Two main validated clinical decision rules defining the guidelines for the appropriate use of radiographs in acute knee injuries are:

**Ottawa knee rules: 1-4**

- Order radiography of the knee if any of the following factors are present:
  1. Age 55 years or older
  2. Tenderness at head of fibula
  3. Isolated tenderness of patella
4. Inability to flex knee to 90 degrees
5. Inability to walk four weight-bearing steps immediately after the injury and in emergency department.

- A recent meta-analysis of six studies evaluating 4,249 patients showed a sensitivity of 98.5% with five studies reporting a sensitivity of 100%. 33

Pittsburgh decision rules: 6
- Characteristics of patients who should undergo radiography after knee trauma: Blunt trauma or a fall as mechanism of injury plus either of the following:
  1. Age younger than 12 years old or older than 50 years
  2. Inability to walk four weight-bearing steps in the emergency department.
- 99% sensitive and 60-79% specific for the diagnosis of knee fractures. 5,6

According to studies published by Bauer 7 and Weber 8:
- Clinically significant fracture can be excluded in patients older than 18 years old who can walk without limping or if there was a twisting injury to the knee and no joint effusion.

PLAIN RADIOGRAPHY
- Initial imaging modality of choice for evaluation of post-traumatic knee pain or instability. 9
- Four views (antero-posterior, lateral and both obliques) may detect subtle fractures or bony avulsions caused by detachments of the cruciate or collateral ligaments and can confirm the direction of dislocation. 9-11

ARTHROGRAPHY
- 50-75% overall accuracy in the diagnosis of ligament and meniscal injuries of the knee. 12-14
- Has been largely replaced by MRI.
- Limitations: examination is limited to the surface evaluation of the meniscus.
- Disadvantages: invasive, intra-articular injection of contrast media, ionising radiation and potential complications.

MAGNETIC RESONANCE IMAGING
- Investigation of choice for evaluation of post-traumatic knee pain or instability, when available. 15
High accuracy in detection of:
1. Meniscal tears 16,17
2. Cruciate ligament tears 16-18
3. Collateral ligamentous injuries 19
4. Bone bruises 20,22
5. Osteochondral defects 21,22
6. Chondromalacia patellae as well as less common pathologies

Cost-effective in reducing the number of diagnostic arthroscopies. 23-25

Advantages: non-invasive, no ionising radiation, superior soft tissue contrast, ability to demonstrate both intra-articular and extra-articular abnormalities, multiplanar imaging and no anatomical restrictions to access.

Limitations:
- Decreased diagnostic accuracy in patients with multiple injuries of the knee. 19,26
- Limited availability and high expense.

COMPUTED TOMOGRAPHY

- Comparable accuracy to that of MRI for the assessment of tibial plateau fractures. 27
- Useful in looking for loose bodies and retro-patellar problems.
- Multi-slice CT arthrography has a high diagnostic accuracy in detection of anterior cruciate ligament tears and associated meniscal lesions and articular cartilage pathology. 28
- Some institutions are using multi-slice CT arthrography as an alternative to MRI because of its limited availability. 28

BONE SCAN

- Can be used to detect radiographically occult post-traumatic bone injuries. 29
- Used extensively to assess chronic knee pathology. 30
- Focal increased uptake is noted at sites of bone repair such as in fracture sites, torn menisci, bone infarctions and avulsions of ligamentous insertions. 29-32

REFERENCES


**FURTHER READING**