

DIAGNOSIS & DIAGNOSTIC EQUIP

# Diagnosing Anterior Cruciate Ligament Tear

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I'm not a great skier, but I love to be on a snow-covered mountain and to experience winter and all its beauty. One of the more common ski injuries involves the knees, and it usually occurs when people try to ski and train above their abilities. Boots and bindings are so good now that the knees bear the brunt of falls. (Head injuries are also common, but some skiers are now wearing helmets.)

Of the injuries that occur in the knee, the anterior cruciate ligament is most commonly injured. A tear in this ligament usually occurs following a sudden valgus impact, accompanied by pain and swelling. On careful physical examination, experienced clinicians may be able to obtain most of the information required to make the diagnosis of an anterior cruciated injury. However, even an experienced examiner may have difficulty assessing the extent of the injury. A patient's pain and muscular spasm may prevent adequate examination.

There are several orthopedic tests evaluating an anterior cruciated injury, but Lachman's test is touted as the most specific and reliable, as far as orthopedic tests go. I generally prefer to examine the knee with an MRI study, since I can generally see the extent of the injury and determine how aggressive the treatment need be.

Injury to a cruciate ligament may not always cause pain. Rather, the person may hear a popping sound, and the leg may buckle when the person tries to stand. An MRI is very accurate in detecting a complete tear (97 percent accurate), but arthroscopy may be the only reliable means of detecting a partial tear.

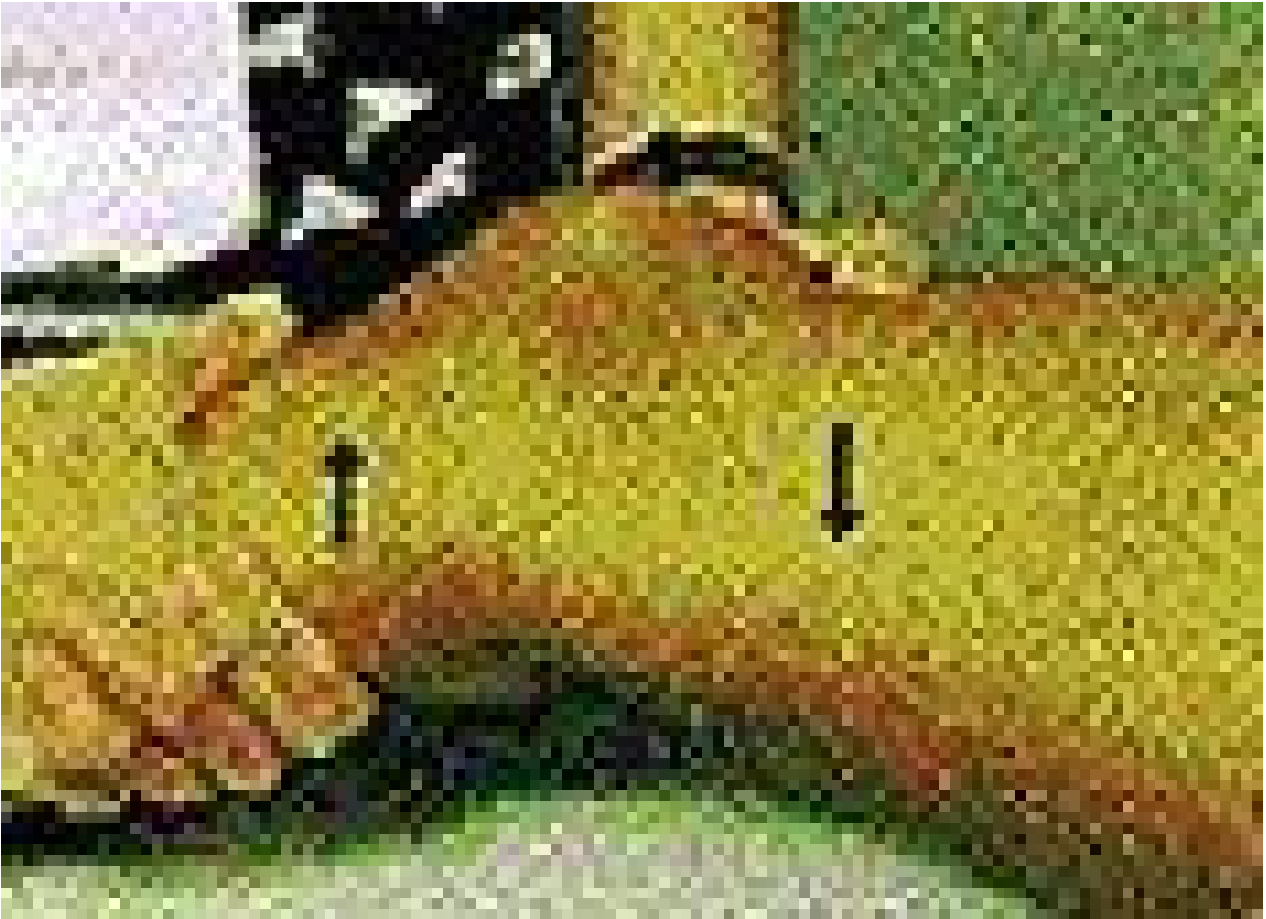


Figure 1: *Lachman's test of the right knee. The examiner used the right hand to place anterior force on the lower leg while simultaneously using the left hand to place posterior force on the distal thigh. A good end point should be felt. Hands are reversed to test the left knee.*

For an incomplete tear, the patient may respond to conservative treatment that should include an exercise program to strengthen surrounding muscles. A protective knee brace may also help patients during activity. For a completely torn anterior cruciate ligament in an active athlete and motivated patient, surgery is generally recommended. The surgeon may reattach the torn ends of the ligament, or reconstruct the torn ligament by using a grafted ligament from the patient (autograft), or from a cadaver (allograft). Although repair using synthetic ligaments has been tried experimentally, the procedure has not yielded better results than use of human tissue.

## Diagram of Cruciate ligaments:

(knee: anterior perspective, with joint partially flexed)

Bi = biceps femoris

Lcl = lateral collateral ligament

Pt = popliteus tendon

Pcl = posterior cruciate ligament

Mcl = medial collateral ligament

Acl = anterior collateral ligament

Acl = anterior collateral ligament

Sa = sartorius

Gr = gracilis

St = semitendinosus

Jc = joint capsule

From Figure 2-1 page 26 *MRI of the Knee*, Munk and Helms Aspen Publication 1992

B

Lc1

Pt

Pc1

Mc1

Ac1

Je

Sa

Gr

St





Figure 2: *Anterior cruciate avulsion. The anterior cruciate has been avulsed from its femoral avulsion and lies inferiorly on the tibial plateau (arrows).*

One of the most important elements in a patient's successful recovery after cruciate ligament surgery is following an exercise and rehabilitation program for four to six months. Successful surgery and rehabilitation will allow the patient to return to a normal full lifestyle.





*Distal anterior cruciate avulsion. On the left, a normal anterior cruciate is seen. The anterior band is shown by the straight arrow, the posterior band by the curved arrow. On the right, the proton image (above) and the T2 weighted (below) images show partially attenuated anterior cruciate ligaments, partly torn from their distal insertions. Far right 2mm thick 3DFT image from a different patient shows avulsion at the distal insertion (curved arrow).*

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