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 overpronation).

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 doctor 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 medication, such as ibuprofen, as prescribed by your doctor.

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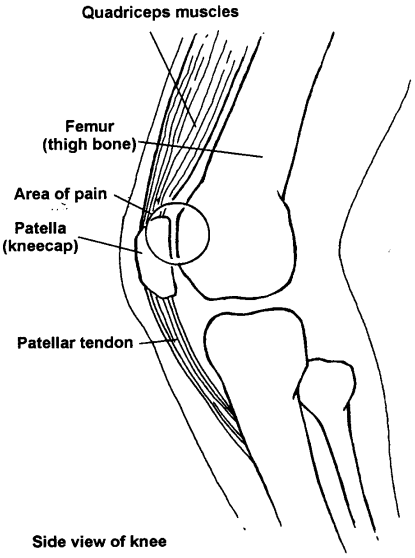

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- Do the exercises recommended by your doctor or physical therapist.

Your doctor may recommend that you:

- Wear custom-made arch supports (orthotics) for over-pronation.
- 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 doctor 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 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.

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Patellofemoral Pain Syndrome (Runner's Knee) Rehabilitation Exercises

You can do the hamstring stretch (exercise 1) right away. You can start doing exercise 2 as soon as it is not too painful to move your kneecap. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using exercises 4 through 6.

1. Hamstring stretch: Stand with the heel of your injured leg resting on a stool that is about 15 inches high. Keep your knee straight. Gently lean forward from your hips, keeping your shoulders in line with your trunk, until you feel a stretch in the back of your thigh. Hold this position for 30 to 60 seconds. Return to the starting position. Do not round your shoulders and bring your head toward your toe. This will stretch your low back instead of your hamstrings. Repeat this exercise 3 times.

Hamstring stretch

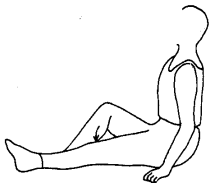
2. Patellar mobility: Sit with your injured leg outstretched in front of you and the muscles on the top of your thigh relaxed. Take your index finger and thumb and gently press your kneecap down toward your foot. Hold this position for 10 seconds. Return to the starting position. Next, pull your kneecap up toward your waist and hold it for 10 seconds. Return to the starting position. Then, try to gently push your kneecap inward toward your other leg and hold for 10 seconds. Repeat these for approximately 5 minutes.

Patellar mobility

Quadriceps stretch

3. Quadriceps stretch: Stand an arm's length away from a wall, facing straight ahead. Brace yourself by keeping the hand on your uninjured side against the wall. With your other hand, grasp the ankle of the injured leg and pull your heel up toward your buttocks. Don't arch or twist your back. Hold this position for 30 seconds. Repeat 3 times.

4. Quadriceps set: Sit on the floor with your injured leg straight out in front of you. Try to tighten up the muscles at the top of your thigh by pushing the back of your knee down into the floor. Concentrate your contraction on the inside part of your thigh. It is very important to strengthen this part of your quadriceps muscle, called the vastus medialis, for your rehab to be successful. Hold this position for 5 seconds. Repeat 10 times. Do 3 sets of 10.



Quadriceps set

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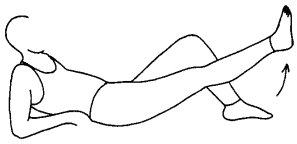
5. Straight leg raise: Sit on the floor with your injured leg straight and the other leg bent so the foot is flat on the floor. Pull the toes of your injured leg toward you as far as you can comfortably while tightening the muscles on the top of your thigh. Raise your leg 6 to 8 inches off the floor. Hold this position for 3 to 5 seconds and then slowly lower your leg. Repeat 10 times. Do 3 sets of 10.



Straight leg raise

6. Weight lifting - leg extension: Do these if you have access to a weight lifting bench with a leg extension attachment. Sit on the bench with the weight attachment in front of your lower legs. Extend your knees by straightening your legs. Be sure your legs straighten completely. The last 15 degrees of extension are the most important. Use enough weight to cause fatigue but not pain. Do 3 sets of 10.

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