THE KNEE: MR Imaging

Primary Care Approach To
Treating The Injured Athlete

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Musculoskeletal Imaging

Disclosures

- No disclosures

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II. Imaging Modalities (very brief overview)

- XR, CT, US, MRI

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Why Imaging?

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Modalities: XR

Modalities: CT

Modalities: US

http://www.ultrasoundpaedia.com/uploads/53003/ufiles/knee/normal/med-knee-jt-normal-hl.jpg

Modalities: MRI

- ***based on the magnetic behavior of H atoms in tissues when placed in a magnetic field and excited by radiofrequency pulses***
- Depending on pulse sequence, tissues will show up as black, white, and everything in between
  - T1, T2, Proton Density (PD)
- T1: fluid black, fat bright, muscle intermediate, tendons and ligaments dark, bone bright
- T2: fluid bright, fat bright or dark (FS), muscle intermediate or darker, tendons and ligaments dark, bone bright or dark (FS)

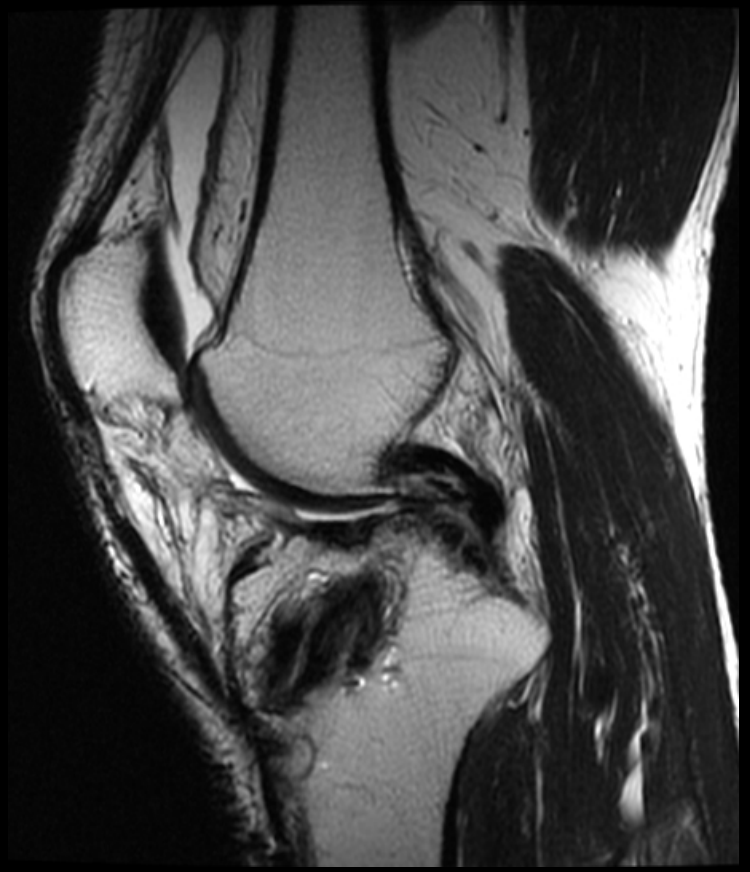
MRI knee protocol

Sagittal T1

Sagittal FS PD

MRI knee protocol

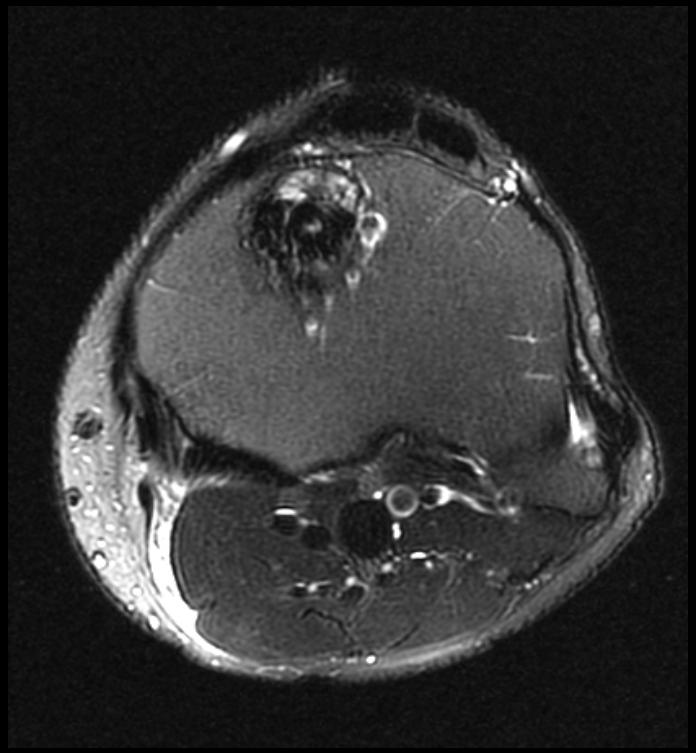
Sagittal 3D GRE



Sagittal T2

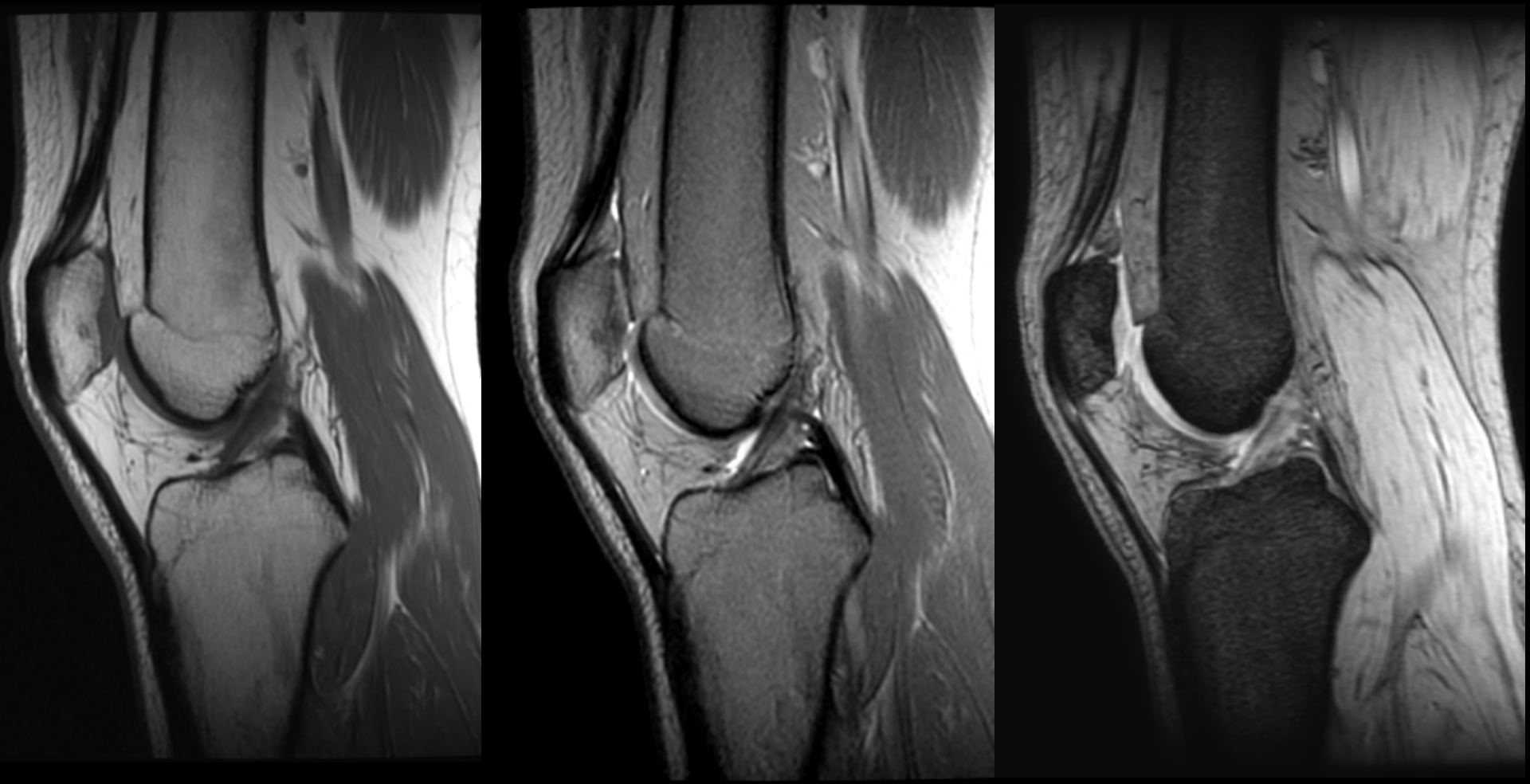
MRI knee protocol

Coronal FS T2



Axial FS T2

Knee anatomy: ACL & PCL, plus



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Knee anatomy: ACL & PCL, plus

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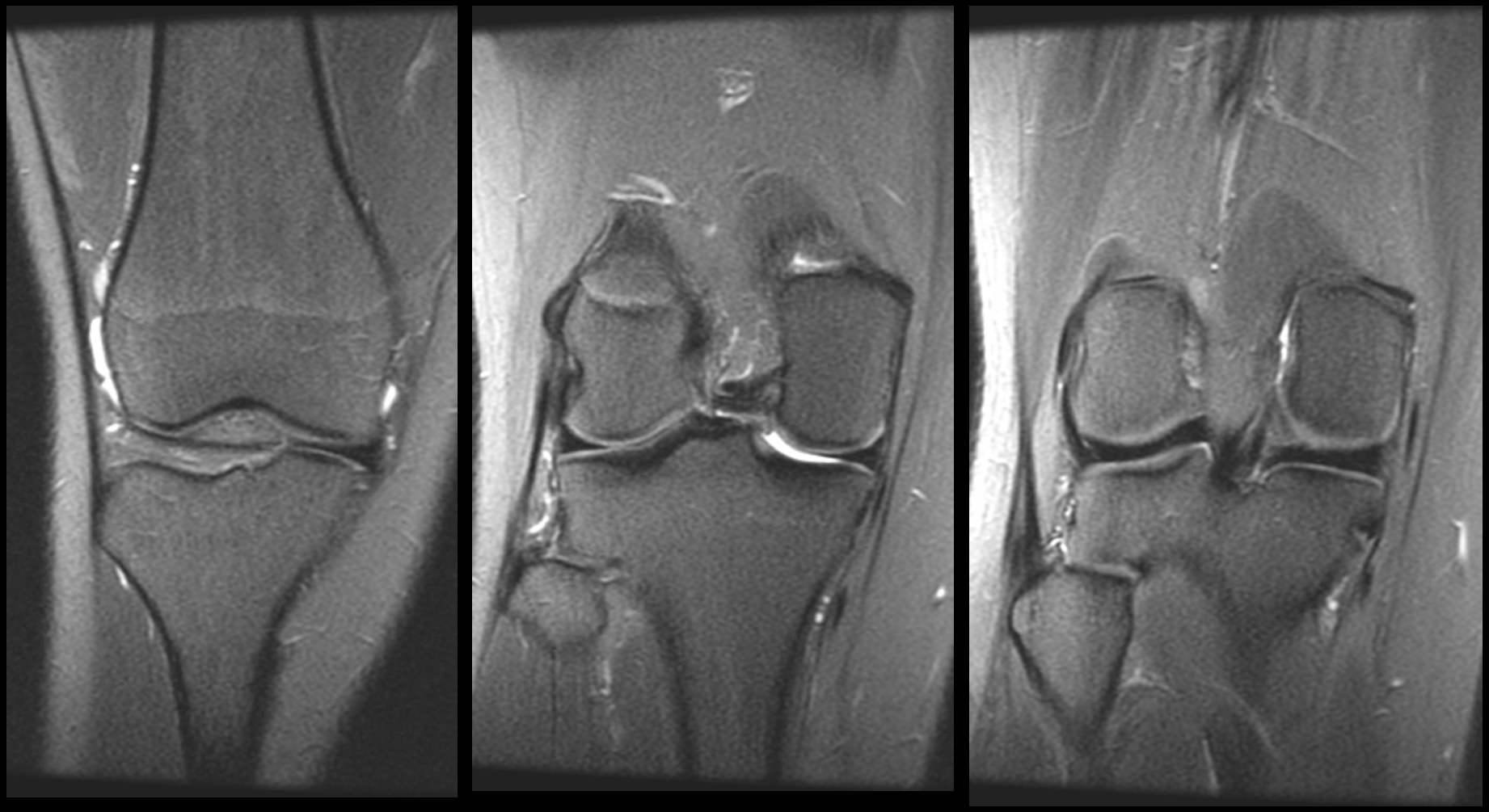
Knee anatomy: ACL

Knee anatomy: ACL bundles

Knee anatomy: ACL bundles

Knee anatomy: MCL

Knee anatomy: LCL complex



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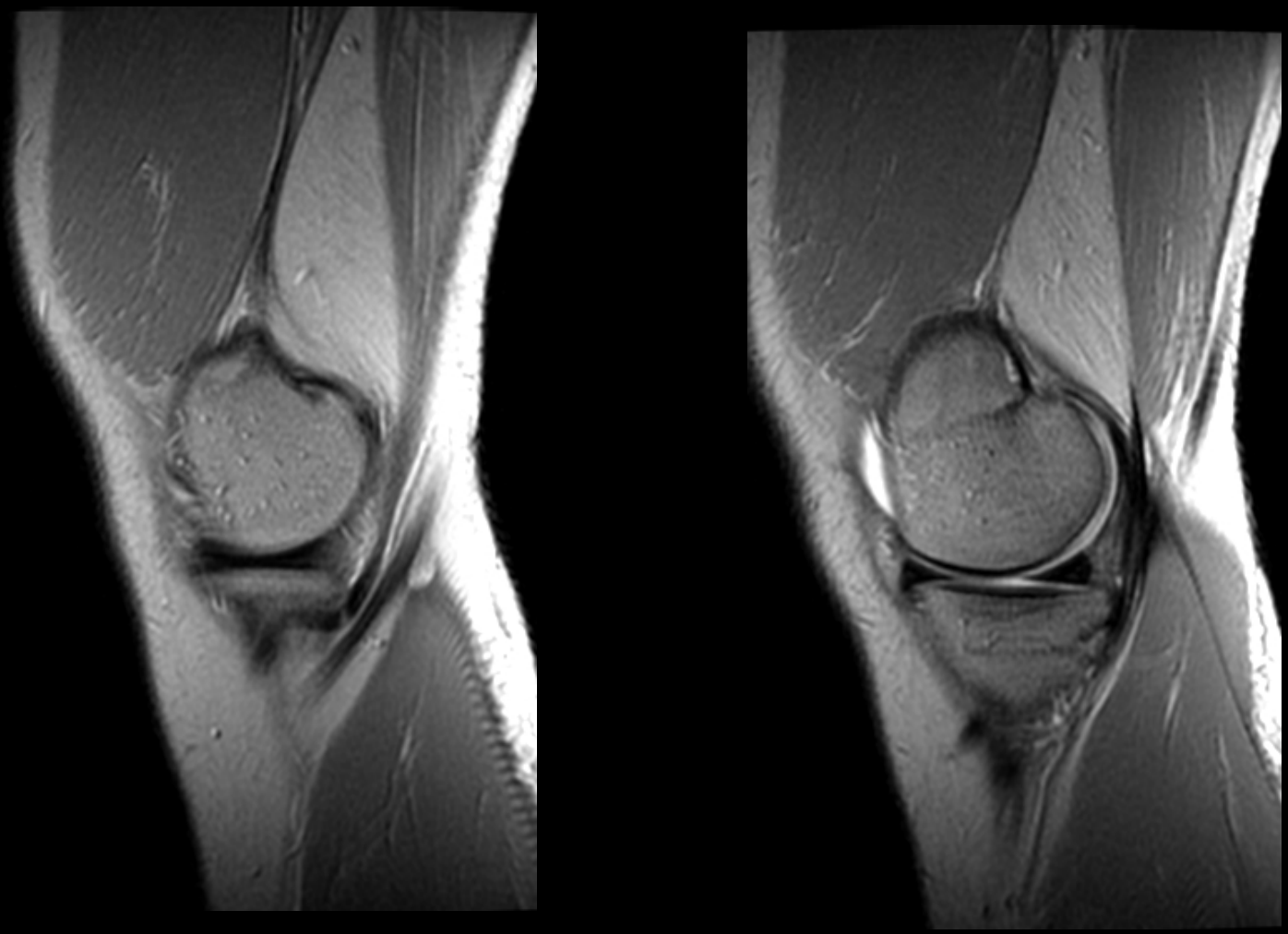
Knee anatomy: popliteus tendon

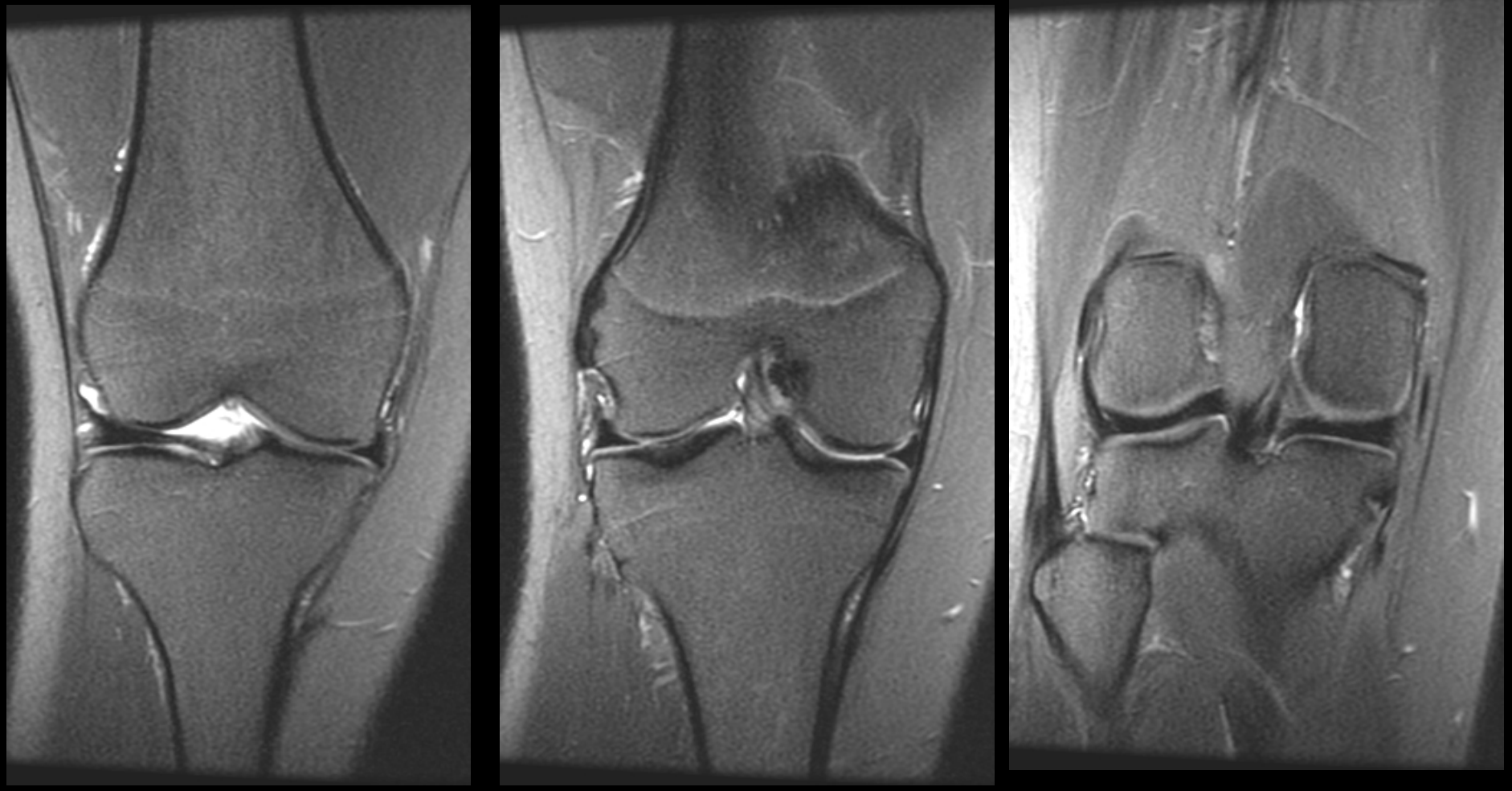
Knee anatomy:
EM & retinacula & HFP

Knee anatomy: lateral meniscus

Knee anatomy: medial meniscus



Knee anatomy: menisci



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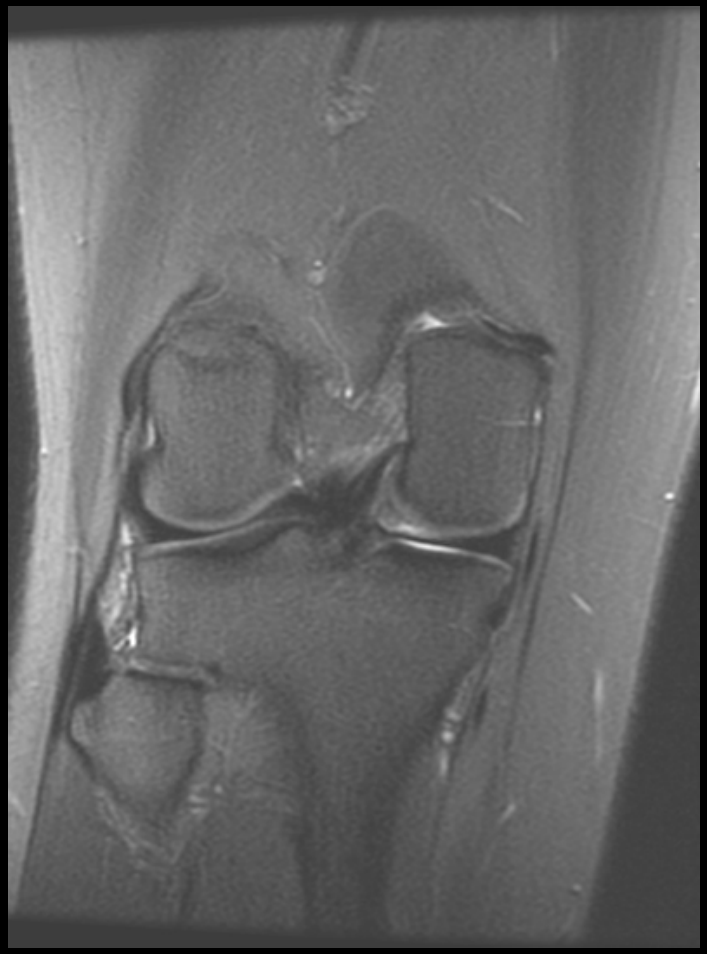
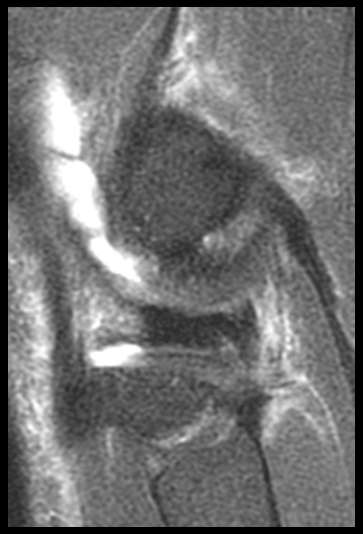
Knee anatomy: articular cartilage

Knee anatomy: articular cartilage



Knee anatomy variant: discoid lateral meniscus

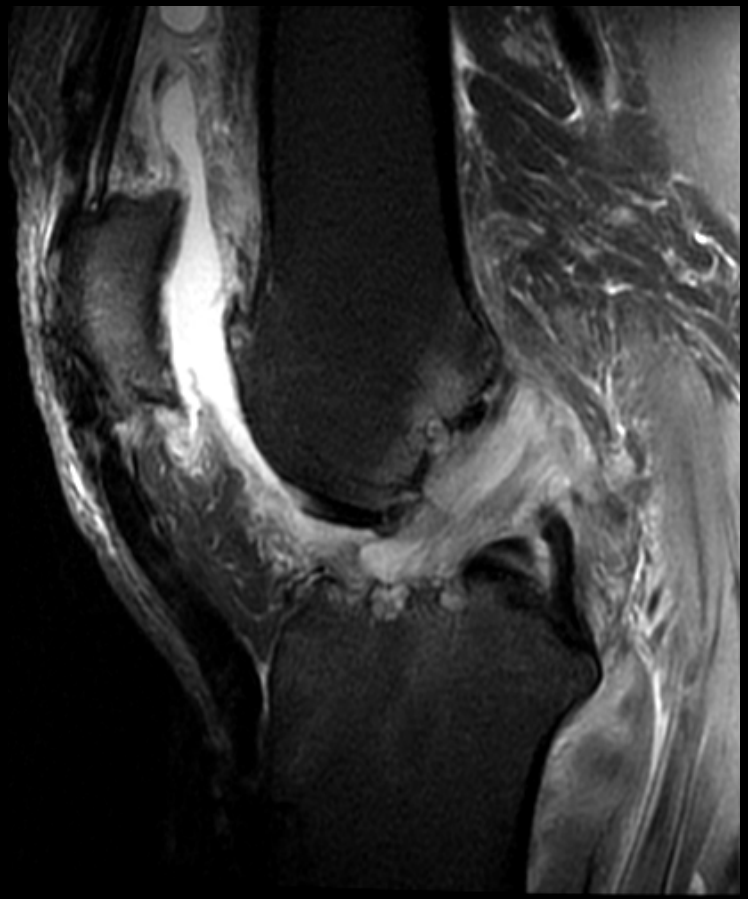




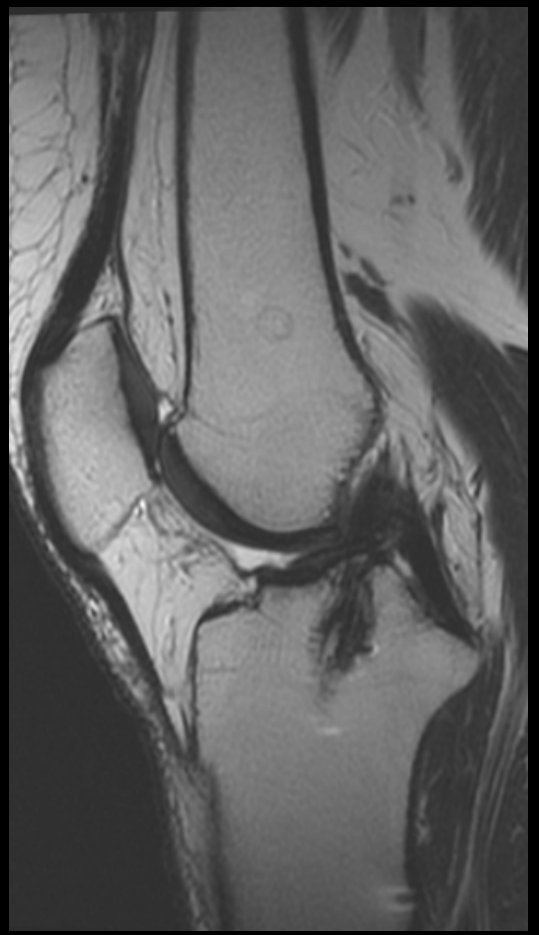


Knee anatomy variant: discoid lateral meniscus

Knee anatomy variant: ACL cyst



Knee anatomy: ACL graft



Knee anatomy: ACL graft

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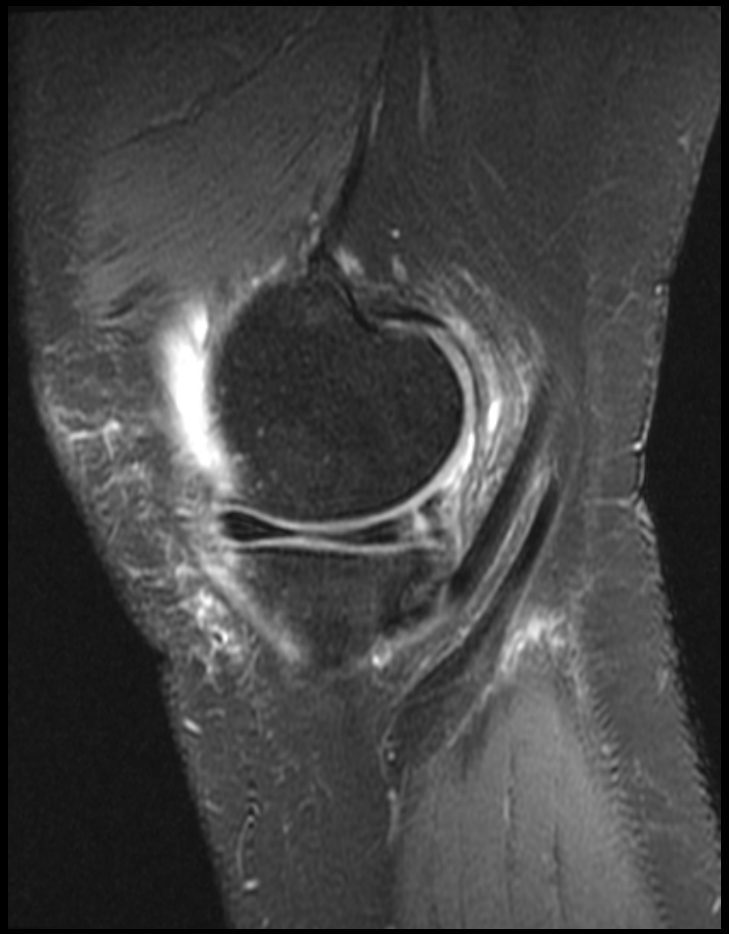
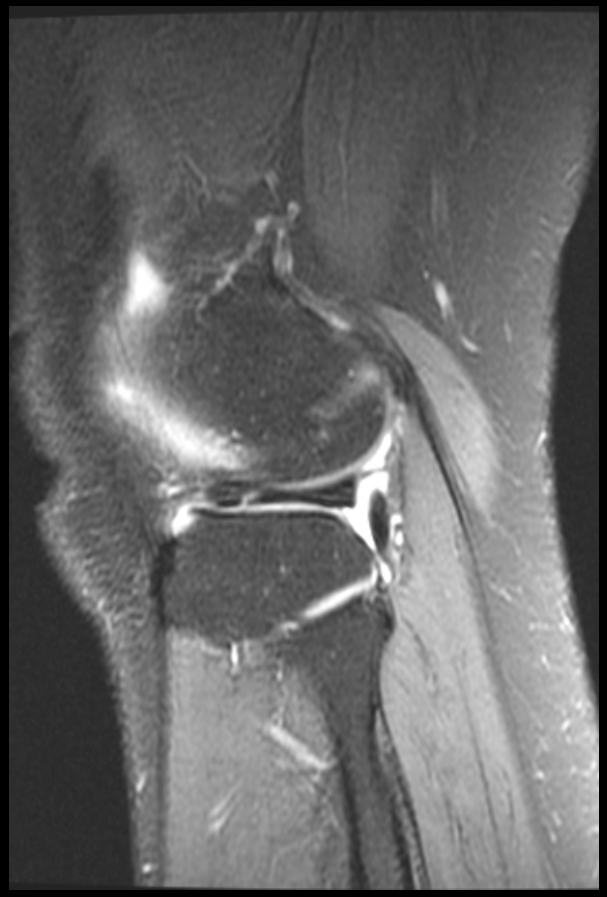
Knee pathology

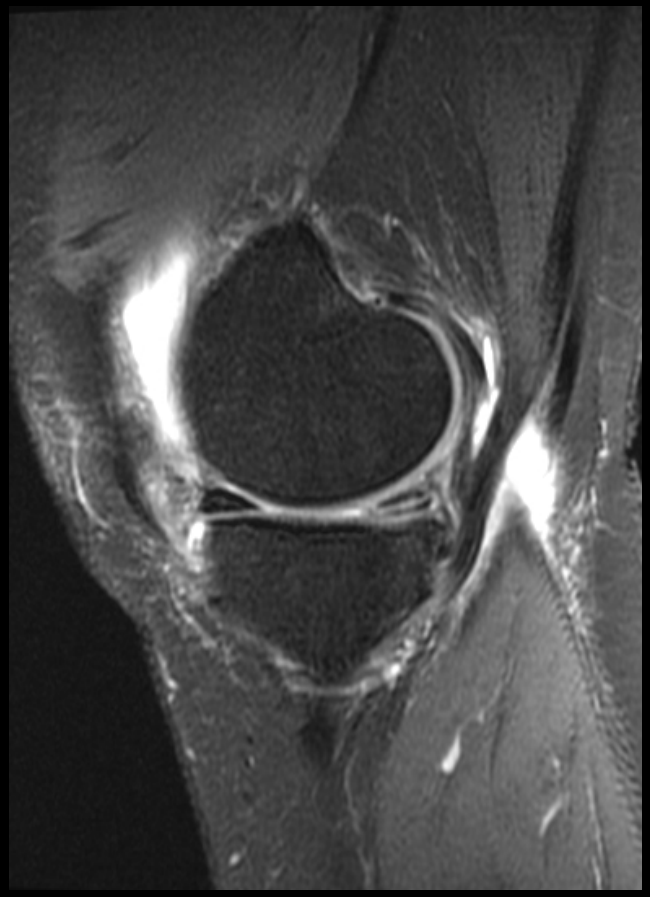
Knee pathology:
PHMM peripheral vertical tear



Knee pathology:
MM bucket handle tear

Knee pathology:
LM tear & MM tear





Knee pathology:
ACL complete tear

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Knee pathology:
ACL essentially complete tear

Knee pathology:
ACL high grade partial tear

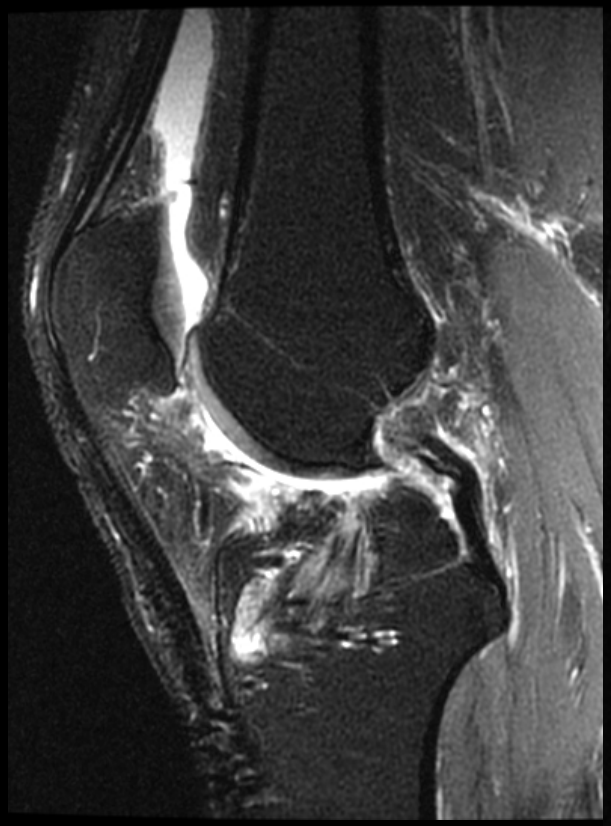
Knee pathology:
ACL posterolateral bundle partial tear

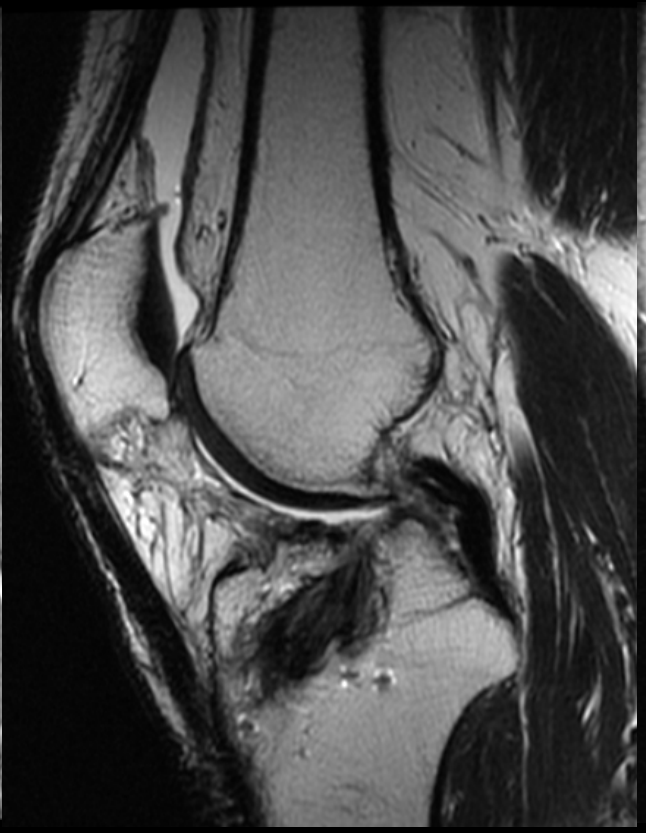
Knee pathology:
ACL posterolateral bundle tear

Knee pathology:
ACL chronic complete tear

Knee pathology:
ACL chronic partial tear

Knee pathology:
ACL graft complete tear





Knee pathology:
ACL graft sprain or degeneration

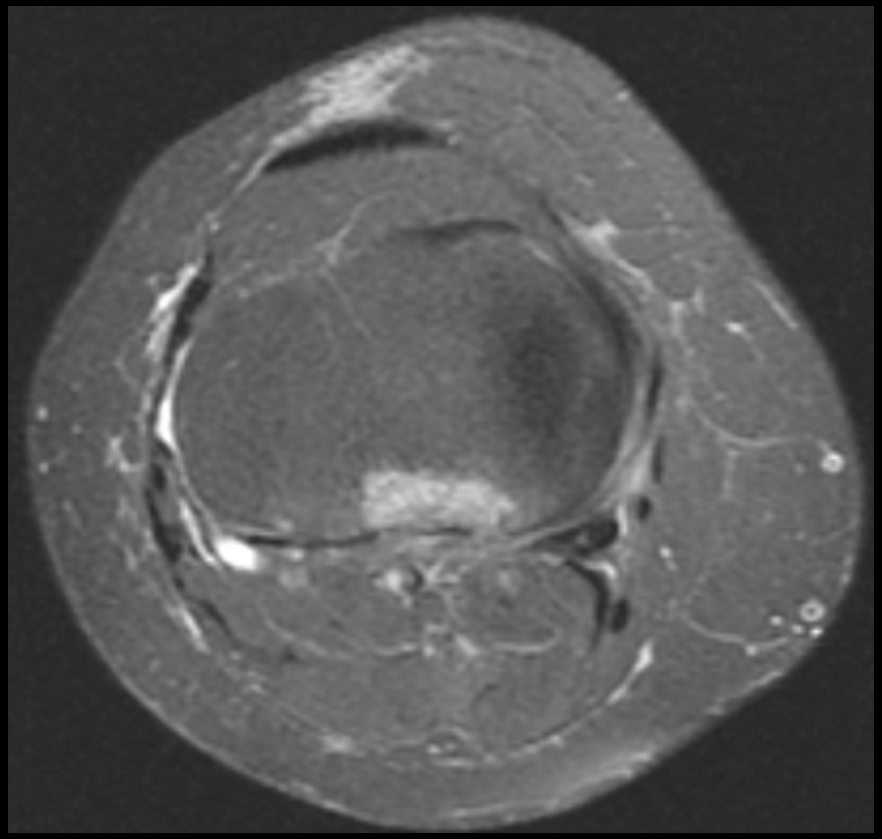
Knee pathology:
FCL high grade sprain or partial tear

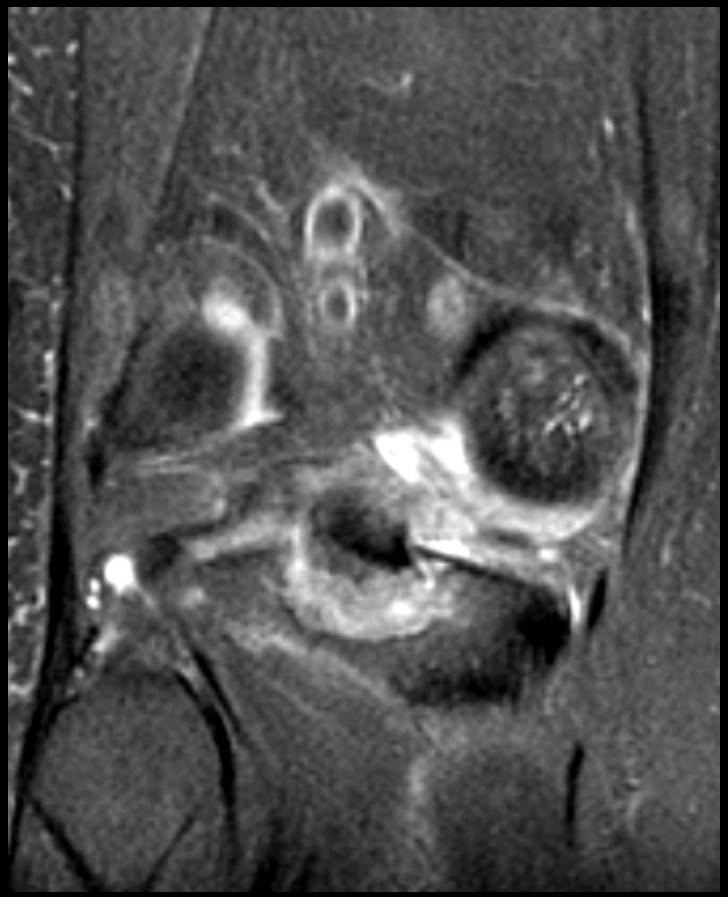
Knee pathology:
MCL grade 2 sprain

Knee pathology:
MCL grade 3 sprain

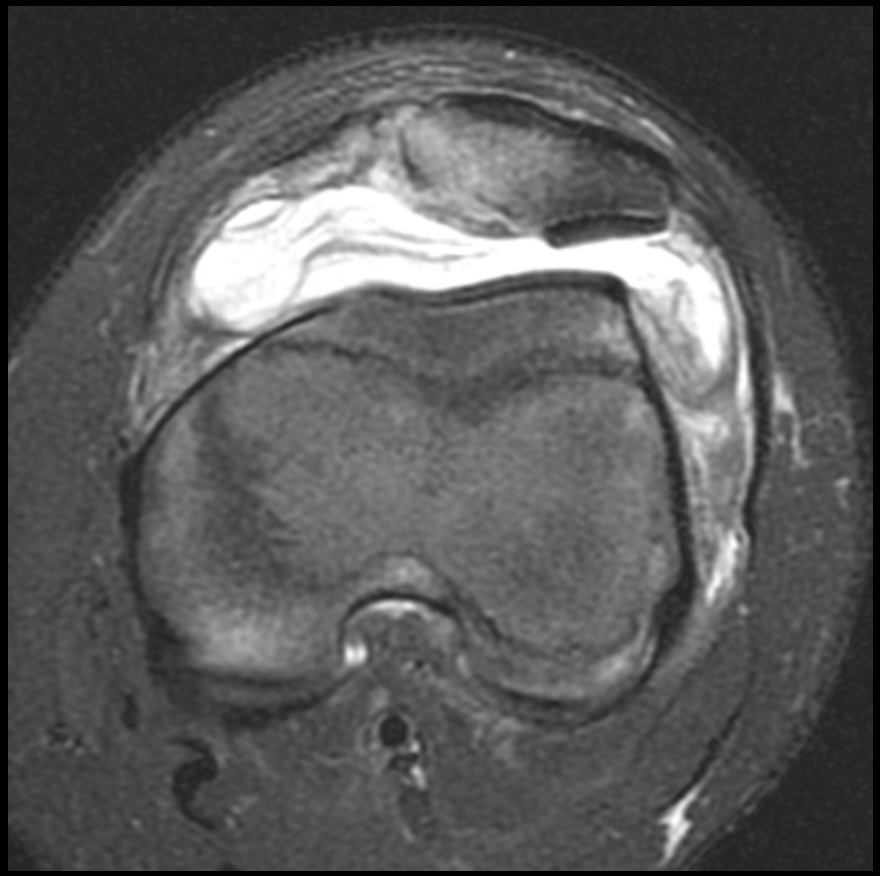
Knee pathology: PCL avulsion

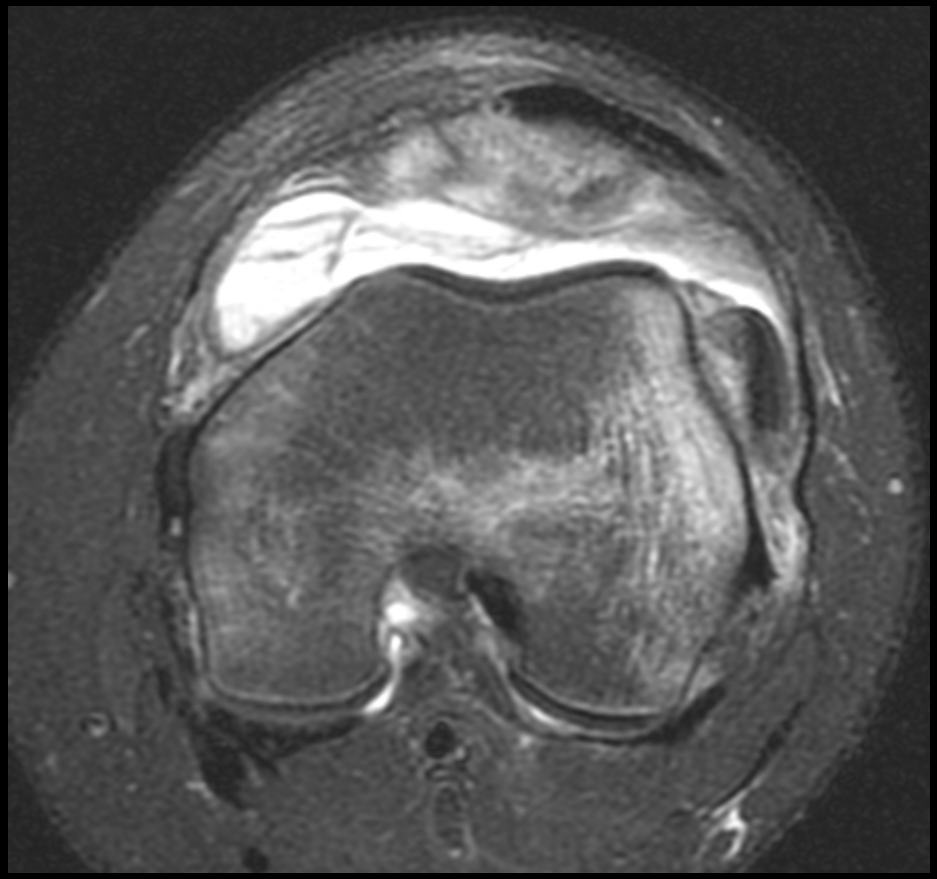
Knee pathology:
PCL avulsion





Knee pathology: transient lateral patellar dislocation with a loose body





Knee pathology: transient lateral patellar dislocation with a loose body

Conclusions

- Knee - complex joint with different anatomic structures causing pathology
- Imaging is the best way to evaluate pathology
- In particular MRI is a great modality for all types of pathology

Thank you!

httpcdn2.kevinmd.comblogwp-contentuploadsshutterstock_111524120.jpg

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References

- * All images taken from various websites have their references listed under the images . Images also taken from the Advanced Radiology PACS.
- Erkonen WE, Smith WL, editors. Radiology 101: the basics and fundamentals of imaging, 2nd ed. Lippincot Williams and Wilkins, Philadelphia, PA. 2005.
- Helms CA. Fundamentals of Skeletal Radiology, 3rd ed. Elsevier, Inc., Philadelphia, PA. 2005.
- Kaplan, Helms, Dussault, Anderson, Major. Musculoskeletal MRI, 1st ed. WB Saunders Company, Philadelphia, PA. 2001.
- Stoller DW. Magnetic Resonance Imaging in Orthopaedics and Sports Medicine, Volume 2, Upper Extremity. 3rd Ed. Lippincott Williams and Wilkins. Philadelphia. 2007.
- Sonin et al. Diagnostic Imaging Musculoskeletal: Trauma. 1st ed. Amirsys. Manitoba, Canada. 2010.
- Helms CA, et al. Musculoskeletal MRI. 2nd Ed. Saunders Elsevier. Philadelphia. 2009.