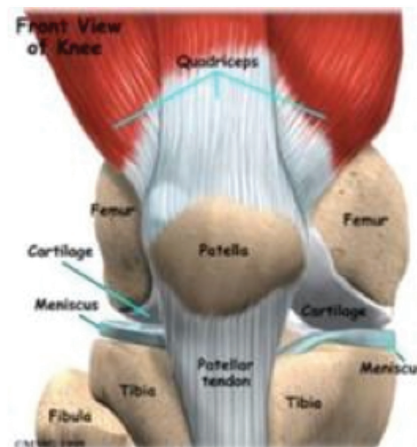


Patellofemoral Syndrome (PFS)

Knee Anatomy

The patella is a moveable bone in front of the knee wrapped inside a large tendon that connects the quadriceps (thigh) muscles to the tibia (lower leg bone). A healthy patella moves smoothly in a groove on the lower end of the femur. If the patella is moving incorrectly through this groove, Patellofemoral Syndrome (PFS) could form.

Many muscle groups and ligaments control the triangular-shaped patella. The patella is coated on its bottom with a smooth covering called articular cartilage. The patella and the femur form a joint, called the patellofemoral joint, that is made up of muscles, soft tissue attachments and the groove where the patella rests.



What is Patellofemoral Syndrome (PFS)?

PFS is the medical name for a condition that causes pain in and around the kneecap. The patella (kneecap) is designed to move smoothly over a groove on the femur (thigh bone). When the patella is not moving or "tracking" properly over the femur, PFS can develop. This knee problem commonly appears in runners and athletes but non-athletes can also be affected. For the pediatric population, PFS can be jump-started during times of growth. PFS can strike at any age to any population.

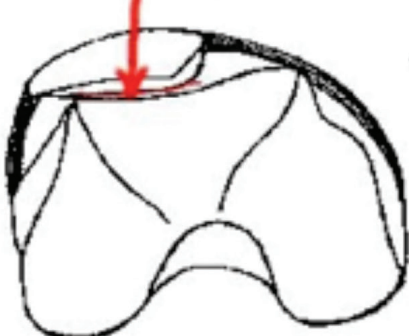
Causes of Patellofemoral Syndrome

- Muscle imbalances in the quadriceps can cause the patella to move improperly through the groove in the femur. If one or more of the quadriceps muscles are weak, a muscle imbalance could occur. This imbalance pulls the patella off its track through the groove. More pressure is then placed on the cartilage on one side of the knee. In time, the pressure will cause damage to the articular cartilage.

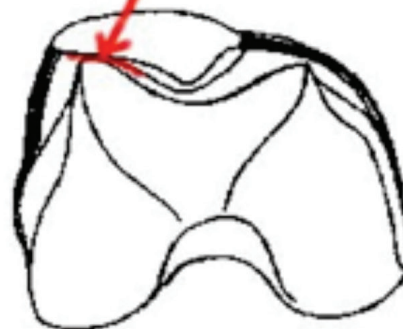
Normal Patella



Lateral Tilt and Subluxation Patella



Lateral Subluxation and Wear Patella



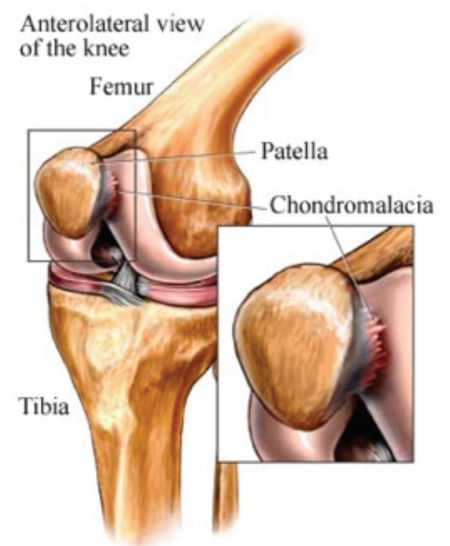
- Anatomic variations can also be at the root of the problem. Some people are born with knee bones that are shaped differently than most. For example:
 - Occasionally, some people have a greater than normal angle and appear knock-kneed (genu valgum). The patella rests in the femoral groove located in the center of this angle. When the person straightens the quadriceps muscles, the patella will be forced to the outside of the knee. Over time, this motion can lead to damage of the underlying articular cartilage.
 - If one side of the patellofemoral groove is smaller than normal, a person could also develop PFS. The groove where the patella moves through the femur is too shallow and the patella could slip out of the groove. It is painful and can also damage the cartilage.
 - People may also have a patella that is tilted, causing increased contact of the patella to the femur.
- A problem with the feet such as fallen arches or forefoot pronation (flat feet) can also cause PFS.
- In addition, an increase in training can bring on the symptoms of the condition.

Symptoms of Patellofemoral Syndrome

One of the first signs of PFS could be a general pain in and around the kneecap. The pain is usually worse after you participate in an activity that includes knee bending, such as running, climbing stairs and doing squat exercises. Other symptoms of PFS include:

- A crunching or cracking sound when the knee is bent. The cracking sound is the sound of the patella sliding back into the patellofemoral groove.
- Pain occurs after long periods of sitting.
- The knee swells and becomes tight and uncomfortable.

PFS can be misdiagnosed as Chondromalacia Patella, a chronic, degenerative condition that affects the cartilage surrounding the patella. PFS may turn in to Chondromalacia Patella over time if not treated. An X-ray is needed to properly diagnose chondromalacia patellae.



Non-Surgical Treatments of Patellofemoral Syndrome

Depending on the cause of PFS, treatment could be as simple as changing your shoes and stopping or modifying the activity that causes pain. A physical therapist, certified athletic trainer or Dr. Gudeman can suggest proper exercises to combat the symptoms including a home exercise program or strength training. This may involve a structured exercise regiment that involves regular follow-up appointments with the therapist or athletic trainer. Additionally, icing the knee after certain activities or working out may reduce any swelling and pain you experience.

Surgical Treatments of Patellofemoral Syndrome

If these non-invasive measures fail to correct the problem, surgery may be necessary. Dr. Gudeman may recommend arthroscopic surgery to look directly at the articular cartilage surrounding the patella and the patellofemoral groove. He may also look at how the patella moves through the groove. If areas of articular damage are identified, he may perform a procedure called "shaving the patella." This procedure smooths the surface of the patella to reduce the pain and can usually be performed on an outpatient basis.

Dr. Gudeman may suggest another surgical procedure called a lateral release if the patella is misaligned. This procedure will move the patella back to a correct position by cutting the ligaments on the outside of the patella. Additionally, tightening the ligaments on the inside of the patella may be considered.

In some cases, Dr. Gudeman may recommend moving where the patellar tendon attaches to the patella and to the tibia. By moving where the tendon attaches, the patella hopefully will track in the center of the groove once it is healed.

Informative Websites

www.saveyourknees.org

www.orthoinfo.org

www.sportsmed.org

www.aana.org

Helping you achieve the optimal activity level
for your lifestyle is my first priority.

- Scott Gudeman, MD



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