

DIAGNOSIS OF ACL TEARS IN MRI

Introduction

- The knee is the most common injured joint. MRI let's radiologists diagnosis injuries to the knee more proficiently. MRI shows better detail, especially of soft tissues. Since there are many components to the knee, MRI gives us a better visualization of an injured ACL. Magnetic resonance imaging is a modality that uses radio waves instead of ionizing radiation. It is a way less invasive technique compared to arthroscopy.

MRI vs. Arthroscopy

- MRI creates better images of soft tissues because it is highly sensitive. It is a valuable tool in anatomic reconstruction because it can give surgeons an accurate planning prep with surgery. MRI can give a measurement of the ACL tear. Arthroscopy is a much more invasive procedure that allows surgeons to physically visualize the knee joint by inserting an arthroscope into the knee joint and display the anatomy on a scree. According to Archives of Iranian Medicine (2013), "Magnetic resonance imaging (MRI) of the knee joint has often been regarded as a noninvasive alternative to diagnostic arthroscopy."
- Arthroscopy would only be recommended if an ACL tear doesn't respond to nonsurgical treatments such as physical therapy, medication, or injections. MRI has more support and is demanded more because of its accuracy and minimal risk, unlike invasive procedures like arthroscopy. MRI is the appropriate diagnostic tool with clinical decision making on ACL ruptures.

Additional Imaging

- Most ACL tears are complete. Partial tears can be harder to diagnose with standard protocol MRI scans alone. To determine if there is a partial or complete tear other additional imaging is used. Oblique sagittal and oblique coronal imaging is used to demonstrate tears more clearly by giving us another visual of the anatomy. These additional imaging techniques improve the diagnostic accuracy of partial tears. The advantages of these techniques are faster scanning times and comfortability of the patient.



Image 2. MRI of knee demonstrating the ACL in a sagittal-oblique view.

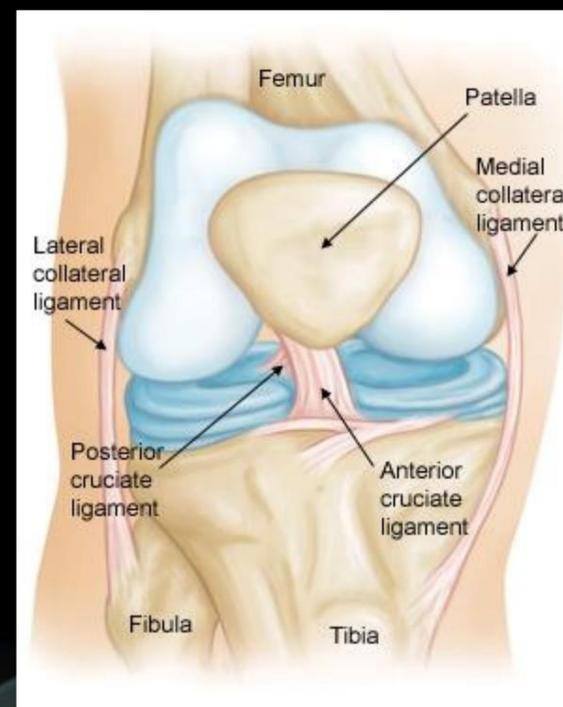


Image 1. Normal anatomy outline of the knee.

Anatomy of the Knee

- The knee is formed by three joints; the femur, tibia, and patella. These bones are connected by ligaments such as the ACL, PCL, LCL, and MCL. The two collateral ligaments stabilize sideways motion of the knee joint. The two cruciate ligaments stabilize the knee from over flexion and hyperextension motions. Since MRI gives us better images of soft tissues, we can see these ligaments and injuries to these ligaments better. These ligaments are in close location to each other so multiple injuries are very common with an injured knee.
- According to the American Academy of Orthopaedic Surgeons (2018), "About half of all injuries to the anterior cruciate ligament occur along with damage to other structures in the knee, such as articular cartilage, meniscus, or other ligaments."

Conclusion

- ACL tears are complex injuries. The knee is the most frequently studied joint in MRI. It develops better detail of soft tissues with extra techniques to allow radiologist to better diagnose and allow surgeons a plan for reconstruction. MRI is the modality of choice to accurately diagnose these injuries.

References

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