelling from occurring
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- removal by your healthcare provider of some of the fluid within the bursa if it is very swollen
- injection of a corticosteroid medicine into the swollen bursa
- leg stretching exercises

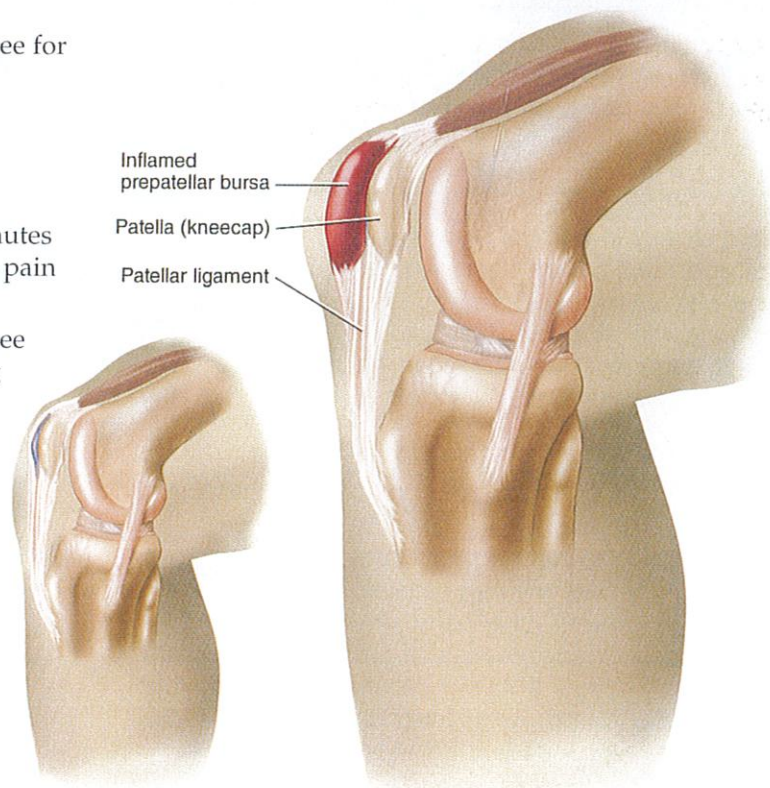
When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee bursa is not swollen or tender to touch.
- You are able to put pressure on your bursa (such as kneeling) without pain or swelling.
- You are able to jog straight ahead without limping.

PREPATELLAR (KNEE) BURSITIS



Normal Prepatellar Bursa

- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

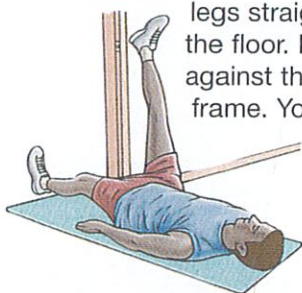
How can I prevent prepatellar bursitis?

Prepatellar bursitis is best prevented by avoiding direct blows to the kneecap area and by avoiding prolonged kneeling. Proper protective kneepads will help prevent inflammation of the bursa.

PREPATELLAR (KNEE) BURSITIS REHABILITATION EXERCISES

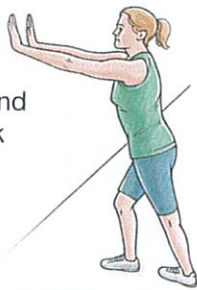
You can stretch your leg right away by doing the first 3 stretching exercises. Start strengthening your leg by doing the last 3 exercises.

1. HAMSTRING STRETCH ON WALL: Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

2. STANDING CALF STRETCH: Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



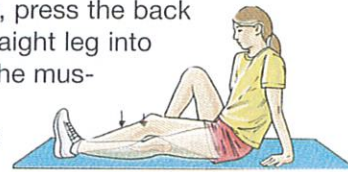
STANDING CALF STRETCH



QUADRICEPS STRETCH

3. QUADRICEPS STRETCH: Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

4. QUAD SETS: Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



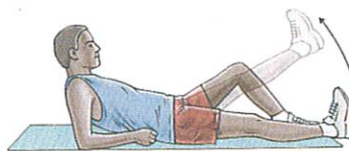
QUAD SETS

5. HEEL SLIDE: Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

6. STRAIGHT LEG RAISE: Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

7. SIDE-LYING LEG LIFT: Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

8. WALL SQUAT WITH A BALL: Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL