



# Hughston Health Alert

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REVIEWING THE KNEE

VOLUME 20, NUMBER 4 - FALL 2008

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- Anterior Cruciate Ligament Injuries
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## In Perspective: Anterior Cruciate Ligament Tears

In 1992, Dr. Jack C. Hughston (1917-2004), one of the world's most respected authorities on knee ligaments surgery, shared some of his thoughts regarding injuries to the ACL.

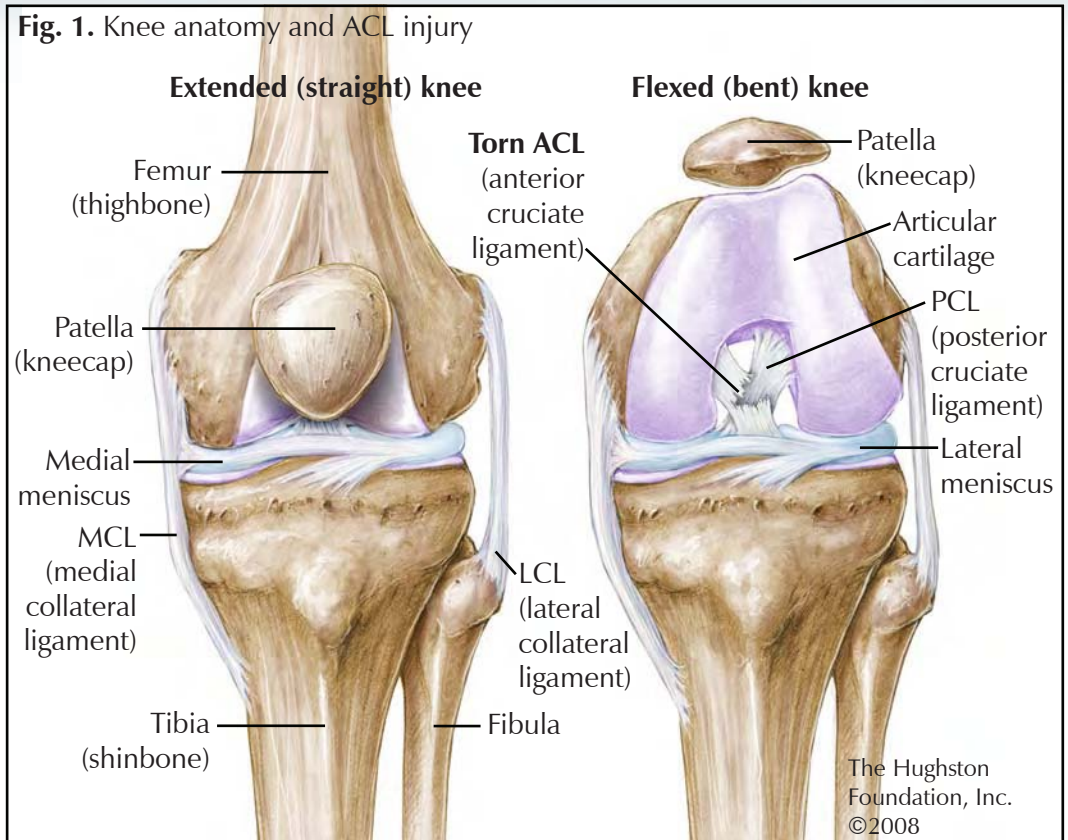
"You tore your anterior cruciate ligament." On hearing your physician speak those words, you are filled with a sense of dread. You envision the end of your athletic life, even recreational sports.

Today, a torn ACL (Fig. 1) has almost become a household word. Through friends, newspapers, television, sports magazines, and even our physicians, we are inundated with the hype that the knee joint will deteriorate and become arthritic if the ACL is not operated on as soon as possible.

You have been convinced that to save your knee you must have an operation immediately to repair the ligament. Your surgery is scheduled for the following day. You are scared.

But there is an old truism in orthopaedic surgery that says, "no knee is so bad that it can't be made worse by operating on it."

For many years, torn ACLs were treated as an emergency and were operated on immediately, even before the initial pain and swelling of the injury subsided.



The trauma of the injury, plus the trauma of the operation added insult to injury, often resulting in the formation of scar tissue. Sometimes the results were stiff, painful knees without normal motion or function. The result was knees that caused the patient disability, even with simple walking.

Over the years, I have had to try to correct these problem knees. Those that were less stiff often responded to concentrated rehabilitation exercises and regained acceptable functional status. Others, however, required surgical release, and some had to have multiple operations to remove scar tissue to loosen the joint.

Isn't there an alternative to this all too common scene? Another treatment approach that isn't as frightful? The Answer is a definite "YES"! In many instances, nonsurgical treatment is successful. In other cases, surgery is necessary. Immediate surgery may be needed to repair other ligaments and torn menisci in the knee. But if only the ACL is torn, immediate repair is not necessary.

If the knee is shown to be loose during the physical exam, then most likely other ligaments in addition to the



ACL have been damaged (Figs 2-3). These other ligaments, when torn badly enough, may need to be surgically repaired within the first week. After they have been repaired and after a good rehabilitation program of six or more months, the decision to reconstruct the ACL can be made. If, at this time, there is a functional need for a ligament replacement, the operation can be done without the risk of subsequent stiffness and disability that can result from emergency repairs of the ACL.

If only the ACL is torn (Figs 4-5), it may be difficult for your physician to confirm any looseness or instability of the knee joint by physical exam. I have seen cases where the ACL tear was only diagnosed by MRI or some other form of imaging study, and based on those findings, the patients were advised to have immediate surgery to repair the ligament. Be wary of this sort of advice. If your knee is not loose enough for your physician to be able to physically demonstrate the instability to you, then you should get a second opinion before having surgery.

In other cases, when the ACL and other ligaments are damaged and there is significant joint instability, surgery can be planned when the pain and swelling have subsided and knee motion has returned to almost normal. This usually occurs six weeks or more after the injury. In the meantime, you will have been performing prescribed daily rehabilitation exercises and using crutches to aid with your walking. When the knee is re-examined, there will be less discomfort and your physician will be able to perform a better evaluation. If the looseness is severe enough, an ACL reconstruction can be performed and the chance of complications is less than with an emergency operation.

The important thing to remember in all of this is that you don't need to be frightened that your knee will be ruined forever if the torn ACL is not repaired immediately. On the contrary, a torn ACL by itself is not a reason for emergency surgery. Rather, it is time for calm, conservative management and appropriate follow-up. If this does not seem to be the approach your physician is taking, don't hesitate to get a second opinion.

*Jack C. Hughston, MD  
(1917-2004)*

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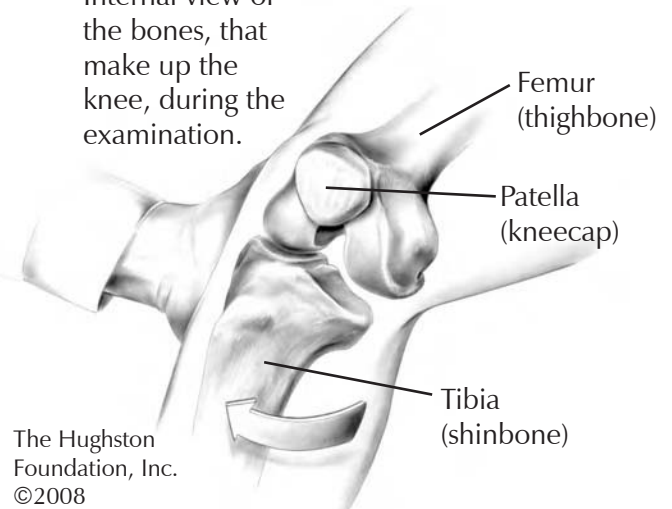
Referenced  
*Hughston JC. Knee Ligaments Injury & Repair. Columbus: GA; The Hughston Foundation Inc; 1993:102-110.*

**Fig 2.** Examination performed to test medial (inside) ligament damage.



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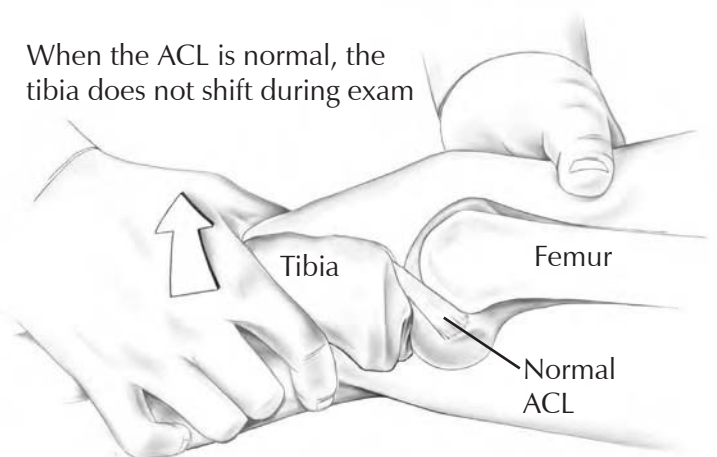
Internal view of the bones, that make up the knee, during the examination.



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**Fig 4.** Examination performed to test if the ACL is normal.

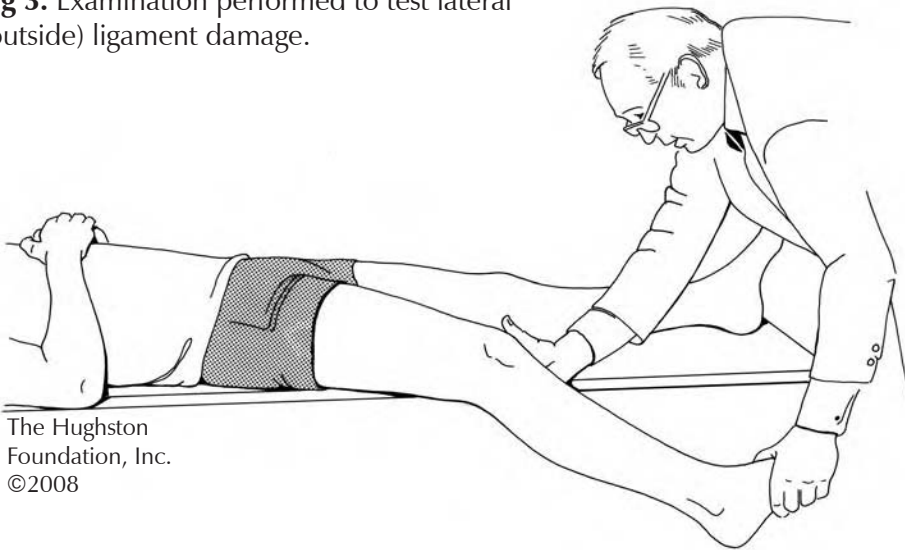
When the ACL is normal, the tibia does not shift during exam



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**Fig 3.** Examination performed to test lateral (outside) ligament damage.



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## Knee Ligament Injuries: The ACL

In the last decade, much attention and publicity has been focused on the treatment of injuries to one of the major knee ligaments—the anterior cruciate ligament, or ACL. Unfortunately, so much attention has been concentrated on injury to this one structure that attention has been drawn away from other important issues regarding knee ligament surgery. For this reason, we find the public is often confused to learn there may be many and varied approaches to treating a “torn ACL.”

Just as a “soft drink” may not always mean a “Coke,” the term “an ACL tear” may be used to describe a whole host of injuries. In fact, much of the research and study carried out over the years at the Hughston Sports Medicine Foundation has

been devoted to the patterns of injuries to knee ligaments. What our research and that of others has shown us is that a knee injury in which the ACL is torn without any other ligaments being torn is quite rare (1% to 2%). However, “a torn ACL” has become the catchall term used to describe most knee ligament injuries despite their complexity.

The appropriate treatment for any torn ligament depends on a variety of factors, such as the severity of the injury, the age of the patient, the demands a person places on his or her knee, the patient’s occupation, and the presence of other associated diseases or conditions (e.g., arthritis). Probably one of the most important factors used to determine the appropriate treatment for a knee ligament tear, however, is the pattern of injury to all the ligaments.

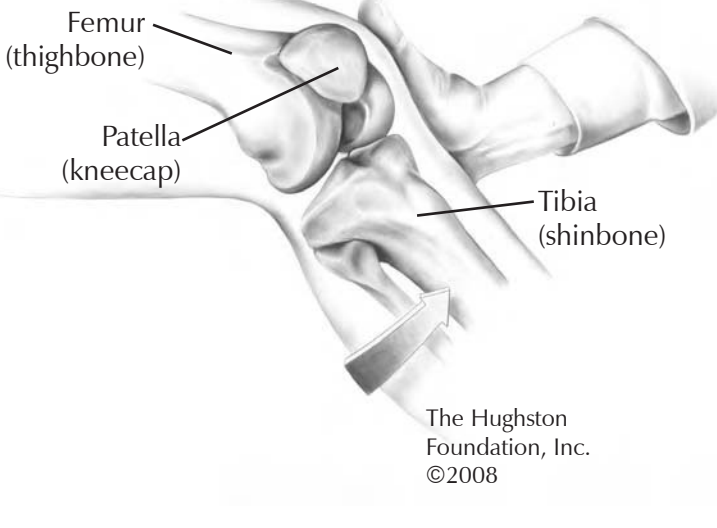
The decision to embark on any given course of treatment should come only after the physician has performed a very thorough examination of the injured knee and has formed a strong opinion as to exactly what has been damaged underneath the skin. This information coupled with the other factors listed above allows patients and physicians to arrive at a course of treatment that is “tailor made” for each patient.

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Reprinted from the *Hughston Health Alert* Volume 4, Number 4, Fall 1992

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*Hughston JC. Knee Ligaments Injury & Repair.* Columbus: GA; The Hughston Foundation Inc; 1993:102-110.

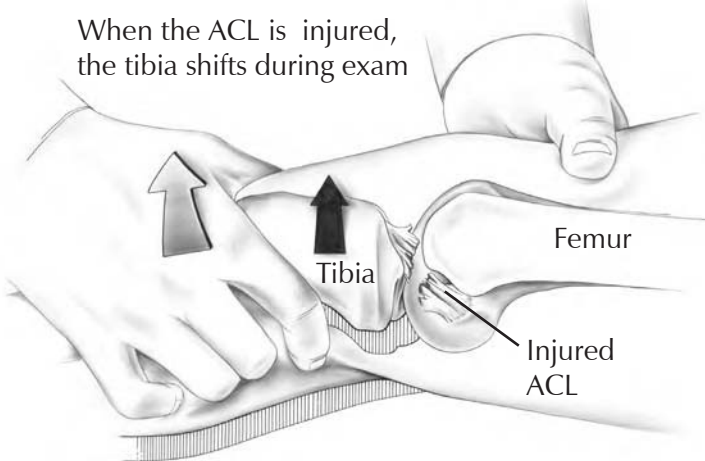
Internal view of the bones, that make up the knee, during the examination.



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**Fig 5.** Examination performed to test if the ACL is injured.

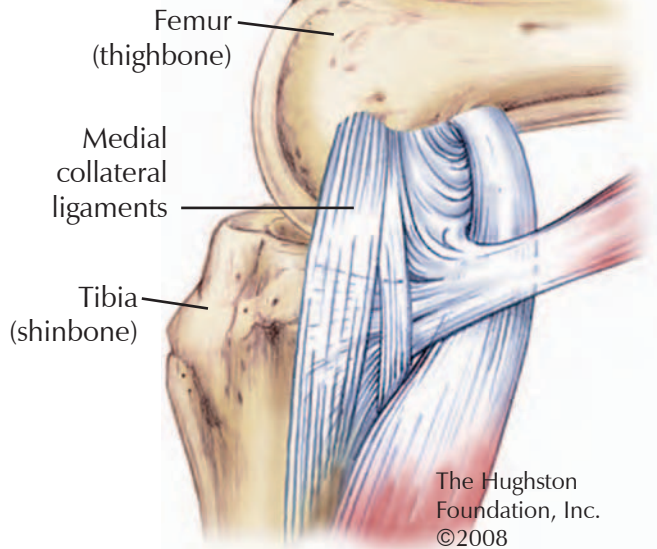
When the ACL is injured, the tibia shifts during exam



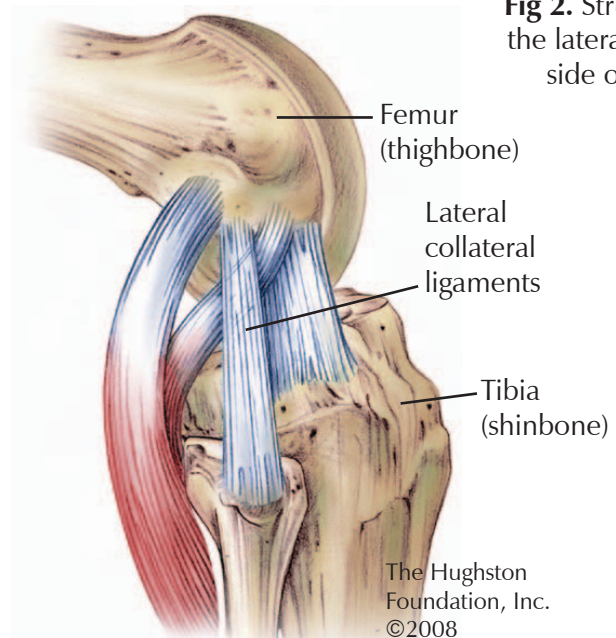
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## Anterior Cruciate Ligament Injuries

**Fig 1.** Structures on the medial (inside) side of the knee



**Fig 2.** Structures on the lateral (outside) side of the knee



The knee joint provides mobility and stability for your legs during walking and running activities. However, these functions can be compromised if the knee is injured. With the increased popularity of and participation in sports and fitness activities, the number of knee injuries has increased. The severity of these injuries varies from mild strains (injury to a muscle or its tendon, which connects muscle to bone) or sprains (injury to a ligament, which connects two bones) to complete tears of the ligaments and other soft tissue structures of the knee.

### Anatomy

The knee joint comprises the cartilage-covered surfaces of three bones: the femur (thigh bone), the patella (knee-cap), and the tibia (shinbone). Four main ligaments help stabilize the knee; the medial (inner side) (Fig. 1) and lateral (outer side) (Fig. 2) collateral ligaments resist side-to-side motion, and the anterior (front) and posterior (back) cruciate ligaments resist forward and backward motion, respectively (Fig. 3). The ligaments work together with the medial and lateral menisci (crescent-shaped cartilage) (Fig. 4) and the leg muscles to stabilize the joint and allow the knee to generate and deliver the large quantities of power required for activities.

The anterior cruciate ligament (ACL) lies inside the knee joint (Fig. 5). It consists of strong fibers (or collagen) that function like the strands of a rope or cable. This ligament provides most of the support that prevents the tibia from slipping forward against the femur.

### Mechanism of injury

When it functions normally, the ACL can handle large forces with little or no problem. If, however, the knee receives forces of a high magnitude and the muscles cannot help absorb the stress, the ACL may take all the load, and it may tear. High-magnitude loading can occur during a slip and fall, sudden change in direction, landing off balance while jumping, or hyperextension of the knee (Fig. 6). When the ligament tears, it generally ruptures like a rope, and the knee momentarily slides out of place.

### Signs of injury

Most people who have torn their ACL say that they heard a "pop" in their knee as the ligament tore. Usually, the knee swells within the first hour after injury and is quite painful. The injured person cannot continue his or her activity.

### Treatment

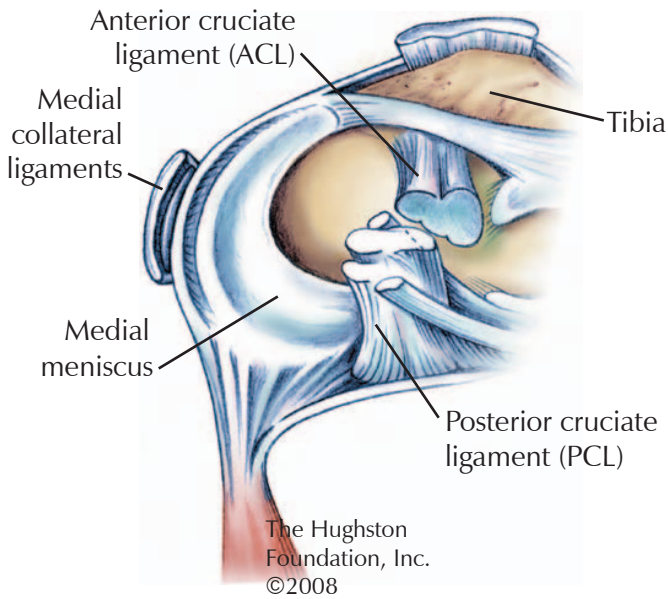
Treatment for an acute (recent) ACL tear involves icing the knee and seeking prompt medical attention. Do not try to walk on the knee without assistance. You must protect the knee against further injury, which will likely occur without appropriate treatment.

A doctor who is familiar with knee injuries can confirm the diagnosis of an ACL injury through a physical examination. He or she will tailor your treatment to the severity of the instability and to the types of activities in which you plan to participate.

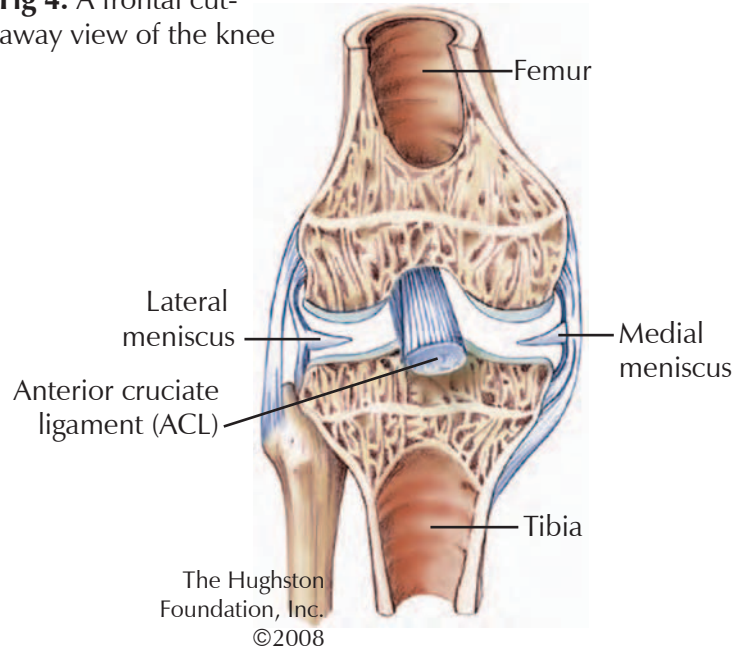
If your activities will place only low demands on



**Fig 3.** Bird's eye view of the knee (femur removed)



**Fig 4.** A frontal cut-away view of the knee



your injured knee, you may not need surgery. You may have good results with nonoperative treatment, which may involve using crutches, wearing a knee brace, and participating in physical therapy. If you plan to have an active lifestyle, you probably will need surgery. Through surgical treatment, the doctor can rebuild or reconstruct the ligament to recreate a maximally stable joint that can meet the demands of work and play.

**How can you prevent these injuries?**

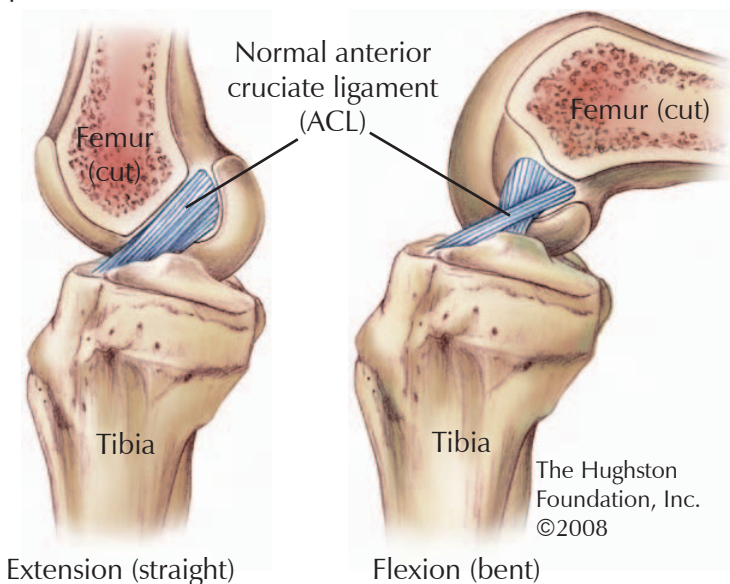
Unfortunately, completely protecting your knee against ACL injury is impossible. However, if you have

a strenuous job or play sports hard, then strengthening and conditioning programs are your best ally. So, before heading to the mountains for a snow-skiing trip or making your debut on the basketball court, talk to a doctor, physical therapist, or athletic trainer to find out how to best prepare for the demands you will soon face.

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**Fig 5.** Lateral view of a normal knee - portion of femur removed



**Fig 6.** Lateral view of a knee with ACL torn - portion of femur removed

