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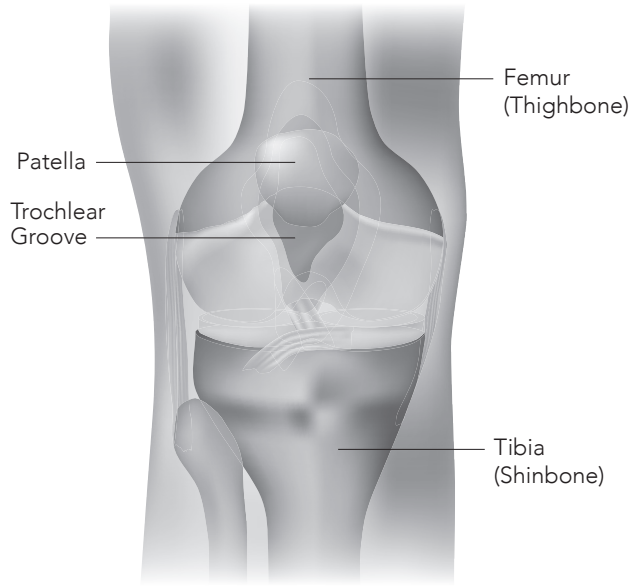
Patellofemoral Pain Syndrome

Patellofemoral pain syndrome (PFPS) is a common knee disorder, which often affects teen athletes and those involved in running and jumping sports. Overuse, a change in activity, and an altered metabolic status are frequently responsible for the development of PFPS. Structural alignment and muscular weakness or imbalances may cause the **patella** (kneecap) to track improperly on the **femur** (thigh bone) during movement, leading to pain around the kneecap. This problem can occur in non-athletes as well! The pain and stiffness caused by PFPS can make it difficult to climb stairs, kneel or perform other everyday activities.

What is the patellofemoral joint?

As the knee bends and straightens, the patella slides within a slot on the femur called the **trochlear groove**. The patella moves in many directions within this groove to provide efficient, frictionless movement. The bone surfaces are covered with **articular cartilage** to make joint movement smooth.



Other terms for patellofemoral pain are: retropatellar pain, peripatellar pain, anterior knee pain and runner's knee.

Different disorders that cause pain around the kneecap include:

- **Infrapatellar tendonitis (jumper's knee)**, which affects the tendon just below the patella
- **Chondromalacia patella**, which involves damage to the cartilage surface of the patella
- **Quadriceps tendonitis**, which affects the tendon attachment above the patella
- **Plica syndrome**, in which joint lining tissue becomes inflamed and/or stiff, causing pain and tightness in the joint

What can cause patellofemoral pain syndrome?

The following factors can lead to patellofemoral pain:

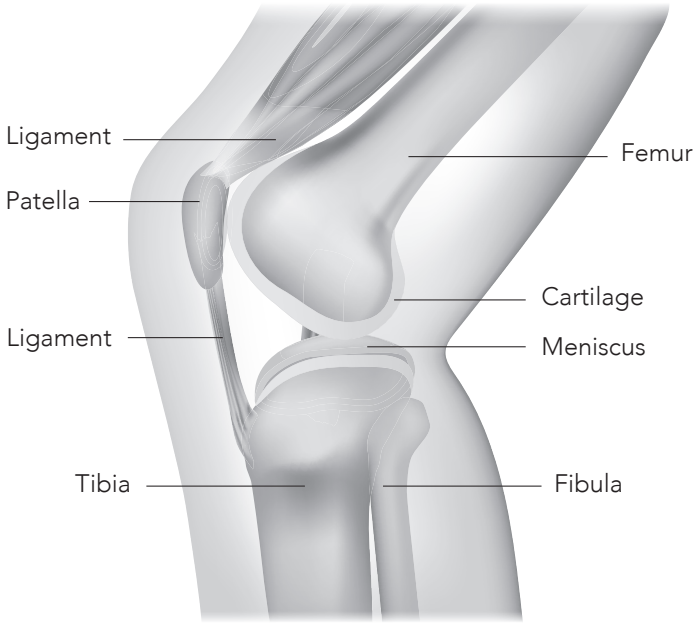
- **Overuse:** the repetitive bending and straightening of the knee that occurs in running may lead to the disorder because of the increased pressure points between the patella and femur when the knee is bent. A constant bending motion, especially on the weighted leg, can irritate the patella and cause a bone bruise to form.
- **Alignment:** The quadriceps alignment between the hip and the knee **(the Q angle)** is thought to affect patellar tracking. Patients with an increased Q angle may be more susceptible to patello-femoral pain because the patella has a tendency to track more **laterally** (to the outside). Pain may be felt more on the outside of the patella and femur because of increased pressure on these contact areas. **The Q angle of growing female athletes enlarges as the pelvis widens during the maturing process, increasing the risk for patellofemoral pain.**

- **Muscular Weakness:** A weakness or strength imbalance of the quadriceps, hip and core muscles may alter the tracking of the patella.
- **Muscular Tightness:** Tight muscles and tendons may also affect patellar tracking. The muscular structures that cause movement in the knee and hip must be flexible. If any muscle or muscle group is tighter than the rest, patellar overload can occur.
- **Flat Feet (excessive foot pronation):** Patients with little or no arch in the foot are also likely candidates for patellofemoral pain. As the foot rolls inward, the tibia compensates by rotating inward, disturbing the normal mechanics of the patellofemoral joint.
- **A Decrease in Patellar Mobility:** the kneecap tightens, losing its normal ability to move in many directions

What are the signs and symptoms of patellofemoral pain syndrome?

Generalized pain around the kneecap is the most common symptom of patellofemoral syndrome. Others include:

- Dull, aching pain in the knee, not necessarily in one specific area.
  - Running, using stairs, squatting, or sitting for a long time with knees bent usually increases pain.
  - Although full range of motion is usually possible, flexing the knee completely is painful.
  - Crepitus (a crackling noise under the patella) may occur during knee movement.
- A slight swelling may exist
- Symptoms may be present in one or both knees.
- Decreased kneecap motion



How is patellofemoral pain syndrome treated?

Patellofemoral pain syndrome can usually be effectively treated with a non-operative treatment program. The following options are typically used in a conservative treatment program:

- **Activity Modification:** Higher impact physical activities should be temporarily limited such as running, jumping, stairs and hills (inclines). **Exercises that worsen pain should be avoided.**
- **Physical therapy** to strengthen and rebalance the muscles of the leg, hip and core, also known as a "core-to-floor" patellofemoral rehab program.
- **Anti-inflammatory medication** such as ibuprofen or topical diclofenac gel is recommended if needed for pain.
- **Icing**
- **A knee sleeve, splint or taping** that will support the joint during healing. Special sleeves or taping techniques can keep the patella tracking properly during motion.
- **Special footwear or orthotics** can support the arch and absorb impact.
- **Maintain a healthy body weight** to avoid overstressing the knees. 4 to 5 times the body's weight in force is transmitted through each knee joint during activity, so weight loss can be absolutely critical to improvement of symptoms in overweight or obese patients.

How long will recovery take?

Recovering from patellofemoral pain can be a long process. Recovery usually takes at least six weeks, often longer. Sport activities that heavily load the knee should only be resumed very gradually and cautiously. **To reach pre-injury activity level, the patient must build greater strength and flexibility**

in the muscles of the core, hip and knee than existed before the injury. By maintaining a high level of fitness, the patient will reduce the likelihood of re-injury.

Fortunately this problem is often self-limited, meaning it eventually goes away on its own. This is especially true of teenagers - the patients most likely to be affected. It is also important to understand that although this condition is painful, **there is usually not significant structural damage in the joint that leads to PFPS.** Much more often it's related to each patient's unique anatomy combined with various muscle weaknesses and imbalances. This is why the vast majority of patients are able to successfully treat their knee(s) without surgery.

Less frequently, patients fail to improve with the above treatments. In that case, sometimes an MRI scan is ordered to further assess the joint structures and make sure there is not underlying joint damage contributing to knee symptoms. In some circumstances, surgery is recommended based on abnormal MRI findings. However, surgery carries significant risks, and the medical research shows that surgery for patellofemoral pain syndrome (in the absence of significant structural pathology) may not reliably improve or resolve symptoms. For these reasons, non-operative management is typically continued for at least six months before surgery is considered.