Not a knee-jerk reaction

7th August 2013
By Doron Sher |

0 Comments

Anterior cruciate ligament (ACL) tears present as acute injuries. This may be with contact or non-contact sport. In the case of a non-contact injury, the history is usually of a patient playing sport with the foot planted attempting a side-stepping manoeuvre. The knee gives way with a popping sound and the patient falls to the ground.

Occasionally the patient may describe a hyperextension injury or a quadriceps active mechanism when the pop occurs as they jump into the air. The knee usually swells over several hours and it becomes progressively more difficult to walk over 24 hours.

Most people are unable to continue playing their sport at the time of injury. Netball, skiing and football (rugby league in males and soccer in females) are the main culprits in Australia.

When examining the patient it is important to ensure they are relaxed. This is often difficult when the knee is painful and swollen and the examination can be challenging. In order to obtain relaxation, the patient is asked to rest his or her head on a pillow with their arms by their sides. It may be useful to gently roll the thigh in and out to get the muscles to relax. Placing a pillow below the knee is often more comfortable for the patient if the injury is 'fresh'.

The basics of knee examination can be viewed on this video:
http://www.youtube.com/watch?v=Q3wbPtqhboM

In cases of suspected ACL injury the following tests will help with diagnosis:

Lachman test: (Figure 1) The knee is unlocked in 30° of flexion. The patient's heel rests on the couch. The examiner holds the patient's tibia with their thumb on the tibial tubercle. The examiner's other hand is placed on the patient's thigh a few centimetres above the patella. Placing your leg under the thigh can make it easier to control the femur in larger patients. The hand on the tibia applies a brisk anteriorly directed force to the tibia.

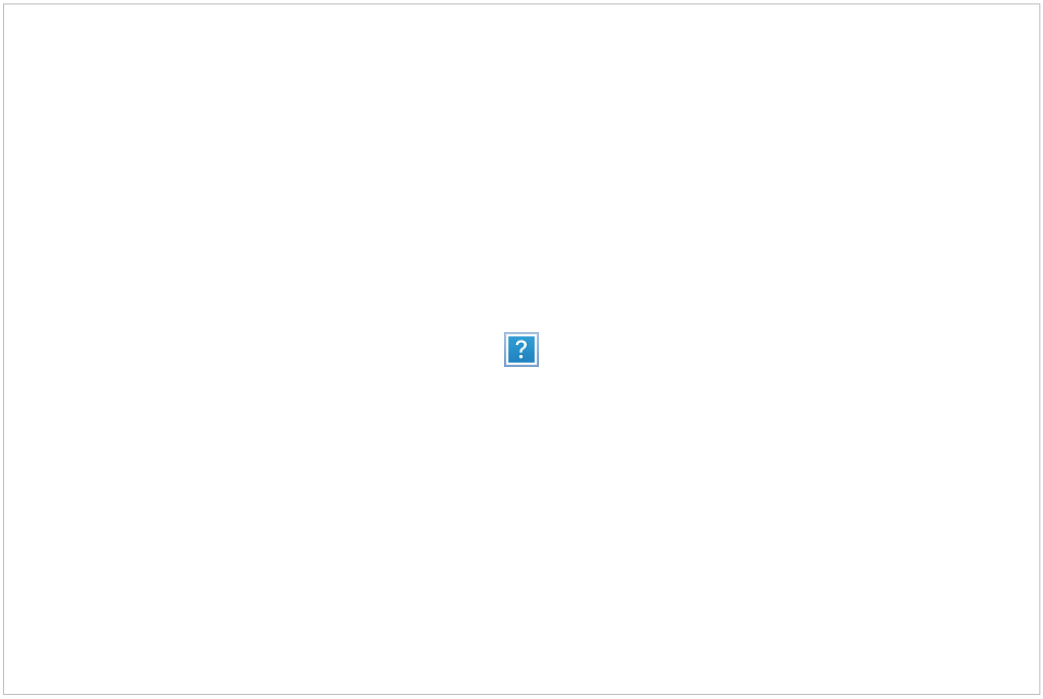

Figure 1. Lachman test

The quality of the endpoint at the end of the movement is described as either ‘firm’ or ‘soft’ and is always compared to the other knee. If the movement of the tibia on the femur comes to a sudden stop, this is described as a firm endpoint. A firm endpoint results from the sudden tensioning of the ACL. A soft endpoint almost always indicates a torn ACL.

Active resisted extension: In patients with bulky muscles or a large effusion, it may be difficult for the examiner to encircle the patient’s thigh with his or her hand. In such cases, the examiner may place a fist under the knee (which bends the knee to about 30°) hold the ankle against the couch with the other hand and ask the patient to lift the leg against resistance.

This resisted quadriceps setting will move the tibial tubercle forward before the tibia starts to rotate into extension. This is a useful screening test but takes some practice to appreciate the anterior translation of the tibia (which indicates the torn ACL).

Pivot shift: (Figure 2) Tests screening for a pivot shift were first described by M. Lemaire in 1968. Since then many such tests have been devised: A shift means that the ACL has torn. It is possible for the ACL to be deficient without a pivot shift occurring and recent research indicates that this may be due to a structure outside of the knee joint itself (see ‘Not all knee surgeries are the same’, MO 9 July)

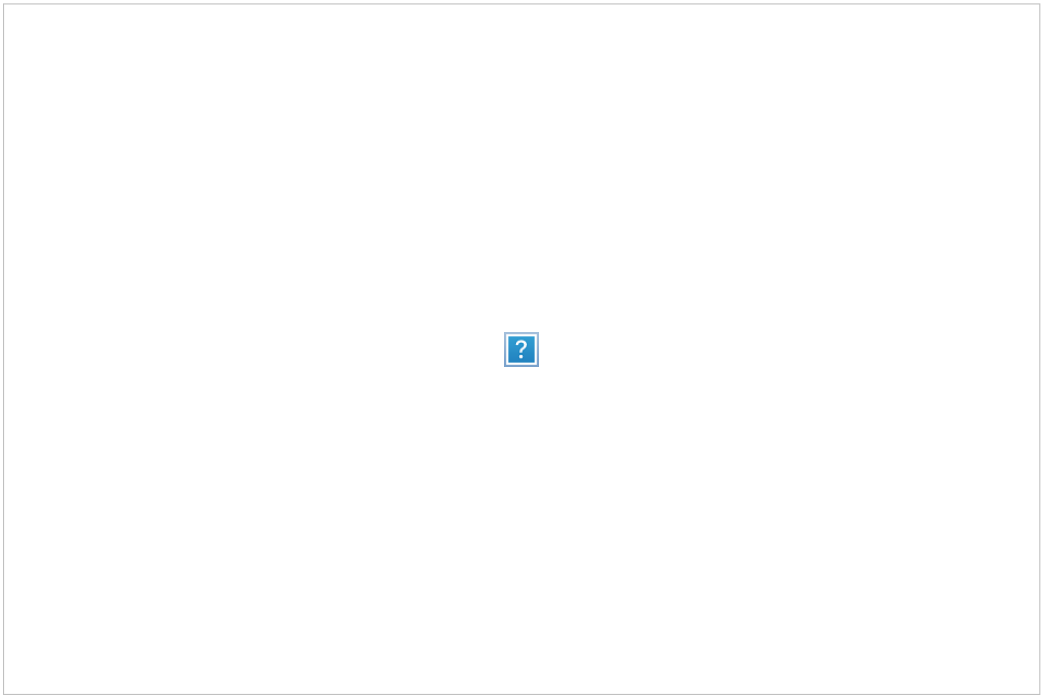

Figure 2. Pivot shift test

The pivot shift test of MacIntosh: “When I pivot, my knee shifts.” This is how a hockey player described his symptoms and so a test was devised to reproduce this sensation. It involves stress applied to the knee in valgus and flexion, with or without internal rotation.

Description of the test: The patient is positioned supine and you stand on the affected side. You use one hand to hold the patient’s foot in very slight internal rotation. With the other hand, you apply a valgus stress to the posterolateral aspect of the proximal calf.

At this point, flexion is started. The lateral tibial plateau will be seen to sublux forwards as the knee starts to bend.

When flexion progresses to about 30° the anterolaterally subluxed tibia will suddenly reduce or drop back into place.

This reduction is associated with a characteristic clunk, which the patient will readily recognize. (It is easiest to learn to perform this test on an anaesthetised patient).

Anterior drawer in 90° flexion or direct anterior drawer: (Figure 3) The examiner sits on the patient’s foot, which has been placed in a neutral position. The knee is in 90° flexion. The index fingers are used to check that the hamstrings are relaxed,

while the other fingers encircle the upper end of the tibia and pull the tibia forwards.

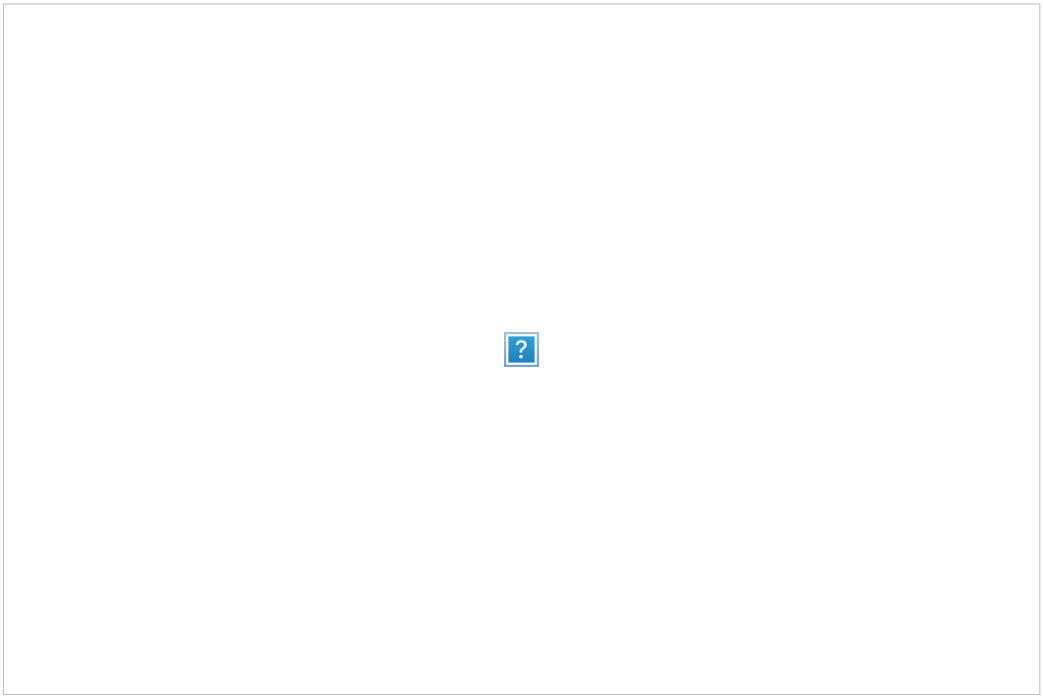

Figure 3. Anterior drawer test

If a direct anterior drawer is obtained, the ACL is torn. The ligament forms a wedge (in 90° flexion) preventing anterior tibial translation.

The finding of an anterior drawer is conclusive evidence of an ACL tear, however, not every ACL tear will be associated with a positive anterior drawer test.

These clinical tests are very sensitive and specific for an ACL tear when performed by an experienced examiner. A plain x-ray of the knee should always be obtained to exclude a fracture but confirmation of the clinical findings of an ACL injury will require an MRI scan.