

Multi ligament Injury

Associated lesions in Acutes cases

**Bony,
Neurovascular,
Cutaneous
Tendinous
Else**

**JL Rouvillain
Fort de France**

Bony lesions : 10-20%

Segond's fracture

Osteochondral fracture

Bone bruise

Avulsion fractures of the ACL and PCL

Avulsion Fracture of the Fibula Head

Tibial plateau fracture

- Moore Classification : 5 types
 - Clin Orthop 1981;56:128-40
- ORIF for preserving articular Surface
- Risk of osteoarthritis, pain and stiffness

Are standards AP and sagittal Xrays
enough?



Qualitative and quantitative femur and tibia displacement



Epiphysal fractures femur, tibia and fibula head



Plateau tibial fracture

Avulsion fractures of the PCL



The best will be an MRI

- For precise diagnostic lesions of
 - ligaments and tendinous
 - meniscal,
 - bony lesions
 - Bone bruise
- But often difficult to obtain in emergency

Segond's fracture



Patella tendon lesion



Bone bruise or Plateau tibial fracture?



MRI and chondral lesion

J Halinen : The efficacy of magnetic resonance imaging in acute multi-ligament injuries. [International Orthopaedics](#) 2009, 33:1733

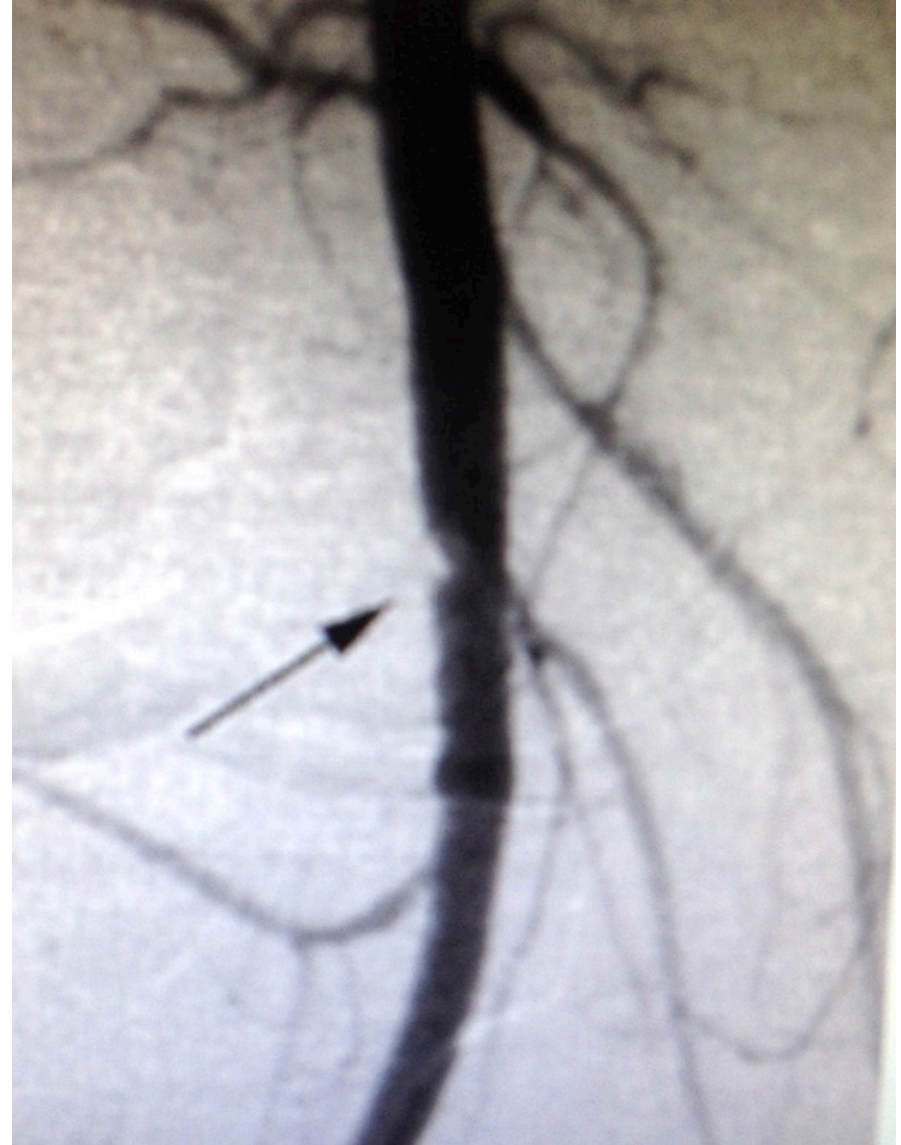
44 Pre-operative MRI

MRI revealed no chondral lesion, but
arthroscopy revealed 11

Vascular Injuries (30-35%)

- A reduced dislocated knee may have as high an incidence of arterial injury as a frank dislocation
- Intimal Flap
- Perception of Dorsalis pedis and Post tibial pulse not safe
- Popliteal Vein injury must also be recognized and appropriately treated
- Ischemia time : no longer 6 hours

Complete lesion or Intimal Flap



Vascular exploration systematic?

Arteriogram even per operative

Angio CT Scann

MRI with injection

Neurologic Injuries

- Fibular nerve in 14-35% often in posterolateral dislocation
- Traction of the nerve : Neurapraxia to complete disruption
- Prognostic poor : No recovery in 50%

Open dislocations of the knee

- 20-30% of all dislocations
- High energy
- Often associated with vascular and neurologic lesions
- Risk of infection and above the knee amputation
- Delayed ligamentous surgery after infection eradication and soft tissue healing

Wound Problems

- Superficial or deep wound infection : Up to 12%
- Age, general health, skin condition, steroid use, prolonged tourniquet time, prior operation...
- Excessive traction during wound closure can cause Blistering

Multicentric retrospective study ESSKA 1998

273 ACL + PCL lesions

- 5 Exposed luxations (2%)
- 8% Arterial lesions
- 13% Fibular nerve lesions
- 14% Extensor lesions
- 15% osteochondral fractures

Multicentrique Study SOO 2002 (91 cases)

Vascular and Neurologic lesions

- Vascular :
 - 20 cases : No pulse after reduction
 - 5 lesions / arteriography with present pulses
 - 4 amputations (One in emergency and 3 at J + 2)
- Neurologic :
 - 40 % Acute neurologic deficiency
 - 60 % associated with vascular lesion ($p < 0,0001$)

Operative Complications

- Iatrogenic vascular and nerve injury
- Anesthesia
- Compartment syndrome
- Wound complications
- Deep venous thrombosis
- Failure of the repair

Per operative Nerve injury

- Fibular nerve in lateral exposure close to the fibular head
- Sensory branches (Infra patellar and sartorial) of the saphenous nerve in the medial side of the knee. Hypersensitivity or dyesthesias
- Complex regional pain syndrome

Compartment syndrome

- After too long ischemia (>6h) or re-perfusion after vascular repair
- Extravasation of arthroscopic fluid between fascial or capsular defects
- Capsular sealing usually occurs in 10 to 15 days. Delayed surgical reconstruction may decrease this risk

Tourniquet complications

- Duration of compression
- Age
- Excessive or insufficient pressure
- Local anatomy
- Report of arterial thrombus leading to amputation
 - *Hegyes Clin Sports Med 2000;18:519-43*

Complex Regional Pain syndrome or Sympathetic dystrophy

- Pain, stiffness, oedema, hypersensitivity, hypervascularity, osteopenia
- Muscle inhibition, soft tissue contractures cause slow progression and painful physical therapy
- Avoid initial pain +++

Conclusion : Associated lesions

- Early surgery for
 - Open injury
 - Contaminated skin lesion
 - Arterial lesion
 - Associated fractures
- Surgery can be delayed for :
 - Nerve injuries
 - Tendons injury
 - Osteochondral and meniscal lesions