

## SMRT Student Scope Submission

### Title and Author

☐

Title: ACL and Meniscus Repair

Author: Jeffrey Blair

Supervisor/Education Coordinator: Adam Stevens

Affiliation: University of Nebraska Medical Center, CT/MRI

Date of Submission: May 4, 2007

### Introduction or Patient History

A 17 year old male was referred to St. Avera's Hospital in O'Neill, Nebraska after sustaining a knee injury during a football game. The patient claimed that the contact made by an opposing player was on the lateral portion of his left knee. During the process, he felt a sudden pop in his joint. The patient underwent physical therapy for the next couple of weeks in attempt to strengthen the joint. The knee was described as feeling "loose" and "unstable" even after therapy. The patient's referring doctor thought that it was time to get an MRI of the patient's knee to aid in the diagnosis of the possible condition. Magnetic Resonance Imaging shows detailed pictures of the tendons, ligaments and bones allowing easy visualization inside of the knee joint. The use of MRI enables physicians to make adequate decisions of whether or not an operation is the appropriate treatment.

☐

### Patient Preparation and Scan Set up

On arrival, the patient was asked to fill out a screening form that helps in regulating the compatibility of the patient to the magnet. The MRI technologists also screened the patient for any contraindications as a precaution and then had the patient change into a gown to ensure that no ferrous objects were mistakenly left on the patient. After the screening, the patient was taken to the mobile 1.5 T GE superconducting magnet and positioned for the exam. A 4 channel multi receiver coil was placed around his knee and sponges were inserted to help limit motion. Also, ear plugs were given for noise reduction and a squeeze ball was given for patient communication.

☐

### MR Imaging Parameters

A total of five sequences were performed on this patient's left knee to look for possible rupture of the ligaments or menisci.

<u>Sequence</u> <u>Matrix</u>	<u>FOV</u>	<u>Slices</u>	<u>TR</u>	<u>TE</u>	<u>Spacing</u>
<u>NEX</u>					
Axial FSE – PD 256 X 192      4	14	21	3500	20	4 skip 1
Sagittal FSE – T1 256 X 192      4	14	24	400	10	4 skip .4
Sagittal FSE – PD 256 X 192      4	14	24	3000	15	4 skip .4
Sagittal FSE – T2 256 X 192      4	14	24	3000	97	4 skip .4
Coronal FSE – PD 256 X 192      4	14	24	3200	15	4 skip .4



### Findings and Discussions

The results of the knee MRI demonstrated an increase in fluid brightness in the medial meniscus most likely representing a tear and also showed that the Anterior Cruciate Ligament was ruptured. The type of meniscus tear is called a bucket handle tear, and probably had been the cause of the pain when the patient had tried to straighten the knee. The rupture of the ACL explained what caused the knee to feel “loose” seeing how the ACL primarily stabilizes the femur’s connection to the tibia. These symptoms aided in the diagnosis of the problem because the doctor realized that under the conditions, the knee was most likely damaged through the ligaments and not a break in the bone.



### Conclusions

When studying this case I learned that ACL ruptures and menisci tears are very common. There were over 95,000 ACL tears last year alone. Athletes involved in pivoting or contact sports are shown to be the most accident prone with knee injuries. One study showed that women have a higher incident rate than that of men for tearing the ACL. Perhaps this is due to the difference of the muscular make-up or just the activities between the two. It was interesting reading some of the different types of ways to repair knee ligaments, especially the ACL. The preferred procedure is to reconstruct the ACL using a portion of the patient's patella-tendon. This technique allows for relatively non-invasive incisions to place the patella-tendon graft, helping to keep infection low. The small incisions to see inside of the knee capsule, also known as arthroscopy, help for accurate positioning of the graft which, in turn, helps with the range of motion after surgery. Overall, patients are able to return to their daily activities quickly.



### References

Jaksha, Jonathan A. MRI examination dictation, staff radiologist. The Nebraska Medical Center. 07 June 2006.

Cross, M.J. (1998). Anterior cruciate ligament injuries: treatment and rehabilitation. In: Encyclopedia of Sports Medicine and Science, T.D.Fahey (Editor). Internet Society for Sport Science: <http://sportsci.org>. 26 Feb 1998.  
<http://www.sportsci.org/encyc/aclinj/aclinj.html#5>

Allen, C. R. ACL Injury: Should it be fixed? American Academy of Orthopaedic Surgeons (Sept 2005):  
[http://orthoinfo.aaos.org/indepth/thr\\_report.cfm?Thread\\_ID=14&topcategory=Knee#anat](http://orthoinfo.aaos.org/indepth/thr_report.cfm?Thread_ID=14&topcategory=Knee#anat)

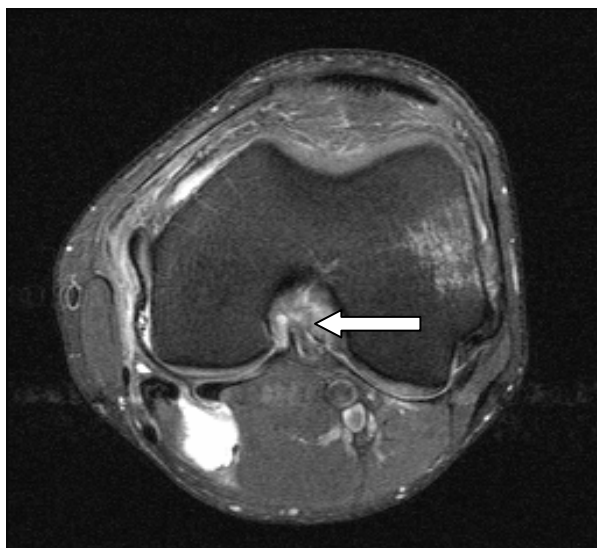
[http://www.stoneclinic.com/acl\\_reconstruction\\_surgery.htm](http://www.stoneclinic.com/acl_reconstruction_surgery.htm)



## Images



Sagittal T-1 MRI of knee with ACL rupture



Axial PD F.S. MRI of knee with ACL rupture