

Weekly Radiology Review: December 9, 2008
MRI Anterior Cruciate Ligament (ACL) Tear

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Red Arrow demonstrates the normal position of the ACL (which is not seen due to complete rupture/tear)

Findings: There is a complete tear of the Anterior Cruciate Ligament (ACL). There is a very large joint effusion. The Posterior Cruciate Ligament, Medial Collateral and Lateral Collateral Ligaments are all intact. The menisci are intact with no tearing.

The ACL and PCL cross each other inside the knee forming an "X." This is why they are called the "cruciate" (cross-like) ligaments. The main function of the ACL is to provide stability to the knee and minimize stress across the knee joint:

- It restrains excessive forward movement of the lower leg bone (the tibia) in relation to the thigh bone (the femur).
- It limits rotational movements of the knee.

Brief Overview: Anterior cruciate ligament tears are a very common injury in basketball, football, hockey, skiing, skating, soccer (and other field sports) due to the enormous amount of pressure, weight, and torque the knee must withstand. Usually the injury occurs when someone tries to rapidly change direction with the leading leg out, twisting the knee; this is usually followed by a loud popping sound. Generally, if the knee is locked, and the leg is firmly planted, then there is a much greater risk of injury. Women are more likely to suffer an ACL tear than men (approx 7-8 times more likely) The cause for this is not completely understood, but it is believed to be due to differences in anatomy and muscular function. Adults will usually tear their ACL in

the middle of the ligament (mid-substance) or pull the ligament off the femur bone. These injuries do not heal by themselves. Children are more likely to pull off their ACL with a piece of bone still attached -- these injuries may heal on their own, or they may require an operation to fix the bone. When an ACL tear is suspected, an MRI may help confirm the diagnosis. This test may also help evaluate other knee injuries, such as to the other ligaments or cartilage. Some people are able to live and function normally with a torn ACL. However, most people complain that their knee is unstable and may "give out" with attempted physical activity. Un-repaired ACL tears may also lead to early arthritis in the affected knee.

Treatment for an ACL injury can either be nonsurgical or surgical depending on the extent of the injury and the expectations of the patient. Non-surgical options may be used if the knee cartilage is undamaged, the knee proves to be stable during typical daily activities, and if the patient has no desire to ever again participate in high-risk activities (activities involving cutting, pivoting, or jumping). If the non-surgical option is recommended, providers may recommend a physical therapy program, wearing a knee brace, or adapting some typical activities. If physical therapy is recommended, it will be used to strengthen the muscles around the knee to compensate for the absence of a healthy ACL. Physical therapy will focus on strengthening muscles such as the hamstring, quadricep, calf, hip, and ankle. This therapy will help to re-establish a full range of motion of the knee. With the use of these non-surgical options a patient can expect to be back to most normal daily activity within one month.

Surgical options may be used if the knee gives way during typical daily activities, showing functional instability, or if the patient is unable to refrain from participate in high-risk activities ever again. Reconstructive surgery may also be recommended if there is damage to the meniscus (cartilage). This surgery is completed using arthroscopic techniques. There is also an option for an autograft to be done using a chosen tendon (hamstring, patella tendon). There however are pros and cons to the surgical treatment, and consideration of possibly complications must be thought through and discussed pre-operatively. If the surgical treatment is chosen there are also rehabilitation requirements. Physical therapy must be completed in three phases after the surgery is completed. With the use of the surgical treatment option, rehabilitation included, one can expect to be returning to their previous and desired level of activity in six to nine months