

Dear Run Doc,

I have been training for the Capital City Half Marathon for 3 months now. I developed knee pain 3 weeks ago. Any chance I'm going to be able to run the race?

Knee pain is one of the most common complaints among runners. It is estimated that knee pain accounts for 50% of all running related injuries. I have seen many new runners abandon their new found passion due to recurring bouts of knee pain. Unfortunately I have also seen many experienced runners training for a goal race stop running for an extended period of time only to see their pain recur when they attempted to return to running. A basic understanding of knee anatomy and biomechanics can help in diagnosing and ultimately treating the more common causes for running related knee pain. With appropriate treatment most runners can expect to be able to run pain-free.

The knee joint is an articulation between 3 bones; the thigh bone (femur), the shin bone (tibia), and the kneecap (patella). The quadriceps muscles (the muscles on the front of your thigh) are responsible for extending the knee and the hamstrings (the muscles on the back of your thigh) flex the knee. It is important to understand that the patella is attached to the undersurface of the quadriceps muscles. Therefore the quadriceps muscles control the movement of the patella through the groove at the end of the femur. The iliotibial band lies on the outside of the thigh and attaches just below the knee on the outside of the tibia. During knee flexion and extension the iliotibial band moves back and forth over a prominence on the outside of the femur. Studies have shown that the iliotibial band typically slides over this prominence at 30 degrees of knee flexion.

Diagnosis:

As is true in many field of medicine, most diagnoses can be established by a good history that is confirmed by a thorough physical examination. Finding a physician who understands runners and running related injuries is the first step. The second step is finding a physician who listens. The location of the pain is paramount in establishing a proper diagnosis. Half of all runners experiencing knee pain will have patellofemoral syndrome (also known as Runner's Knee). In these cases symptoms are typically localized to the front of the knee. The pain related to iliotibial band (ITB) syndrome accounts for 25% of all knee pain in runners. Given its location on the outside of the knee, ITB syndrome is characterized by pain on the outside of the knee. These two conditions, patellofemoral syndrome and ITB syndrome, account of 75% of all running related knee pain. Given their relatively high frequency, the rest of this article will focus on these two conditions.

The description of the pain can also provide clues to the diagnosis. Patellofemoral syndrome is frequently described as aching and worse with running, kneeling, squatting, lunging, and going up and down stairs. Most affected individuals will have pain when sitting for prolonged periods of time; such as watching a movie or long car rides. The

pain associated with ITB syndrome is usually characterized as sharp. Many people will describe their knee locking late during a run.

Treatment:

As with all running related injuries there are some basic measures that must not be overlooked. This includes proper shoe fitting, running surfaces, training programs, etc. However, these basic injury prevention techniques are beyond the scope of this article and have been covered elsewhere. Most injuries are characterized by inflammation early in their course. Icing the affected area for 15-20 minutes can help to reduce the inflammation.

PFS/Runner's Knee

Treatment is directed at identifying the muscular imbalances that has caused the pain. Historically, it has been felt to result from an imbalance of the quadriceps musculature. The quadriceps muscles on the outside of the thigh become stronger than the muscles on the inside. This results in the patella being pulled to the outside and dragging through the groove at the end of the femur. Ultimately the undersurface of the patella becomes inflamed with resulting pain and grinding.

More recently we have learned that the hip musculature also plays a very important role. Most runners with PFS have weak gluteal and hip external rotator muscles. This causes the femur to roll in while running and walking which also leads to aberrant tracking of the patella at the end of the femur. I frequently find cases where people with PFS aren't responding to physical therapy because the emphasis has been placed on quadriceps strengthening and failed to incorporate appropriate strengthening of the hip muscles. Addressing this essential component allows most runners to get back on track. By rebalancing the quadriceps and strengthening the gluteals and hip external rotators we are able to restore normal knee mechanics and ultimately alleviate pain.

ITB Syndrome

When treating patients with ITB syndrome I think of two things – flexibility and strengthening. Many people with ITB syndrome will have a tight iliotibial band. Performing appropriate stretching exercises and using a foam roller can help to improve flexibility. However, it is my experience that many injured runners focus too much on stretching the ITB when the underlying cause is related to weakness in the hip musculature. When the gluteals and hip external rotators are weak the femur will roll in the running and the bump on the outside of the femur becomes more prominent. This results in painful snapping of the ITB with every stride. Therefore, a comprehensive therapy plan should include both stretching and strengthening exercises.

Return to Running

By far the most common question I am asked is “can I run?” Obviously every situation is unique and this decision must be made on an individual basis. There are many factors essential to this decision including the degree of symptoms, associated injuries, goal race, timing of the injury, etc. However, with these two conditions structurally the knee is intact. Most individuals are able to continue training using pain as their guide. My cardinal rule is that if your gait is affected or the pain is causing you to limp then you should not be running. Consider cross training while you continue with your rehabilitation exercises. Many people with ITB syndrome are accustomed to running the same pace that results in 30 degrees of knee flexion. Again, studies have demonstrated that the iliotibial band snaps over the femur at 30 degrees of flexion. If you develop ITB syndrome during a run or worse yet, during a race, try altering your pace a little faster or a little slower. This will hopefully avoid the same degree of knee flexion and may get you through the last few miles. If your pain persists it is always recommended to see your physician to help confirm the diagnosis and establish an effective treatment plan.

Happy Running!
Darrin Bright, MD
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