Patellofemoral Pain Syndrome

Patellofemoral pain syndrome (PFPS) is one of the most common causes of knee pain seen in family medicine, sports medicine, and orthopedic clinics. PFPS is known by several other names, including “runner’s knee” and “anterior knee pain.” PFPS is a clinical diagnosis, meaning that a physician makes this diagnosis based upon the presence of certain symptoms and physical exam findings, not with lab results or imaging. The symptoms of PFPS can have many causes, and identification of inciting factors is necessary to guide treatment. While PFPS can cause significant discomfort, in most patients it can be treated effectively using relatively non-invasive therapeutic measures.

The Anatomy

In PFPS, the patella (knee cap) rubs against the inner or outer femur (thighbone) rather than moving down the middle. This can cause the patellofemoral joint on either the inner or outer side to become inflamed causing pain.

Clinical Symptoms

- Discomfort localized to front of the knee, generally around the knee cap and the joint surface it shares with the femur.
- The symptoms of PFPS can include pain, stiffness, or various combinations of both. Pain is usually worsened by activities such as running, squatting, and going up or down stairs.
- Especially characteristic of PFPS is knee pain that is present during and/or immediately following prolonged sitting with the knees in a flexed position. Patients may also describe a “catching” or “grinding” sensation with knee movement.\(^3\)
- Symptoms may occur during or after a particular activity or even as late as the next day.\(^2\)

**Risk Factors**

While there are many potential causes of PFPS, they all produce discomfort by causing abnormal movement of the structures of the patellofemoral joint during normal knee movement. These include, but are not limited to, the following:\(^1,3,4\)

- Overuse
- Overweight/Obesity
- Trauma
- Flat feet
- High-arched feet
- Quadriceps muscle weakness
- Increased tone of the iliotibial band
- An abnormally mobile patella
- Structural abnormalities of the knee joint

**Treatment**

The treatment of patellofemoral pain syndrome is multifactorial, and requires cooperation between the physician, physical therapists, and most importantly, the patient. The three parts of a successful treatment regimen include the following:\(^3\)

1. **Switch to low impact aerobic activities:** Decrease or eliminate high-impact forms of exercise such as running or specific movements that worsen the pain (squatting or sitting for prolonged periods of time).

2. **Physical therapy:** Consultation with a physical therapist to develop a personalized rehabilitation plan has been shown to be effective in the treatment of PFPS.\(^1\) Exercises can be aimed at strengthening and/or increasing flexibility in certain muscle groups to correct abnormal patellar movements.

3. **Footwear:** Shoes that offer little arch support or are worn out should be replaced with new shoes purchased from a reputable running store with knowledgeable salespeople. Patients should also wear over-the-counter orthotics.

Additional therapies include:
- Analgesics (NSAIDs such as ibuprofen)
- Icing the knee(s)
- Patellar taping
- Surgical consultation (generally as a last-resort)
Strengthening and Stretching Exercises:

**Heel Touchdown:**
Begin with one foot on the edge of a 4-6” step and the other in the air. Keeping your hips level slowly bend your stance knee until the heel of your other leg brushes the floor. Your knee should stay over your stance foot (be in alignment with the foot and hip of that same leg). Slowly return to start position.

*Easy:* Hold onto a stable object for balance.
*Hard:* Do not use arms for balance.

**Side Glide:**
Tie an exercise band around your legs with no slack. Keep a slight bend in your knees. Keeping your toes pointed forward, step to the side. Slowly bring the feet together. Continue for distance of approximately 20’. Reverse direction and return to starting position.

*Easy:* Band above knees.
*Hard:* Band below knees.

**Clamshell:**
Tie an exercise band around your thighs just above the knee. Lie on your side with your knees bent and heels together. Keeping your heels together spread your knees approximately 12”. Slowly relax. Repeat on the other side.

**Ankle Inversion:**
Make a loop out of exercise band. Cross leg to be exercises over the other. Loop the band around both feet. Place your hand on your knee to prevent movement of the leg. Pull the foot up from the floor as if trying to look at the bottom of your shoe. Slowly relax. Repeat on the side.
Iliotibial band stretch:
Lie on side with affected leg facing the ceiling and hanging off edge of surface towards your back. Bend unaffected leg and cross foot over opposite knee. Apply downward force with foot over opposite knee. Back should be straight. Hold this position for 30 to 45 seconds. Repeat 3 times and then switch legs and repeat.

Quadriceps Stretch:
Wrap a band of cloth around the ankle of the affected leg and lie on your back towards the edge of the surface. Hang affected leg over side of surface and pull back on cloth, keeping the unaffected leg bent and resting on the surface. Hold this stretch for 30 to 45 seconds.

Hamstring Stretch:
Rest affected leg on surface with foot of unaffected leg on floor. Place band of cloth around arch of foot of affected leg and pull towards your body. Hold stretch for 30 to 45 seconds.

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References

http://health.med.umich.edu/healthcontent.cfm?xyzpqabc=0&id=6&action=detail&AEPersonID=HW_Knowledgebase&AEPersonActionID=tp22235spec#tp22235spec-Bib