Knee pain around the patella is inconsistently referred to as patellofemoral pain syndrome (PFPS), anterior knee pain, or runner’s knee.\(^1\) Chondromalacia patella is often used to describe this condition as well, but this term refers specifically to the anatomical appearance of the patellofemoral cartilage, which is actual fraying and damage to the underlying patellar cartilage and is a pathologic diagnosis.\(^2\) The relationship between the appearance of deranged cartilage of chondromalacia patella and symptoms of PFPS is questionable.\(^3\)

The classical presentation of patients with patellofemoral pain syndrome is anterior knee pain that typically occurs with activity and often worsens when going up or down steps or hills. It can also be triggered by prolonged sitting.\(^4\) One or both knees can be affected. It is an overuse disorder and is the most common cause of knee pain seen by primary care providers.\(^5\) It is often seen in athletes, most often in runners. There is a higher incidence in women\(^6\)\(^7\) and increased incidence with increased age.\(^8\)

Consensus is lacking regarding the cause of the syndrome. PFPS is thought to be due to abnormal forces across the patella due to one or more of: a tracking disorder of the patella in the femoral groove, muscular imbalance in the quadriceps, abnormal patellar anatomy, altered foot or ankle biomechanics, an increased Q angle, and abnormal development of the femoral condyles.\(^6\)\(^9\) These can occur due to trauma, joint overload, overuse, or misalignment.\(^10\)

**Subjective Findings and History**
- History of knee injury (e.g. fracture, dislocation), overuse, overload, or insidious onset
- Onset after increase in physical activity.\(^11\)
- History of anterior knee pain, classically worse after prolonged sitting (movie-goer’s sign).
- Limited ROM, associated crepitus
Aggravated by ascending and descending stairs, work, squatting, or running
Pain, stiffness, catching, locking of knee
May be associated with pes planus, pes cavus, increased Q-angle, muscular imbalance

**Objective Findings**
The reliability of individual physical examination findings in PFPS is limited as it is a multifactorial condition. However clusters of test findings and situational phenomena (i.e. the clinical history) are more diagnostic.

- Pain or crepitation during squatting (Waldron test) or on palpation.
- Provocative maneuvers with muscular contractions (patellar apprehension).
- Static biomechanical abnormalities including: leg length discrepancy, hamstring tightness, abnormal patellar mobility, hallux valgus, abnormal foot morphology.
- Dynamic biomechanical abnormalities including: muscle weakness or imbalance, knee abduction impulses, hip weakness or adduction, excessive foot pronation, insufficient foot pronation.
- Other findings described include limited motion, effusion, catching and/or locking.
- Evaluate the entire kinetic chain (hip, knee, ankle, foot) and spine for weakness and joint dysfunction.
- Diagnostic imaging is generally not helpful in the diagnosis of PFPS. Imaging may be helpful to rule out osteochondritis dissecans, infection or neoplasm. In general, six weeks of no improvement is a reasonable period to wait before ordering plain-film radiographs. X-rays may be positive for joint space narrowing/osteophytic changes. X-ray may show irregular patellar surface.

**Assessment**
- Thorough bilateral knee exam (observation strength, palpation, and ROM).
- Leg length and foot and arch examination.
- Special orthopedic tests: patellar tendon palpation, patellofemoral compression test, patella facet/retinaculum tenderness, patellar glide, apprehension test, popliteal angle, evaluation for dynamic misalignment, patellar grind, medial plica, Q angle test.
- Rule out “red flags” of serious disease (infection, tumor, inflammatory arthritis).
- Rule out non-local causes of pain (e.g. referred back pain).
- The clinical impression should indicate the specific anatomical structures involved and clinically correlate with any mechanism of injury, the history, subjective complaints, and objective findings.
- A thorough examination for diagnosing this condition can be found at: American Family Physician. Persistent anterior knee pain.
- Radiographs may be warranted if the patient's symptoms fail to improve after one to two months of appropriate conservative therapy.
- Advanced imaging (magnetic resonance imaging (MRI), computed tomography (CT), musculoskeletal ultrasound (MSK US), and radionuclide scanning) is not indicated in the initial evaluation, but may be considered in patients who do not improve to rule out other pathology.
Plan

Passive Care:
- Multimodal physiotherapy modalities.\(^\text{15}\)
- There is only limited evidence for the effectiveness of NSAIDs for short term pain reduction in PFPS.\(^\text{16}\)
- There is limited evidence to support the use of intraarticular injection of corticosteroid or glycosaminoglycan polysulfate (GAGPS).\(^\text{16}\)
- Nutritional supplementation for inflammation.
- Patellar strap, taping (mixed results).\(^\text{17,18,19,20}\)
- Lower extremity and spinal manipulation to correct joint dysfunction, manual therapy.\(^\text{18}\)
- Foot orthotics or insoles.\(^\text{18,20,21}\)

Active Care:
- Open or closed chain exercises to improve strength, ranges of motion, and function.\(^\text{22,23}\)
- Training in proper mechanics of joint protection and exercise therapy.\(^\text{18,20,24}\)
- Activities/work restrictions: Limit activity depending upon diagnosis, degree of symptoms, and type of daily activities
- Acupuncture.\(^\text{18,25,26}\)
- Biofeedback.\(^\text{27}\)
- Nutritional supplementation (Vitamin C, manganese, magnesium, calcium, glucosamine sulfate, chondroitin, methylsulfonylmethane, bromelain and essential fatty acids.
- Botanical supplementation to reduce inflammation (Curcuma longa (turmeric), Capsicum annum (cayenne), Arnica montana (arnica), Ruta graveolens (rue), Hypericum perforatum (St. John’s wort), and Gaultheria procumbens (wintergreen)).
- Topical treatments (e.g. comfrey poultice, hypericum, arnica, wintergreen).

Referral Criteria
- Referral may be considered if no progress after one month, intra-articular loose bodies are present, and/or progressive loss of range of motion or strength
- Referral to physical therapy if not available in your clinic

Resources for Clinicians
Family Practice Notebook.com  Patellofemoral Syndrome.
http://www.fpnotebook.com/Ortho/Knee/PtlfmrSyndrm.htm


Resources for Patients
http://www.mayoclinic.com/health/chondromalacia-patella/DS00777

Medline Plus. Chondromalacia patella.

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The Evidence


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