

Knee Anatomy and Function



Straight (extended) knee



Bent (flexed) knee

Femur

Meniscus

Quadriceps tendon

Patella

Patellar ligament

Tibia

Patellar surface of femur

When the knee is straight, the patella sits in a groove at the bottom of the femur.

As the knee bends, the patella tracks along the groove in the femur.

Treatment of Patellofemoral Pain



N. Reback

Rest and avoid activities that trigger or worsen pain.



Physical therapy, including stretching and strengthening

Patellofemoral Pain - A common cause of anterior knee pain

Patellofemoral (PF) pain is a common cause of anterior knee pain in young adults and adolescents. This is described as knee cap pain that is worsened by activities that load onto a flexed knee. These include squatting, stairs, hiking, and running.^{1,2}

The patella acts as a lever which helps extend the knee.¹ The patella moves within the trochlear groove of the femur during leg extension and flexion. PF pain is thought to be due to incorrect tracking of the patella.³ More specifically, in PF pain, the patella tracks laterally.

Risk Factors for developing PF pain¹

- Activities including running, squatting, stairs (rapid increase in activities/training)
- Dynamic valgus (caving in of knees)
- Female sex (increased Q angle)
- Foot abnormality (eversion and pes pronatus)
- Sudden increase in activity level
- Patellar instability
- Quadriceps weakness

Diagnosis of this condition is made on a combination of history and physical examination findings. On history, the cardinal feature is that pain around and behind the knee cap is worse during weight-bearing knee flexion activities. Patients may also complain of worsening of their pain after a prolonged period of sitting with the knee flexed (on a plane, in a movie theatre).²

On physical exam, pain with squatting is most sensitive for PF diagnosis.² Other tests, such as the patellar grind test, apprehension test, and tilt tests, have low diagnostic yields. These do not present with joint swelling, and range of motion is preserved.²

Imaging is not required for the diagnosis of PF pain.¹ Radiographs should be obtained in cases where the diagnosis is not clear, or when the patient does not respond to first-line treatment options.²

The treatment of PF pain includes rest, activity modification, and physical therapy. The key is to work on and correct the underlying causes of the pain. This may include avoiding repetitive activities, assessing footwear, and most importantly addressing hip and knee muscular imbalances that cause the knee cap to track incorrectly. Patients should begin with a structured physiotherapy program to help correct imbalances.² In some cases, foot orthotics can be considered to help with leg alignment and reduce pain in the short term.⁴ Bracing and taping techniques, while not fully supported by evidence, can help patients during periods of activity by stabilizing the patella.³

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1. Gaitonde DY, Ericksen A, Robbins RC. Patellofemoral Pain Syndrome. *Am Fam Physician*. 2019;99(2):88-94.
2. Crossley KM, Callaghan MJ, Linschoten R van. Patellofemoral pain. *Br J Sports Med*. 2016;50(4):247-250.
3. Jin J, Jones E. Patellofemoral Pain. *JAMA*. 2018;319(4):418-418.
4. Collins NJ, Barton CJ, Middelkoop M van, et al. 2018 Consensus statement on exercise therapy and physical interventions (orthoses, taping and manual therapy) to treat patellofemoral pain: recommendations from the 5th International Patellofemoral Pain Research Retreat, Gold Coast, Australia, 2017. *Br J Sports Med*. 2018;52(18):1170-1178.