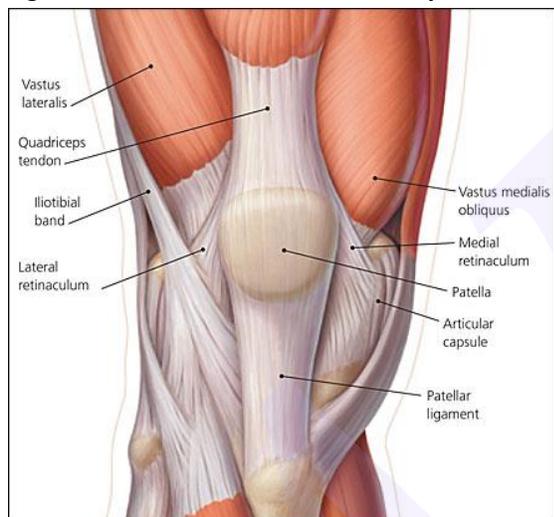


## What is Patellofemoral Pain Syndrome (PFPS)?

Patellofemoral Pain syndrome (PFPS) is also commonly referred to as 'anterior knee pain', 'chondromalacia patallae', or 'patellar malalignment'. The multitude of terminology is secondary to the nature of pain described in or around the patella. PFPS is a common orthopedic complaint; as 1 in every 4 people may develop PFPS. Typically more women than men who are 10-35 years old are suggested to have greater rates of occurrence. Incidence rates of greater than 25% are present in athletic populations, possibly due to overuse and overloading of the knee joint.<sup>1</sup>

**Figure 1: Patellofemoral Joint Anatomy<sup>2</sup>**



The knee joint is comprised of 2 joints: the tibiofemoral (tibia and femur bones) and patellofemoral joint (between patella and femur bones). See Figure 1 for anatomical detail. The patella, also known as the kneecap, lies anterior to the femoral trochlea and is the largest sesamoid bone in the body. This sesamoid bone (the patella) is implanted in the tendon and functionally improves the knee's biomechanical flexion motion and protects the tibiofemoral joint.<sup>3</sup> Ideally, the effects of the quadriceps and patellar tendon, and medial and lateral retinaculum act together to stabilize patellar movement.

## Why does PFPS happen?

PFPS can occur from a variety of reasons such as deviations in patellar tracking, increased forces to the patellofemoral joint, and possible tissue ischemia from mechanical forces from 20-90 degrees knee flexion.<sup>2,3</sup> Contributing factors to the development or exacerbation of this condition include overuse, trauma or biomechanical/anatomical reasons. However additional complicating factors can include personal, neurophysiological, and environmental sources. The sources that generate the anterior knee pain are associated with stress to the anterior synovium, infrapatellar fat pad, subcondral bone and medial or lateral retinaculæ, and/or decreased arterial blood flow.<sup>2,3,4</sup>

## Suggestions for Clinical Diagnosis of Patellofemoral Pain Syndrome

**Patient's History**, may describe:

- Previous injuries: Patellar subluxation, dislocation, traumatic injuries to the knee, or previous knee surgeries<sup>2</sup>
- Onset of symptoms: Gradual onset of pain in one or both knees, unless secondary to traumatic incident
- Location of pain: 'underneath', 'around', 'behind' the patella
- Description of pain: Primarily 'achy'; can be sharp at times<sup>2</sup>
- Complaints of: Swelling, popping, grinding, knee buckling or giving way<sup>1</sup>

- Aggravating factors: squatting, ascending/descending stairs, prolonged sitting, running, kneeling, jumping<sup>4</sup>
- Dance specific movements: Repetitive or deep knee flexion(i.e. grand pliés), jumps

### **Clinical Presentation**

For a clinician, the patient may present with these common findings associated with PFPS:

- Observation: lateral patellar tracking(J-sign), poor VMO tone, excessive worn footwear<sup>1,2</sup>
- Palpation/location of pain: Tenderness retropatellar or pain of patellar facets
- Muscle length imbalances: Hamstrings, quadriceps, plantarflexors, tensor fascia lata/iliotibial band(TFL/ITB complex), hip flexors
- Muscle strength imbalances: Hip abductors, hip flexors, quadriceps, external rotation
- Postural alignment: Increased Q-angle, foot pronation, tibial torsion
- Special tests: Positive Theater sign, patellar grind test, patellar tilt test, step-down test

### **Differential Diagnosis**

During the history collection and physical examination it is important evaluate and rule out other sources of anterior knee pain. Other diagnoses that can cause anterior knee pain are: Osgood-Schlatter, ACL tear/sprain, patellar tendinopathy, patellar fracture, osteoarthritis of patellofemoral joint, osteochondritis dissecans, loose bodies, synovial plica syndrome, and bursitis. Always remember to look beyond just the source of the problem and analyze above and below the knee joint as well.

## **Patellofemoral Pain Syndrome Management**

### **Physical Therapy Management**

At Performing Arts Physical Therapy (PAPT), we can provide a comprehensive examination and evaluation to determine the most effective treatments to accomplish a patient's goals and treat underline symptoms. Physical Therapy is often the initial step for conservative care to treat and manage PFPS. Physical Therapy can produce clinically meaningful results for pain and function in as few as 6 visits in 6 weeks.<sup>4</sup> However depending on the individual, more or less visits may be required to see improvement. All patients are strongly encouraged to actively participate in the home exercise program and modify activities/rest as suggested by their supervising therapist to ensure the best results. Table 1 provides an example of a multimodal treatment program at PAPT to address common findings in an individual with PFPS.

**Table 1: PAPT Sample Patellofemoral Pain Syndrome Treatment Options**

Modalities	Manual Therapy	Therapeutic Exercises	Neuro Re-ed	Additional Interventions
<ul style="list-style-type: none"> <li>• Cryotherapy</li> <li>• Electrical Stimulation</li> <li>• Ultrasound</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Mobilizations (patellar, hip and lumbar spine)</li> <li>• Soft tissue mobilization</li> <li>• Trigger Point Release</li> <li>• Myofascial Release</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening                             <ul style="list-style-type: none"> <li>○ Side-lying clamshells</li> <li>○ Hip isometrics</li> <li>○ Quad sets</li> <li>○ VMO setting</li> <li>○ Circular plié-releve</li> </ul> </li> <li>• Stretching                             <ul style="list-style-type: none"> <li>○ Hamstrings</li> <li>○ Quadriceps</li> <li>○ Gastrocnemius/Soleus</li> <li>○ TFL/ITB</li> <li>○ Hip Flexors</li> </ul> </li> <li>• Self-Trigger Point Release                             <ul style="list-style-type: none"> <li>○ Foam Roller</li> <li>○ Ball</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Skeletal Alignment</li> <li>• Pilates:                             <ul style="list-style-type: none"> <li>○ Leg springs</li> <li>○ Footwork series</li> <li>○ Jump board</li> </ul> </li> <li>• Single-leg balance (on foam, dynadisc, trampoline)</li> </ul>	<ul style="list-style-type: none"> <li>• Kinesiotape</li> <li>• Orthotics</li> <li>• Bracing</li> <li>• Footwear examination</li> </ul>

### Medical Management

Non-Steroidal Anti-Inflammatory medications (NSAIDs) can be recommended by your physician to use in conjunction with Physical Therapy to manage pain (analgesic effect) and decrease inflammation.

Diagnostic imaging (i.e. radiograph, MRI, CT) is often not necessary for treatment or diagnosis of PFPS. When indicated, imaging can rule out other conditions for those individuals with trauma or surgery, swelling, >50year old, skeletally immature and those that conservative treatment has been unsuccessful.<sup>2</sup>

Surgical management is not indicated for the majority of patients with PFPS. Although rare, possible surgical procedures can be indicated to correct anatomical alignment are: lateral retinacular release or repair of medial structures.<sup>2</sup>

### Self-Report Outcome Measures

To help measure a patient's progress in terms of pain, function, disability and advancement towards goals, the following outcome measures are implemented to inform both patient and therapist:

- Visual analog scale (VAS)
- Patient Specific Functional Scale (PSFS)
- Lower Extremity Functional Scale (LEFS)

## References

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4. Crossley K, Bennell K, Green S, Cowan S, McConnell J. Physical therapy for patellofemoral pain: a randomized, double-blinded, placebo-controlled trial. *Am J Sports Med.* Nov-Dec 2002;30(6):857-65.