

Sports-Induced Inflammation in the Lower Extremities

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Inflammations of the patellar and Achilles tendons, knee and ankle apophyses, and plantar fascia are common among professional and amateur athletes. The tendency to favor a sore leg and delay seeking medical attention often results in muscle atrophy. Many patients thus require physical as well as pharmacologic therapy to prevent further injury and regain full use of the leg.

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Patellar Tendinitis (Jumper's Knee)

Every contraction of the quadriceps puts stress on the patellar tendon. With increased frequency, duration, or intensity of quadriceps contractions, the tendon can become inflamed at its site of attachment to the inferior pole of the patella. The activities most likely to cause inflammation are jumping, walking or running up stairs, cycling, and knee-extension and squatting exercises.

Patellar tendinitis is most prevalent among older adolescents and young adults, particularly those who have less than optimal flexibility in their quadriceps and hamstring muscles. Patients typically complain first of postexertional knee pain and stiffness. As the inflammation worsens, symptoms are provoked more easily and occur during exertion as well as afterwards. If the tendinitis is not treated, eventually even prolonged standing or sitting will elicit pain and stiffness.



Figure 2. In evaluating for tendinitis, direct palpation of the deep fibers of the patellar tendon is best accomplished by depressing the superior pole of the patella with the thumb and index finger to elevate the inferior pole.

A finding of well-localized tenderness at the inferior pole of the patella is diagnostic. The patella must be elevated to ensure direct palpation of deep tendon fibers (Figure 2). Most of the examination is aimed at determining the extent of muscle impairment, if any. After visual inspection and palpation, the flexibility of the quadriceps is assessed by passive flexion of the knee (Figure 3, left). The flexion angle is normally 135° or greater. Hamstring flexibility is similarly determined by performing a passive straight-leg lift (Figure 3, right). The flexion angle of the hip is generally 70° or greater, but for athletes, the norm is 90° or greater.

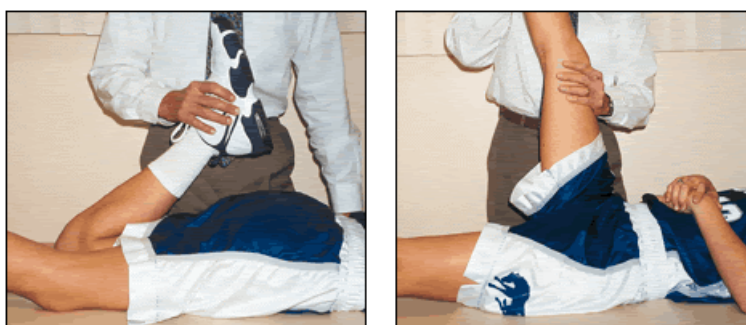


Figure 3. Flexibility of the quadriceps is determined by measuring the flexion angle of the knee. The patient lies prone as the injured knee is passively flexed (left). Flexibility of the hamstring muscles is similarly determined by measuring the flexion angle of the hip. The patient lies supine as a straight-leg lift is performed (right).

Successful treatment of patellar tendinitis usually requires that the patient modify or refrain from exertional activities for a short time. The use of nonsteroidal anti-inflammatory drugs, ice packs, and patellar tendon counterforce straps may aid in alleviating symptoms. Exercises to stretch the quadriceps and hamstring muscles may also be helpful (Figures 4) but should not be undertaken if painful.



Figure 4. Quadriceps stretching exercises are performed with the foot held by the contralateral hand. This keeps the hip aligned and extended so that the stretch is felt in the anterior thigh (top left). If the patient cannot grasp the foot, a chair may be used for support (top center). For hamstring stretching exercises, the patient lifts the leg while lying supine. The hip is flexed and the knee fully extended (top right). (It may be necessary to slightly decrease hip flexion in order to fully extend the knee). Many athletes prefer an alternative exercise in which calf and hamstring muscles are stretched at the same time. It is performed sitting down. The fully extended knee is held down by the contralateral hand as the ipsilateral hand actively flexes the foot (bottom). All stretches should be held for at least 20 seconds and performed frequently throughout the day, especially before and after exertional activities.

If quadriceps atrophy is noted, isometric exercises are also required to regain full use of the knee. These exercises should be delayed until they can be done without pain. No special equipment is needed. The patient sits on the edge of a chair and, with injured leg fully extended and heel on the floor, tightens the quadriceps as if trying to force the knee to the floor. Ideally, four to six contractions, each held for eight seconds, should be performed several times a day. Patients may become bored and ask for a more aggressive program, but isotonic exercises with weights should not be attempted until the vastus medialis obliquus has regained full size, tone, and strength--the risk of recurrent inflammation and patellofemoral dysfunction is too great.

Patients who have difficulty performing isometric exercises may benefit from using an electric muscle stimulator (EMS unit) to induce contractions. Direct stimulation of the vastus medialis obliquus for at least two hours a day for one month is usually sufficient to restore function. Once patients experience the sensation of effective contractions, they may be able to do the exercises without EMS help.