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A long-distance runner with lateral knee pain

CASE SUMMARY

A 25-year-old female marathon runner, who trained three times a week, consulted an orthopaedic surgeon due to lateral knee pain. It had been bothering her for 7 weeks. The onset was gradual. After several visits to her physiotherapist, where she performed exercises for coordination, strength and stability, she decided to seek further advice, because the problem was gradually getting worse. She experienced a sharp pain on the outside of the left knee. The pain worsened during activity after an often pain-free start and was exacerbated on running downhill. The pain disappeared hours after the exercise, and in rest she had no complaints at all.

Physical examination revealed a healthy female (1.70 m, 55 kg). Inspection of the knee showed a diffuse lateral swelling without erythema. There was no effusion. On palpation, there was tenderness over the whole lateral side of the knee, with the tenderest point being the lateral femoral condyl. The range of motion was normal.

When putting full weight on the injured leg during the Renne test, the lateral knee pain occurred. The Noble test (manual compression of the iliotibial band (ITB) on the lateral femur condyl during flexion and extension of the knee) was positive; the patient experienced pain at 30° of flexion during motion from 90° flexion to full extension. The McMurray test for a meniscal tear was not painful. Performance of the Ober test showed moderate tightness of the ITB. Neurovascular examination was normal.

The patient was referred for MR imaging of the left knee (figures 1, 2).

WHAT IS YOUR DIAGNOSIS BASED ON CLINICAL EXAM AND IMAGING FINDINGS?

Diagnosis

Iliotibial band friction syndrome (ITBFS).

Imaging findings

Coronal T2 weighted fat suppressed image of the left knee demonstrates an area of high signal intensity at the distal part of the iliotibial tract (white arrow). The area of high signal intensity indicates an ill-defined fluid collection. The tendon is still detectable as a linear low-signal-intensity structure within the fluid collection.

Normal thickness of the tendon is seen on the axial T2 weighted fat suppressed image (small white arrow). No evident bone marrow oedema is found. A normal aspect of the lateral meniscus (small white arrows) is seen.

TREATMENT

The patient was advised to abstain from running for 4 weeks and prescribed a graded exercise programme. Her complaints disappeared after finishing the programme, and she has since successfully resumed running marathons.

Figure 1 Coronal T2 weighted MR image of the knee.

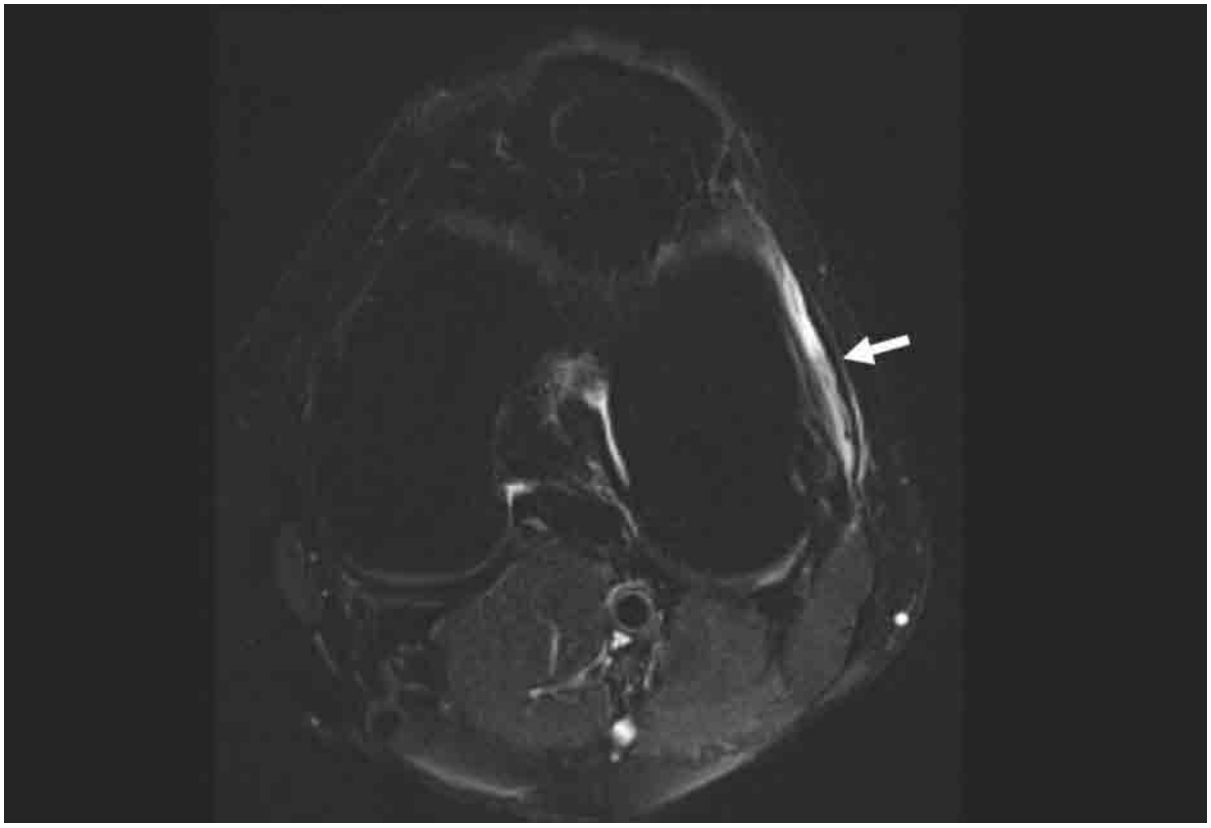

Figure 2 Axial T2 weighted MR image of the knee.

DISCUSSION

ITBFS is one of the most common causes of knee pain in runners; it may also occur in cyclists and is therefore also referred to as 'runner's knee' or 'cyclist's knee.' It should be noted that these synonyms can cause confusion, as some authors may use the term 'runner's knee' to describe patello-femoral pain.

In 2002, ITBFS was the second most common overuse injury in a large case series of running injuries[1] (after patello-femoral syndrome), and another recent article also showed the incidence to be 12% of all running-related overuse injuries.[2]

The ITB or tract is a fascial condensation in the lateral part of the thigh. Originating proximally from the iliac spine, the iliotibial tract continues down to the knee, where it becomes a ligament like structure, separated from the femur by connective tissue, fat and two layers of synovium.[3–5]

Several hypotheses of the cause of pain have been reported in the literature. Most of the time, the pain is reported to be due to friction of the ITB moving over the lateral femoral epicondyl.[2]

According to Fairclough *et al*,[6] friction is not the cause, as they found the ITB was tightly fixed in its anatomical position and thus unable to move over the femur condyl. They state that increased compression of a highly vascularised and innervated layer of fat and loose connective tissue is the cause of the pain.

The patient with ITBFS classically presents with a gradual onset of tenderness over the lateral femoral condyl and lateral knee pain, worsening during activity. The pain occurs just after heel strike at approximately 20° of knee flexion and is exacerbated on running downhill. Sometimes a palpable crepitus is found on the lateral knee side.[7–10] The Noble compression test, where the practitioner presses on the ITB during knee flexion and extension, can reproduce the pain felt on running.[2]

ITBFS may be misdiagnosed and confused with other injuries causing lateral knee pain, such as a lateral meniscal tear, lateral discoid meniscus, injury of the lateral collateral ligament or popliteal tendinitis.[10]

The three major modalities that can be considered for further examination when the diagnosis of ITBFS is in doubt are: MR imaging, ultrasonography and bone scan. Bone scans are seldom used in the clinical practice and are not discussed further in this article.

Since ITBFS is in fact a clinical diagnosis, MR imaging is not often used for the diagnosis. Though MRI could be requested in order to exclude other disorders in the differential diagnosis with similar symptoms.[2] The prognostic value of MR Imaging in ITBFS is not yet known and requires further investigation. In general, sagittal images do not contribute to diagnosing ITBFS, in contrary to coronal and axial images. Axial images are necessary to differentiate between intra-articular fluid and ITBFS.[9]

According to Muhle *et al*,[5] the two main abnormalities seen on MRI are either a poorly defined signal intensity alteration or a circumscribed fluid collection located in a compartment-like space medial to the ITT with obliteration of the fatty layer distal to the vastus lateralis muscle.

To detect soft-tissue abnormalities, ultrasonography may be useful, but the findings are not specific. According to Martens *et al*,[11] ultrasonography has even been reported to be insensitive for the detection of soft-tissue abnormalities underneath the lateral femoral condyl: only one of 23 patients with this disorder is said to show 'an aberrant picture around the lateral femoral epicondyl' on ultrasonography.

The essence of the treatment of ITBFS is a conservative structured rehabilitation programme. Resting, decrease physical activities, application of ice packs, administration of oral

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anti-inflammatory medication and, if necessary, local steroid injection are the most important components of treatment.[10] According to Fredericson *et al*,[12] treatment is best divided into four phases. The first acute phase has as main goal to suppress the inflammatory reaction, by activity modification, ice, non-steroidal anti-inflammatory drugs and corticosteroid injection in cases of severe pain or swelling. Stretching of the ITB and soft tissue therapy for any myofascial restrictions is the accent of the subacute phase. Because impaired hip musculature is an important cause of the irritation in the knee, the recovery phase emphasises increasing hip abductor strength and integrated movement patterns. The last, return-to-running, phase focuses on an everyday programme in which activity is gradually restored to the normal level.

In the very rare cases where non-operative treatment is not sufficient, surgery can be considered.[12] Barber *et al*[13] reported successful treatment of ITBFS by lengthening the ITB with Z-plasty. Surgical treatment with the mesh technique, using incisions in the ITB, is also reported to be successful.[14]

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