Practice Guidelines

Patellofemoral Pain: Guidelines from the American Physical Therapy Association

Key Points for Practice

- PFP presents with retropatellar or peripatellar pain with knee flexion.
- PFP is unlikely if squatting does not reproduce pain.
- The most effective treatment for PFP are exercises that target muscles of the posterior hip and quadriceps.
- Adding patellar taping and foot orthoses to exercise improves short-term pain.

From the *AFP* Editors

Patellofemoral pain (PFP) is a common condition, characterized by poorly defined knee pain in the anterior retropatellar or peripatellar region. PFP affects up to 85% of the population at all ages but appears to be most common in adolescents. PFP can persist for many years and recurs in up to 90% of affected people. It may lead to future patellofemoral osteoarthritis. The American Physical Therapy Association released guidelines for the diagnosis and management of PFP.

Risk Factors

Decreased flexibility and muscle weakness of the hip and knee are present in PFP, but hip weakness appears to be secondary to PFP instead of a cause. Physically active women are more susceptible to PFP compared with similarly active men. Knee extensor weakness in women increases PFP risk. Women who participate in multiple sports are at lower risk than women participating in a single sport. Measurements of static and dynamic knee valgus, including the Q angle, do not predict PFP risk.

Diagnosis

PFP presents with retropatellar or peripatellar pain on knee flexion, such as with squatting, stair climbing, or prolonged sitting. With this type of pain, these activities are the most accurate diagnostic tests. Lack of pain with squatting makes PFP unlikely. Reduced lateral patellar mobility with patellar tilt testing is highly specific but cannot rule out PFP. Other proposed tests have insufficient accuracy.

Other causes of anterior knee pain have more specific findings. Patellar instability presents with recurrent subluxation or dislocation episodes and apprehension with lateral patellar pressure. Patellar tendinopathy is common in adults, but pain and tenderness are isolated to the inferior patella or tibial tubercle. Apophysitis in children and adolescents can present with pain at similar locations as patellar tendinopathy in adults.

General Treatment Approaches

The primary treatment for PFP is a combination of posterior hip and quadriceps exercises, which reduce pain and improve function for at least five years. Weight-bearing and non–weight-bearing exercises are similarly effective. These exercises include single-leg squats, step downs, squats, lunges, and hip exercises using resistance bands. High volume exercises are most effective, such as three sets of 30 or more repetitions three times per week as tolerated. The guideline does not recommend specific exercise programs. The

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This series is coordinated by Michael J. Arnold, MD, contributing editor.

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three-phase program from the military's Center for Human Performance includes the recommended elements. (https://www.hprc-online.org/physical-fitness/rx3/knee).

Patellar taping combined with exercise improves short-term pain, but braces and sleeves do not. An illustration of patellar taping is included in a previous *American Family Physician* article (https://www.aafp.org/afp/2019/0115/p88.html). Foot orthoses reduce pain in the short term (six weeks) in patients with increased pronation. Custom orthoses are not superior to less expensive prefabricated inserts.

Other therapies added to exercise do not improve outcomes over exercise alone, including electromyography-based feedback, neuromuscular electrical simulation, blood flow restriction, and manual therapies. Dry needling does not improve outcomes, and acupuncture has benefit over usual care but not over sham acupuncture.

For runners, gait retraining may improve PFP symptoms. Gait retraining can include managing running load by avoiding hills or reducing mileage, increasing step speed to reduce stride, and altering from rearfoot strike to forefoot strike.

Specific Treatments Based on Assessment

Studies of PFP show four patterns of injury that can guide treatment.

SOLITARY OVERUSE

Many cases of PFP are primarily caused by increasing joint load from acute overexertion or rapid increases in training. Injury prevention programs do not prevent these injuries, but reducing activity followed by gradual return can be beneficial. With a history of overexertion or overtraining, relative rest may be the first intervention.

MUSCLE PERFORMANCE DEFICITS

Some people with PFP have notable weakness in knee and hip extension. Although hip weakness appears to be a result of PFP, training focused on hip and quadriceps resistance exercises can improve symptoms.

MOVEMENT COORDINATION DEFICITS

Although dynamic knee valgus does not predict PFP risk, a subset of people with PFP who demonstrate knee valgus with a single-leg squat appear to benefit from gait retraining.

MOBILITY IMPAIRMENTS

People with mobility impairment caused by PFP have hypermobility of the foot with hypomobility of the hamstrings, quadriceps, gastrocnemius-soleus complex, patellar retinaculum, or iliotibial band. Prefabricated foot orthoses may be beneficial for this group.

Editor's Note: This guideline is largely consistent with the 2019 *AFP* article on patellofemoral pain syndrome (https://www.aafp.org/afp/2019/0115/p88.html). It emphasizes few important history and physical examination findings and highlights the limitations of the Q angle, Clark test, and patellar shrug many of us learned. Produced by physical therapists, this guideline unsurprisingly has specific exercise recommendations, but it also highlights that most adjunctive treatments are not effective.—Michael J. Arnold, MD, contributing editor

The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, or the U.S. government.

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Janelle Marra, DO, FAAFP, CAQSM
Naval Hospital Camp Pendleton, Camp Pendleton, Calif.
Email: jmarra08@gmail.com ■