

Imaging of the Knee

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- X-ray
- Ultrasound
- Computed tomography (CT)
- MRI

- Osteoarthritis
- Fracture
- Meniscus
- Ligament
- Patellar dislocation

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1. X-ray

- « Radiographs are the workhouse of knee imaging. Almost any symptom or sign may be initially evaluated with an x-ray.

Radiographs provide usefull information across the entire spectrum ok knee pathology, including congenital deformities, arthritis, trauma, oncology, sports injury, metabolic disease, and arthroplasty evaluation » (1)

1. S. Madoff – Knee imaging Techniques and normal Anatomy. Insall & Scott Surgery of the Knee – 2017.

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1. X-ray – Radiographic views

- **Standard radiographic examination** consists of 4 views :
 - Anteroposterior (AP) – weight bearing images are preferable whenever possible.
 - Lateral view
 - Axial (Sunrise or Merchant)
 - Schuss view (AP 30-45° flexion WB)

- Tunnel, stress X-ray, and oblique views may be performed for specific indications.

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2. Ultrasound

It's a very safe procedure
Infiltration or punction under ultrasound guidance

Informations :

- Popliteal fossa
- Medial collateral ligament (follow healing process)
- Extensor mechanism
- Meniscal cyst, bursitis

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3/ Computed tomography

Informations :

- Fractures (and fracture healing)
- Assessment of patellar tracking , patellar tilt , TA-GT.
- Joint loose bodies

CT – arthrography :

- Cartilage
- Meniscus (healing of repaired menisci)

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4/ MRI

MRI is an extremely powerful tool that has supplanted other imaging modalities for evaluating internal (and external) derangement.

- Ligaments and tendons – ITB
- Menisci
- Cartilage
- Bone bruise

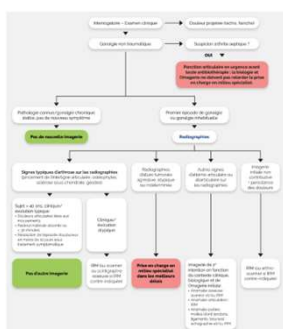
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5. Osteoarthritis

- The **Rosenberg** view is efficient for evaluating arthritis of tibio-femoral joint. It reveals joint space narrowing (2) - joint space narrowing is often underestimated on conventional AP weight-bearing view.
- Patello-femoral arthritis is detected on lateral and axial view.
- MRI and CT arthrography are much more precise to evaluate a cartilage lesion (if you plan to do an unicompartmental knee arthroplasty).
- The first exam if you suspect osteoarthritis is **X-ray – not an MRI !!**

2. Rosenberg TD, The forty-five degree posteroanterior flexion weightbearing radiograph of the knee. J Bone Joint Surg Am 70:1479, 1988.

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Place of imaging in exploration strategy of non traumatic knee pain :
- AP view, Weight bearing
- AP view, 45° of flexion WB
- Lateral view, WB, 30° of flexion
- Patellar skyline view

3. HAS. Pertinence de l'imagerie dans l'exploration d'une gonalgie non traumatique de l'adulte. June 2022

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Schuss view (or Rosenberg view or 45° view)



Weight bearing radiography in extension



Rosenberg / schuss view

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6. Fractures

- Radiographic examination for knee trauma :
 - AP, lateral, 45° internal and external rotation oblique projection, axial view (4). **Lipohemarthrosis** is seen on lateral view (fat-fluid level), which is highly suggestive of intra-articular fracture
- CT will better visualize the degree of comminution, give a more accurate delineation of the depression of the articular surface (tibial plateau)
- MRI is superior to CT in detection of occult fractures.

4. Mechlin M. Fractures. Insall & Scott Surgery of the Knee. 2017

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6. Fractures

- Lipohemarthrosis

Fracture of tibial spine



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6. Fracture

- Fracture of the patella

Segond's Fracture

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7. Imaging of the meniscus

- MRI** is considered the imaging modality of choice in diagnosing meniscal pathology, and characterizing meniscal tears (5)
- Don't forget to ask an **x-ray (degenerative lesion)** (6)!
- MR arthrography** has proved to be useful in the evaluation of repaired menisci and after high grade partial meniscectomy (7)

5. Nguyen. MR imaging-based diagnosis and classification of meniscal tears. Radiographics 34, 2014
6. Dentl - Sell. ESSKA meniscus consensus, 2016
7. Barbet. Meniscal injuries and imaging the postoperative meniscus. Radiol Clin North Am. 51, 2013

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7. Meniscus

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8/ Imaging of the ligaments

MRI is the standard of care imaging in the post-traumatic knee with clinical findings suggestive of ligamentous injury (8).

- ACL/ PCL - bone bruise
- Graft healing – graft impingement – tunnel widening
- Medial collateral ligament
- Lateral collateral ligament and posterolateral corner
- Associated meniscal lesion

8. Gonzalez F. Cruciate ligaments. Insall & Scott surgery of the knee, 2017

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9/ Imaging of patella luxation

- X-ray : trochlear dysplasia – Caton index
- MRI : lesion of ligament – bone bruise – cartilage lesion

Fig.31.3 Classification of the trochlea dysplasia on the lateral X-ray according to Dejour [18]

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9. Servien E. Journées lyonnaises du genou, 2022

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- Ask a question to the radiologist !
- Don't forget X-rays

Thank you