You might have “runner’s knee,” but you don’t have to be a runner to get it. Your pain may have been dubbed “movie-goer’s knee” even if you prefer other forms of entertainment.

Each description is among the multiple terms used to describe patellofemoral pain syndrome, or PFPS. It refers to pain at the front of the knee and in and around the patella, or the kneecap.

The pain is common among athletes, active teenagers, older adults and laborers and comprises approximately one-fourth of all reported knee pain, according to the American Physical Therapy Association.

Pain typically occurs with activity, but it also can result from prolonged sitting (watching a movie, riding on an airplane). It affects more women than men. Most often, patients can avoid surgery.

Causes of PFPS are many, including overuse, excessive weight, patellar tracking disorder, wear and tear under the kneecap. However, new research is challenging the way we think about the mechanical roots of patellofemoral pain.

The new focus: the femur, or thigh bone, the longest and strongest bone in the body.

KNOCK-KNEED
Among people who have PFPS, it is common that the femur rotates under the patella. Think of this as a corkscrew motion, or what we commonly refer to as being knock-kneed (genu valgum).

But what causes this?
When we bend and extend our legs, the patella slides through a groove in the femur. But if the bones don’t line up properly, the result is a “malalignment” that can accelerate wear between the bones and even damage protective cartilage.

To compensate for this, treatment often has focused on improving the strength of the quadriceps muscles with an eye toward improving the patella’s tracking in the femoral groove. Other remedies included taping or bracing the knee and even surgeries. They all focused on the patella – and yet in many cases the pain persisted.

Dynamic MRIs challenged the notion that the patella was the issue. The images revealed that the patella stays still; rather, it’s the femur that rotates. This has led to a change in focus, to hip strengthening and retraining of the mechanics of the lower extremity.

Improving strength in the lateral hip, the theory goes, can help to reduce how much the femur rotates.

SURGICAL OPTIONS
Surgery is considered a last resort in the treatment of PFPS. Most patellofemoral pain responds to physical therapy with an exercise and stretching program, according to the International Cartilage Repair Society.

Non-operative treatment most often fails when the most current therapy is not used. Prior to the focus on improving hip strength, patients with continuing pain ultimately opted for surgery.

Several surgeries were developed in an attempt to reduce pain; however, the success rate is quite low. Among the most popular surgeries:

Lateral release: The intent of this procedure is to assist with patella positioning. The
procedures completed, the cartilage on the back of the knee may be recommended if the known as chondromalacia, this slow return to activities. Anti-inflammatories, and a marathon will be treated brought on by running in example, patellofemoral pain on activity modification. For a change in activity level or underlying lower extremity mechanics continue to persist.

PT TREATMENT

Physical therapy can play an important role in correcting the mechanical problem that underlies patellofemoral pain. When PFPS is the result of a change in activity level or worsened by a specific activity, treatment typically focuses on activity modification. For example, patellofemoral pain brought on by running in a marathon will be treated with rest, ice, over-the-counter anti-inflammatories, and a slow return to activities. For chronic pain, treatment historically involved strengthening the quadriceps and stretching the hamstring and iliotibial band; the latter is fibrous tissue that runs down the outside of the thigh from the hip to the shin.

Now, the primary focus is on improving hip strength. The hip extensors contribute 25 percent of energy absorption during landing. If the hip muscles are not strong enough, that load is transmitted to other lower-extremity joints, the knee in particular. Physical therapy focuses on these areas:

1. Gluteus medius strengthening: Weakness in this broad, thick muscle, which sits on the outside of the pelvis, may cause the femur to angle inward and rotate abnormally with obvious implications for PFPS.
2. Trunk stabilization: Exercises to strengthen the core muscles.
3. Proprioception/balance: Research has shown that patients with PFPS have impaired proprioception, which is our ability to control our limbs without looking directly at them.
4. Femoral mechanics: This involves training the proper alignment of the femur. Cues often are needed to prevent femoral internal rotation and adduction in order to maintain correct alignment.

In most cases, exercises learned in physical therapy must be continued for the rest of the patient’s life to maintain proper alignment between the femur and patella. The best news is that 80 to 90 percent of PFPS patients recover fully without surgery and are able to resume their previous activities.

REFERENCES

“Patellofemoral pain syndrome.” UCSF Medical Center website, accessed December 2014.

Q&A

PFPS

By Jeremy Ansbach

WHAT IS THE ANATOMY OF THE KNEE?

The knee joint comprises four primary bones: the tibia, or shin bone; femur, or thigh bone; fibula, on the outside of the lower leg; and patella, or kneecap. The patella glides in front of the tibia and femur, between a groove on the femur. The patella increases the leverage that the quadriceps tendon can exert, increasing the muscular strength. Ligaments attach these bones except for the patella, which is embedded in the tendon of the quadriceps muscles. This tendon becomes the patellar tendon as it runs below the kneecap and attaches to the tibia.

WHAT STRUCTURES ARE INVOLVED IN PATELLOFEMORAL PAIN SYNDROME (PFPS)?

Patellofemoral pain syndrome, as the name suggests, is thought to be caused by irritation on the back of the patella and front of the femur, leading to pain at the front of the knee and sometimes noises, called crepitus.

WHAT CAUSES THIS IRRITATION?

The most accepted theory is that it is a direct result of poor tracking of the patella in its groove. Previous schools of thought believed this was because the patella was gliding inappropriately because of the muscles that attached to it (quadriceps). However, more research is pointing in the direction that the patella remains still but the femur rotates along its axis too much, causing the groove to move. This comes from a lack of control on the femur by the muscles that attach to it near the hip, primarily the gluteus medius.

ARE THERE OTHER NAMES FOR PFPS?

Yes, including runner’s knee, moviegoer’s knee, chondromalacia patella, fat pad irritation, and anterior knee pain.

HOW CAN PHYSICAL THERAPISTS PLAY A ROLE IN REHABILITATION OF PFPS?

After discussing your condition with you, a physical therapist will evaluate movements and posture that may be causing the irritation. Range of motion, flexibility and strength of the leg will be assessed. The therapist then will determine whether there are existing deficits contributing to the pain. Exercises will be identified to address any deficits, usually focusing on muscular imbalances: some muscles being too tight, others being too weak.
By Amy Morlock

PATIENT HISTORY
A 14-year-old female was referred to physical therapy after dealing with bilateral knee pain for three months. She was a full-time student, played year-round lacrosse and basketball in the winter. She had been playing sports since age 8.

This was the patient’s first case of knee pain. She reported that the frequency of practice and games had increased for her in the past year. Her pain was inferior and medial to the patella in both knees, 10/10 at worst and 3/10 at best. Her pain increased with prolonged standing and walking, squatting, stairs, sitting with knee bent, and running. At the time of her initial evaluation, she was unable to participate in sports because of the pain.

ASSESSMENT
The patient’s posture presented as poor alignment through the lumbar spine, pelvis, hips, knees and ankles. This consisted of an increase in lumbar spine lordosis, internally rotated femurs and genu recurvatum (hyperextension), and increased pronation. The presence of the hyperextension led to edema around the infrapatellar fat pad. Her lower extremity muscle bulk was uneven: more than typical in the quadriceps and hamstrings, less than normal in the gluteals. This malalignment resulted in changes in her gait pattern, increasing stresses at the knee.

She presented with core, gluteus medius, ankle plan-tarflexor, hip flexor and knee extension weakness. Upon resisted testing, hip flexors and knee extension were painful.

Based on a subjective evaluation and assessment, the physical therapist concluded that the patient suffered from patellofemoral pain syndrome resulting from irritation and swelling of the infrapatellar fat pad.

TREATMENT
Initial physical therapy treatment consisted of taping techniques to reduce pain and inflammation; tape was applied to improve the femoral position and prevent hyperextension. Manual techniques were used to stretch hip adductors and medial hamstrings and to improve function of the gluteus medius and other hip stabilizers.

Exercises addressed the muscular imbalances of the tight muscles and weak muscles. Strengthening began in a non-weight-bearing position but quickly progressed to weight bearing. Functional exercises that addressed proprioceptive and return-to-sport activities were added once the patient no longer reported pain.

RESULTS
Upon discharge, the patient’s flexibility and strength had improved greatly and pain was 0/10. Her score on the Knee Outcome Survey-Activities of Daily Living scale had improved to 100 percent, and she had returned to sport pain free.

REFERENCES
RESEARCH ABSTRACT

Strengthening Hips vs. Quads to Reduce Patellofemoral Pain

By Branden Fleishman

INTRODUCTION

Patellofemoral pain syndrome (PFPS) is a common condition that causes anterior knee pain. PFPS has a much higher prevalence in females compared with males and comprises 16 to 25 percent of all injuries in runners. It frequently is caused by a muscular imbalance of the lower extremity, resulting in poor alignment of the patella and femur during knee flexion and extension.

Historically, PFPS has been linked to impairments of the quadriceps muscles. But more recent research has focused on strength deficits of the proximal hip musculature as a contributor to this disorder. During functional activities, the lateral hip muscles prevent hip adduction and internal rotation, which may result in impaired joint alignment and lead to the development of PFPS.

METHODS

Thirty-three females with PFPS were randomly assigned into two separate groups, one (hip group) that received hip strengthening and another (quad group) that received quadriceps strengthening. Each group received specific exercise for four weeks prior to initiating similar functional exercise strengthening for a subsequent four weeks.

Primary outcome measures consisted of pain using a Visual Analog Scale (VAS), and function using the Lower Extremity Functional Scale (LEFS). Secondary measures included strength measures of hip abductors (HABD), Hip External Rotators (HER), Knee Extensors (KE), and functional step-down test.

RESULTS

After four weeks, the hip group demonstrated significantly less pain than the quad group, which had no change in pain. Both groups measured significantly lower pain scores at eight weeks compared with baseline. Both groups showed improved LEFS scores throughout the eight weeks. With regard to strength, both groups had similar increases in step-down scores at four and eight weeks. From baseline to eight weeks, the hip group demonstrated a 21 percent increase in HABD strength, while the quad group showed no change from baseline.

DISCUSSION

While both rehabilitation approaches improved function and reduced pain in the treatment of PFPS, targeting hip strength is more efficient for earlier dissipation of pain compared with exercises focused on the quadriceps. The quad group did not show significant gains in knee extension strength, despite significant changes in pain and function. The unchanged knee extensor strength may have been the result of pain causing inadequate muscle activation for strengthening. This is a further indication for proximal lower extremity strengthening. However, there is no one program that will be effective for all patients. A comprehensive analysis of lower extremity mechanics including hip strength should be a priority.

REFERENCE