



History: 33 year old injured their right knee skiing three days ago



Coronal PD  
anterior image



Coronal PD  
mid plane image

DEPARTMENT OF RADIOLOGY AND IMAGING HOSPITAL FOR SPECIAL SURGERY



Sagittal IR of lateral knee



Coronal PD mid plane image



Sagittal PD images through the ACL

Consecutive axial  
PD images  
Through the ACL



Consecutive axial  
PD images  
Through the ACL



Consecutive axial  
PD images  
Through the ACL





Sagittal IR image



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Sagittal IR image  
medial knee



Sagittal PD image  
medial knee



Coronal PD mid  
plane image

## Findings

An avulsion fracture has been sustained of the lateral tibial plateau at the site of attachment of the joint capsule, posterior to Gerdy's tubercle. Impaction related to a recent pivot shift injury is seen of the lateral compartment with disruption of the proximal ACL. The superficial medial collateral ligament is markedly hyperintense with partial discontinuity. Edema is seen in both the medial and lateral subcutaneous soft tissues.

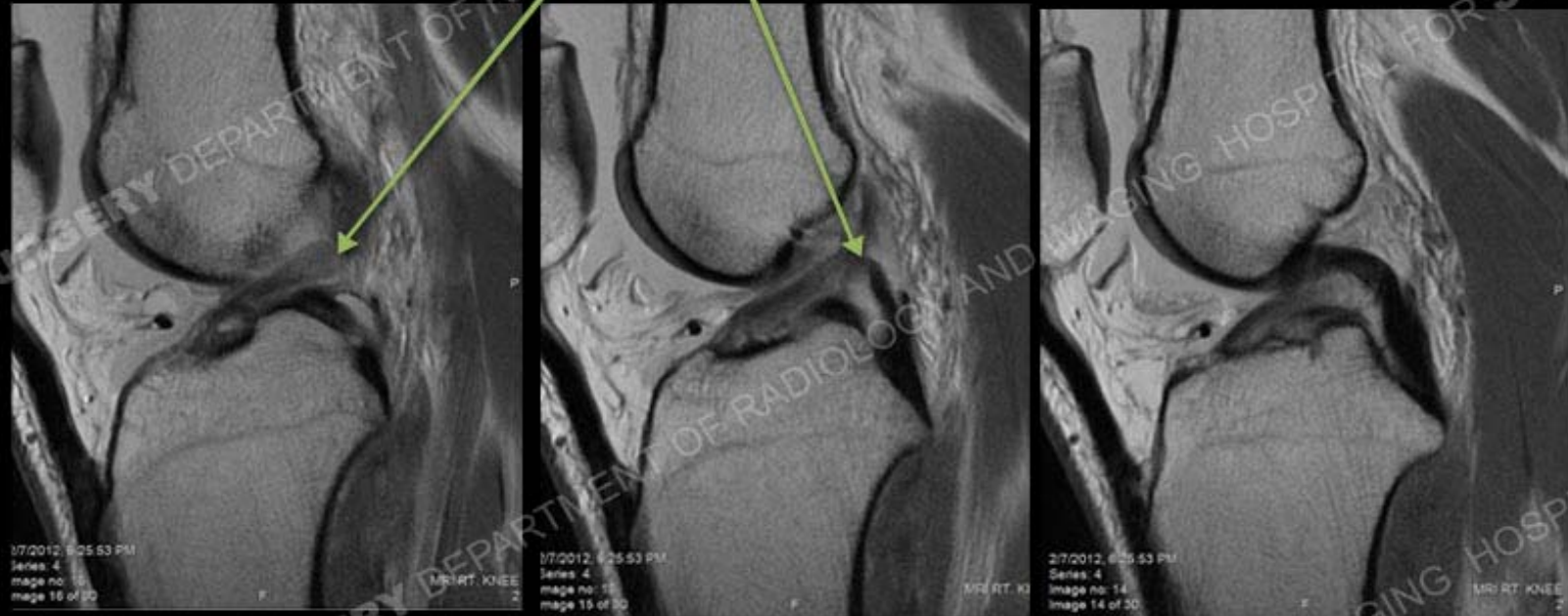


Anterior image demonstrates intact Gerdy's tubercle at the IT band insertion

Avulsion fracture at the lateral capsule (LC) insertion site.



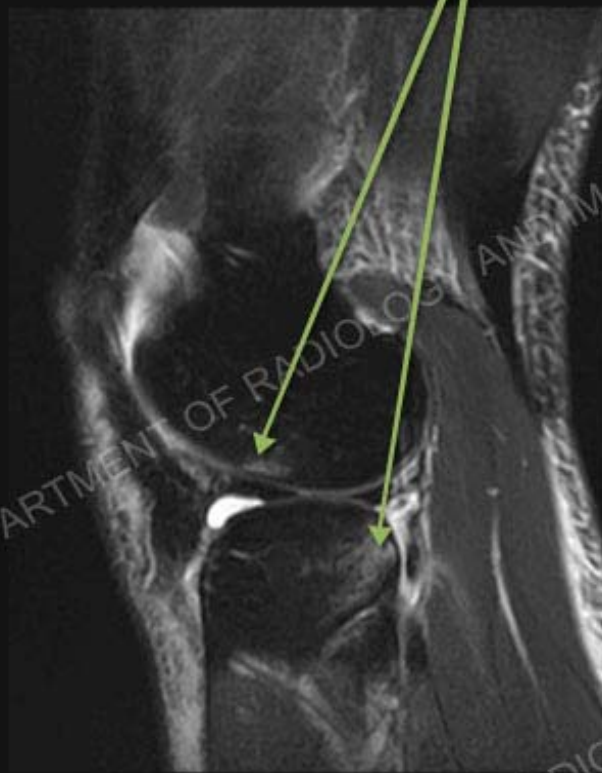
Complete disruption of proximal fibers of the ACL



Edema at classic locations of pivot shift injury. This is further towards the intercondylar notch than at the bony avulsive site.



Edema at lateral bony avulsion



Circle: Sulcus terminalis - Area to assess on radiographs for deep lateral femoral notch sign in the setting of ACL disruption.



Edema in medial soft tissues

Hyperintense, partially disrupted MCL



Dotted arrows: Intact fibers of MCL

## Diagnosis: ACL disruption with Segond fracture and partial MCL tear

The most typical mechanism of ACL disruption is a pivot shift injury where a valgus stress is placed on a flexed knee with the femur internally rotated. This yields a classic edema pattern of the posterior lateral tibial plateau and the sulcus terminalis of the lateral condyle. The sulcus of the lateral condyle when deeper than 1.5mm indicates an ACL tear and can at times be identified on radiographs. A Segond fracture is an avulsion injury of the lateral joint capsule. The mechanism of injury relates to internal rotation of the tibia with a varus moment imparted to the knee. It has a high association (75-100%) with ACL injuries as well as of the menisci. Given that in this case there was additionally, an MCL injury, one can see the often complex mechanisms yielding injury patterns of the knee.



## Resources

The lateral femoral notch sign. Pao DG. Radiology. 2001 Jun;219(3):800-1.

Medial and lateral second fractures in a skeletally immature patient: a radiographic marker for the multiply injured knee. Kwon OS, Park MJ, Tjoumakaris FP. Orthopedics. 2011 Nov 9;34(11):e772-5.

Avulsion fractures of the knee: imaging findings and clinical significance. Gottsegen CJ, Eyer BA, White EA, Leach TJ, Forrester D. Radiographics. 2008 Oct;28(6):1755-70. Review.

Mechanism-based pattern approach to classification of complex injuries of the knee depicted at MR imaging. Hayes CW, Brigido MK, Jamadar DA, Propeck T. Radiographics. 2000 Oct;20 Spec No:S121-34.

