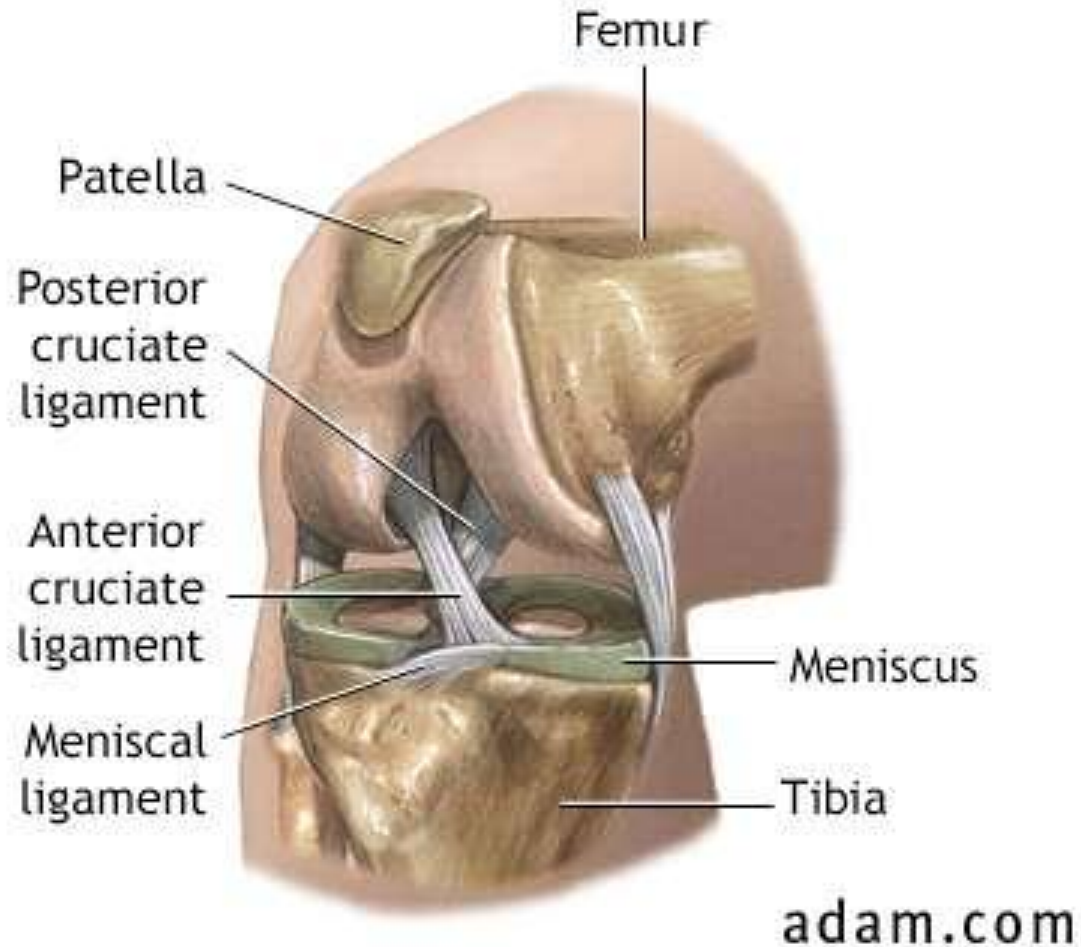
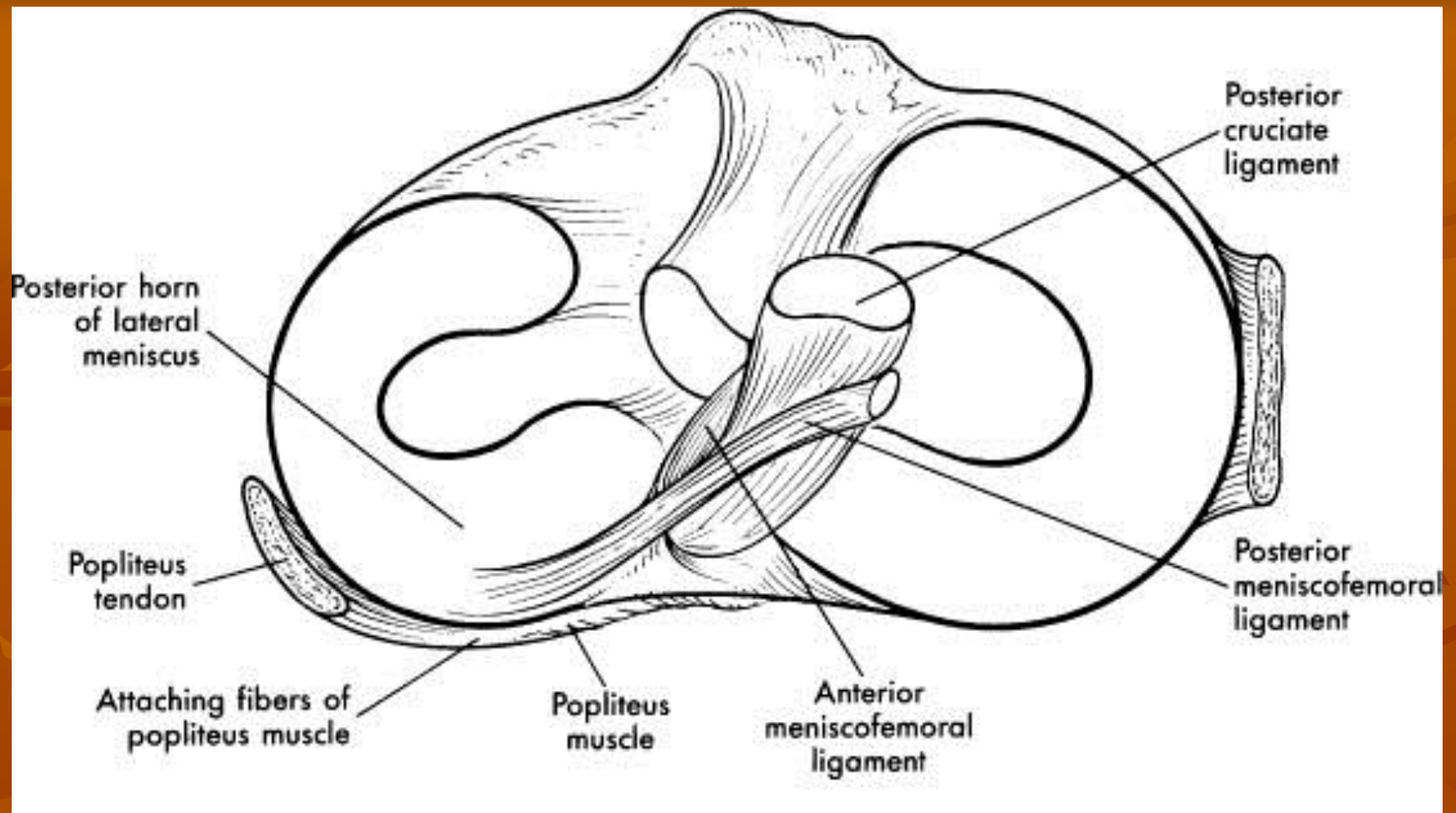




# Knee Injuries

# Anatomy



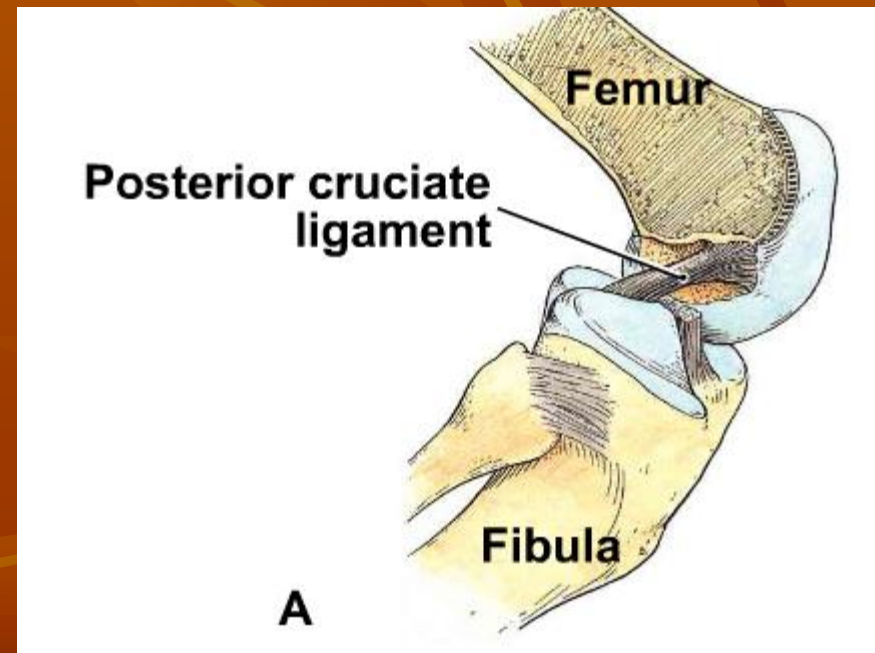
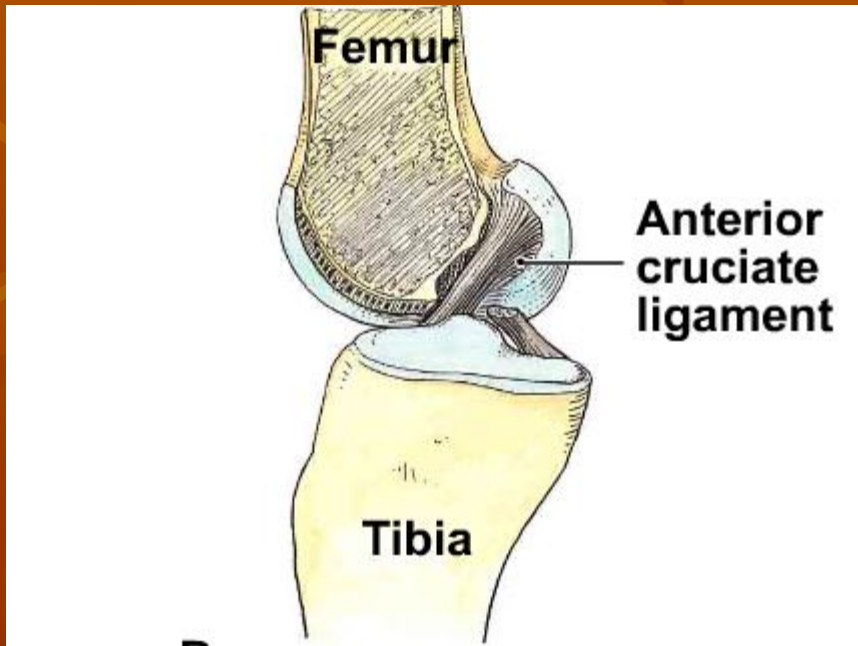


Lateral meniscus is smaller in diameter, thicker about its periphery, wider in body, and more mobile; posteriorly it is attached to medial femoral condyle by either anterior or posterior meniscomfemoral ligament, depending on which is present, and to popliteus muscle .



# Ligaments of the knee

- Medial collateral ligament
- Lateral collateral ligament
- Anterior cruciate ligament ACL
- Posterior cruciate ligament PCL





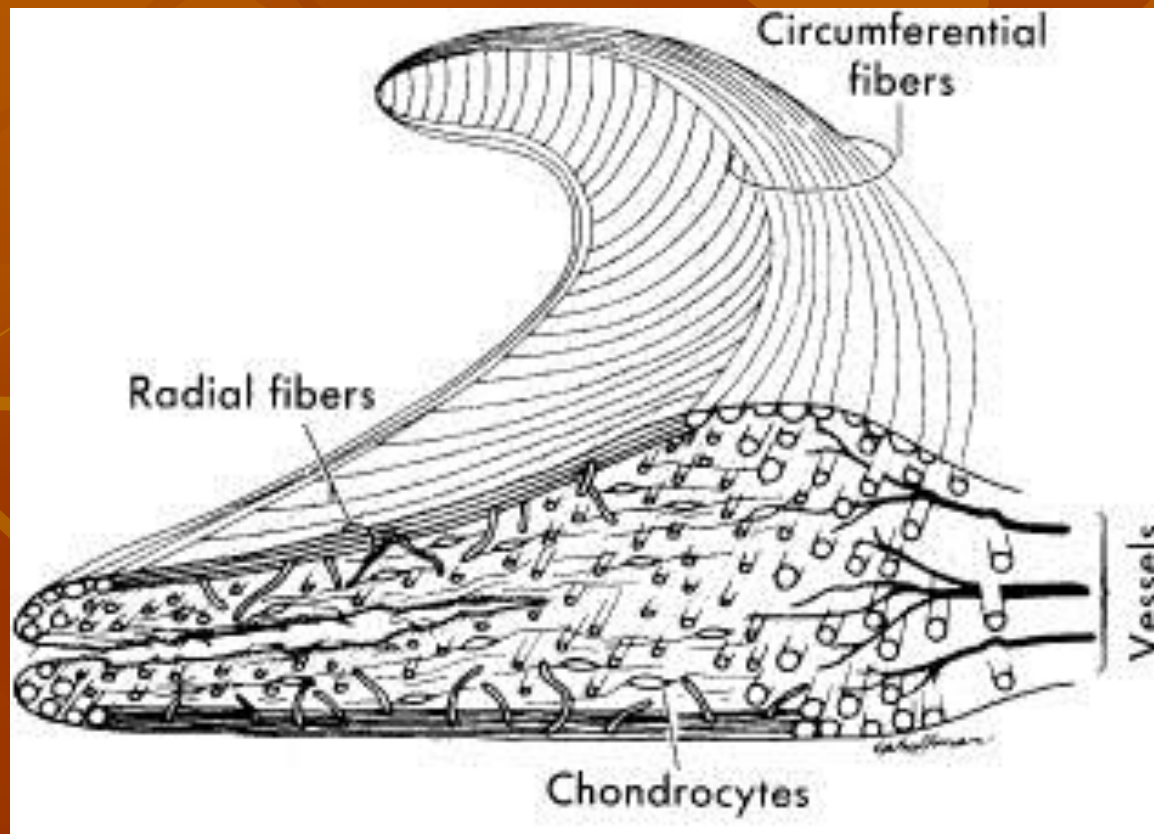
# Meniscal injuries



# Functions of the menisci

- Shock absorber
- The menisci act as a joint filler, compensating for gross incongruity between femoral and tibial articulating surfaces
- The menisci are believed to have a joint lubrication function, helping to distribute synovial fluid throughout the joint
- Aiding the nutrition of the articular cartilage.
- They undoubtedly contribute to stability in all planes but are especially important rotary stabilizers and are probably essential for the smooth transmission from a pure hinge to a gliding or rotary motion as the knee moves from flexion to extension.
- Reduce the stress on the articular cartilage by increasing contact area between femoral condyles and tibial plateau.

# Collagen fiber orientation within meniscus





# Mechanism of meniscal tear

- Traumatic lesions of the menisci are produced most commonly by rotational force while the joint is partially flexed and occurs as the flexed knee moves toward an extended position.

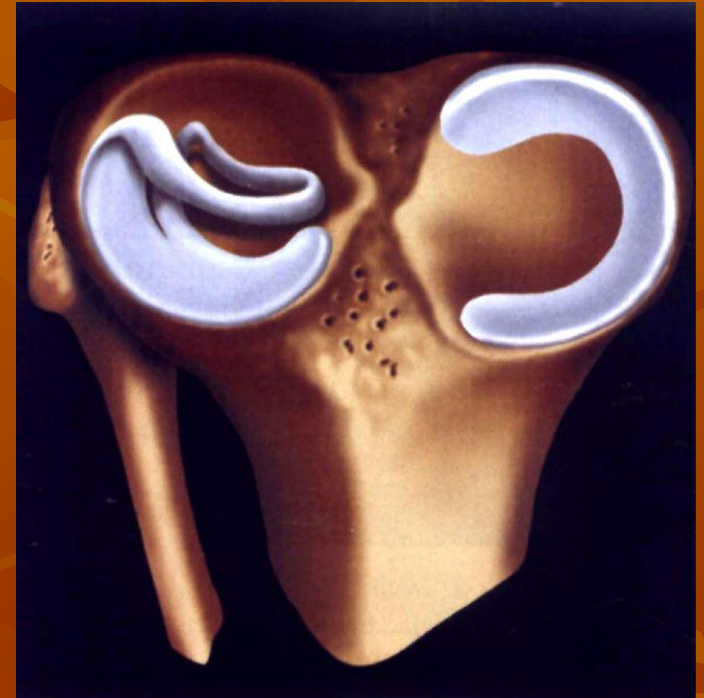
# Medial meniscal injury is more common than lateral

- the medial meniscus is larger in diameter , thinner in its periphery and narrower in the body.
- It is attached to medial collateral ligament while lateral meniscus is separated from lateral collateral ligament by popliteus tendon .
- the menisci follow the tibial condyles during flexion and extension, but during rotation they follow the femur and move on the tibia;
- consequently the medial meniscus becomes distorted. Its anterior and posterior attachments follow the tibia, but its intervening part follows the femur; thus it is likely to be injured during rotation.
- However, the lateral meniscus, follows the lateral femoral condyle during rotation and therefore is less likely to be injured.

# Classification of meniscal tears

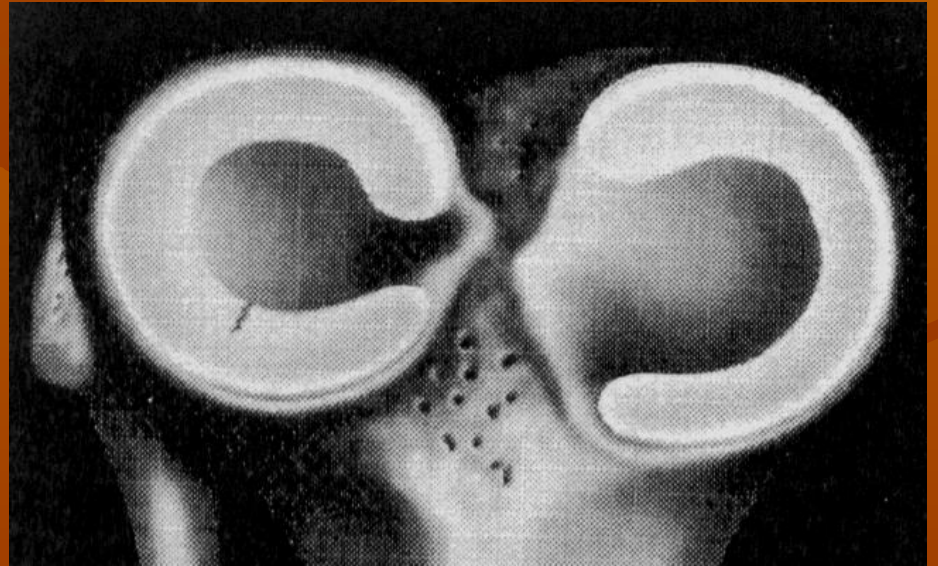
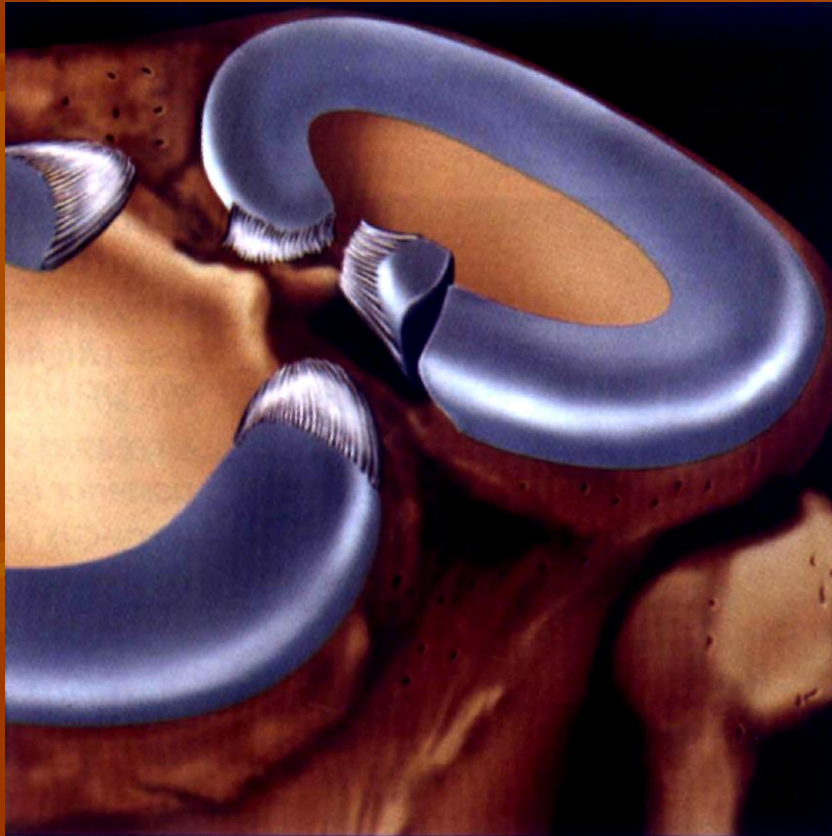
- longitudinal tears
- transverse and oblique tears
- a combination of longitudinal and transverse tears (complex tear)
- Flap tear
- tears associated with meniscal cyst
- tears associated with discoid menisci.

# Longitudinal (Bucket handle)

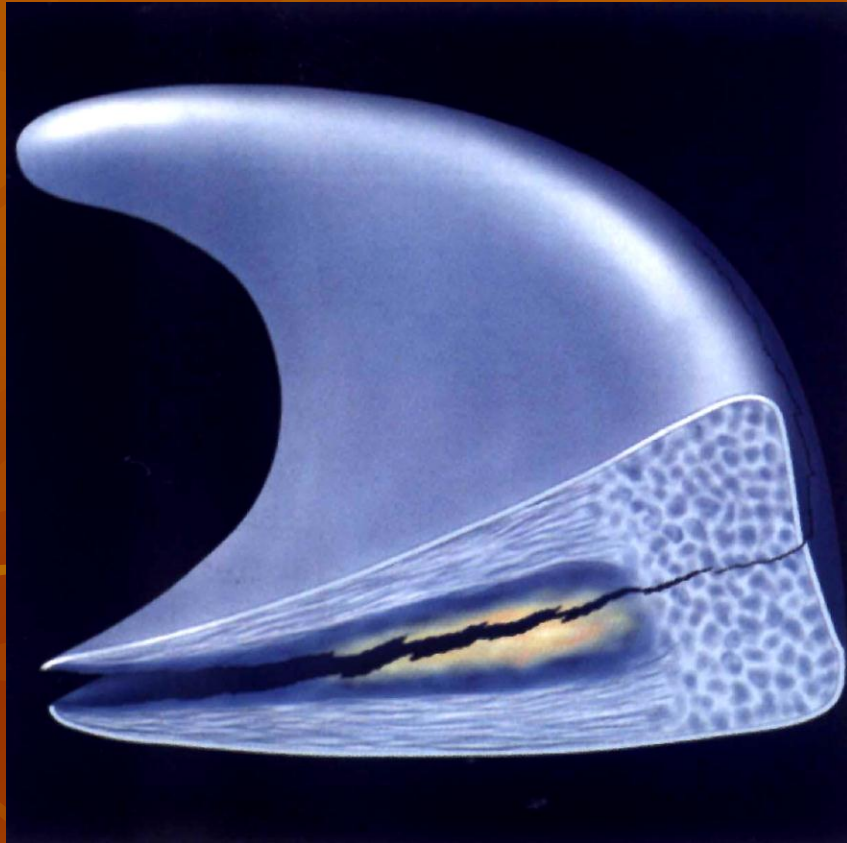




# Transverse or radial tears

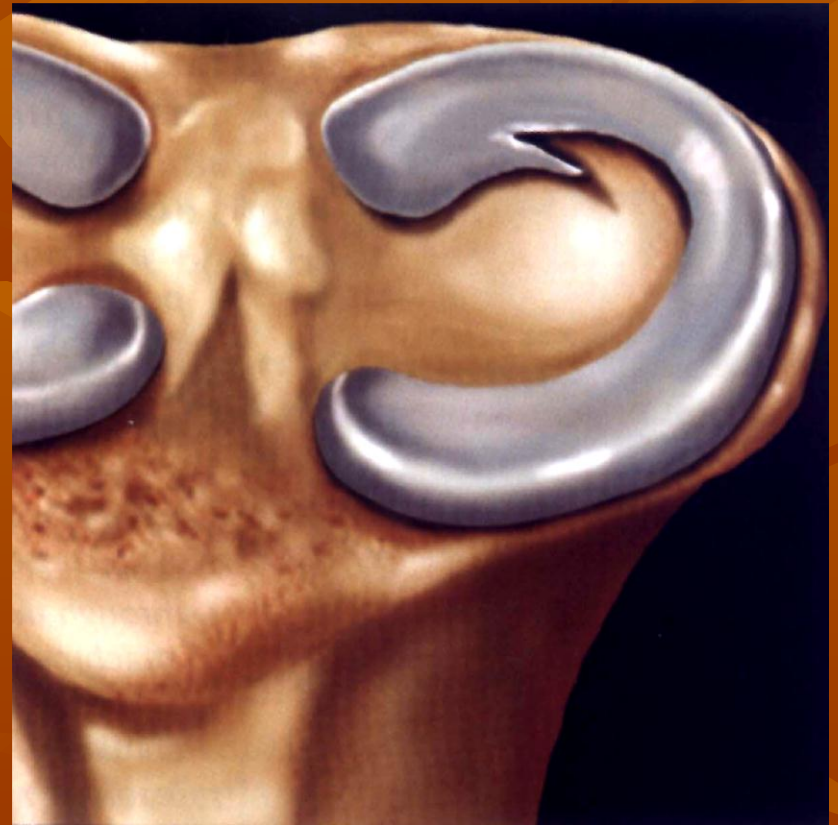
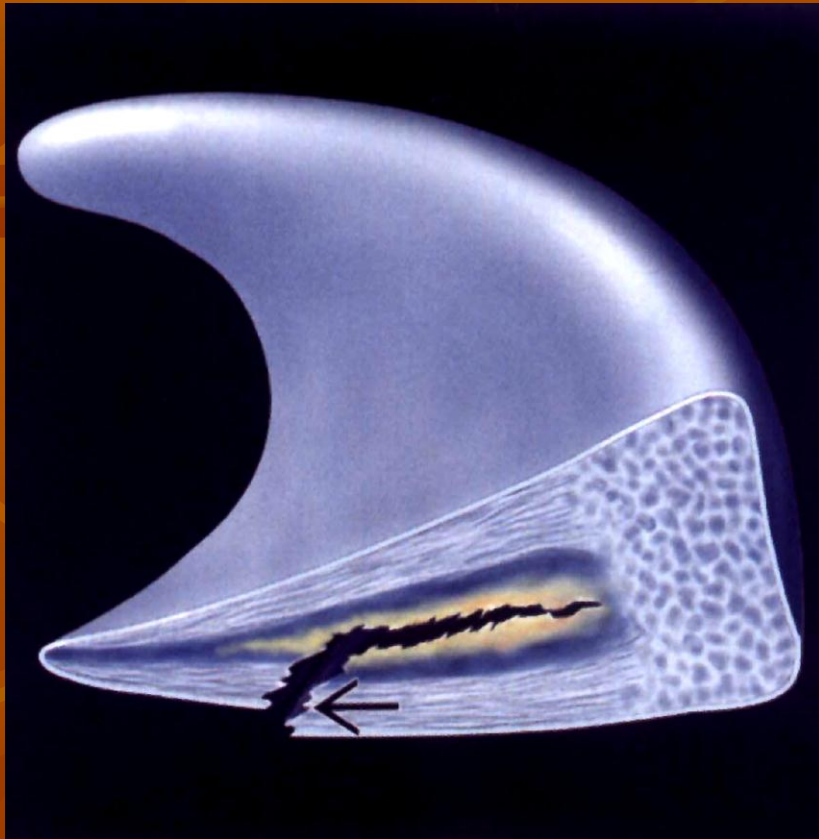


# Horizontal tear (cleavage)

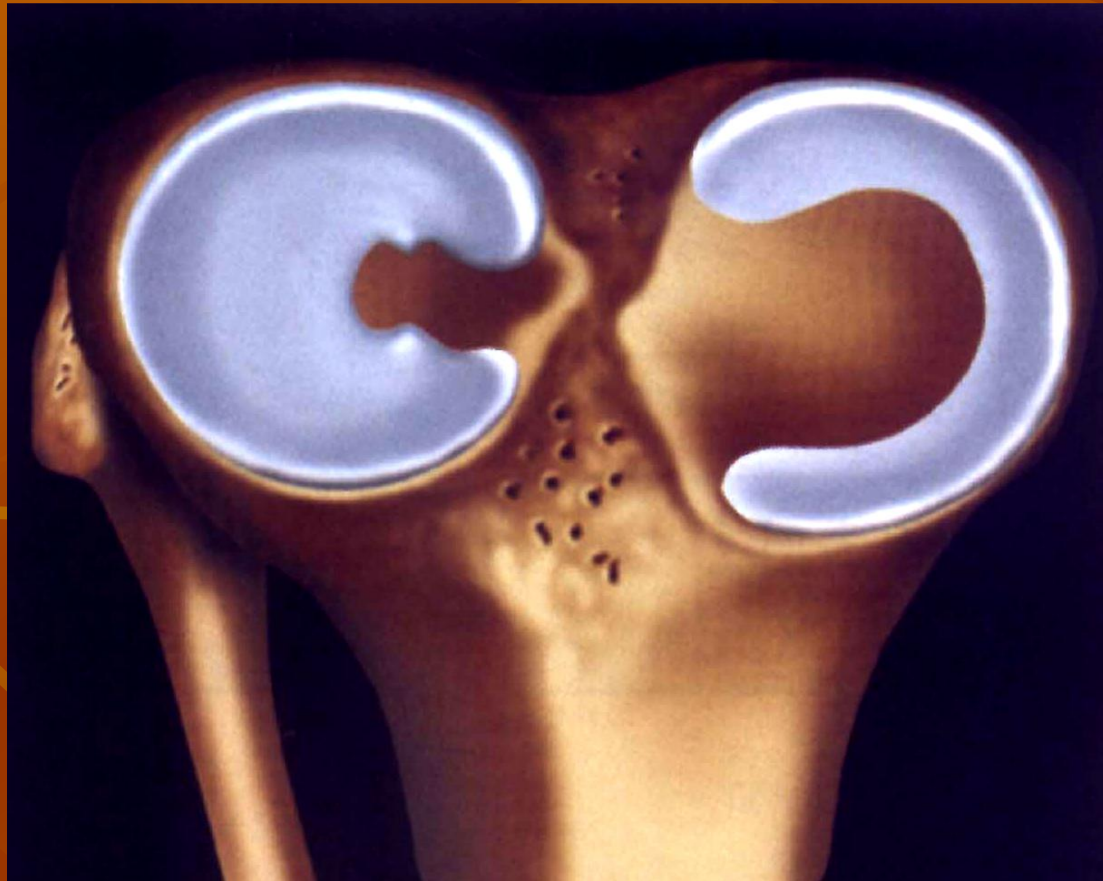




# Flap or oblique tear



# Discoid meniscus



# Diagnosis

- History of specific injury

- Symtpoms:

pain

locking

Giving way

Swelling (effusion)

Abnormal sound ( clicking)

- Signs:

Atrophy of musculature around knee

Effusion

Localised tenderness over the joint line

Diagnostic tests

# Diagnostic tests

- McMurray test
- Apley's grinding test
- Squat test

# Investigations

- Plain x-rays
- CT
- MRI
- Diagnostic arthroscopy



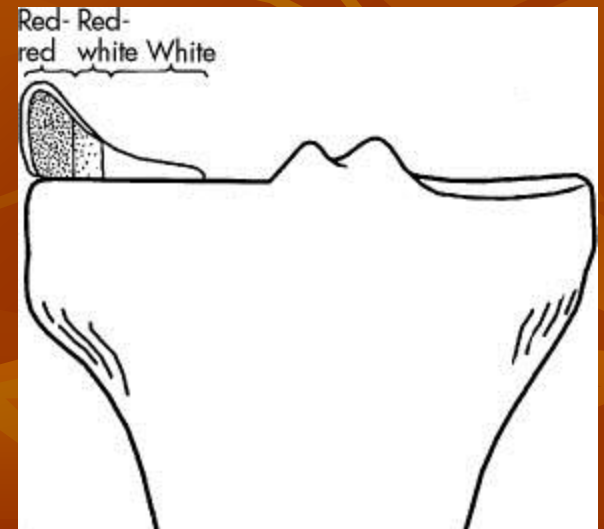
# Management

- Non operative ( in acute cases):
  - incomplete meniscal tear or a small (5 mm) stable peripheral tear with no other pathological condition, such as a torn anterior cruciate ligament
  - groin-to-ankle cylinder cast or knee immobilizer worn for 4 to 6 weeks.
  - Crutch walking with touch-down weight-bearing is permitted when the patient gains active control of the extremity in the cast.
  - The patient is instructed in a progressive isometric exercise program during the time the leg is in the cast to strengthen the quadriceps, the hamstrings, and the gastrocnemius and soleus muscles about the knee, as well as the flexors, abductors, adductors, and extensors about the hip.
  - Cast or immobilizer is discontinued after 4-6 weeks and rehabilitative exercise programs for muscles are started



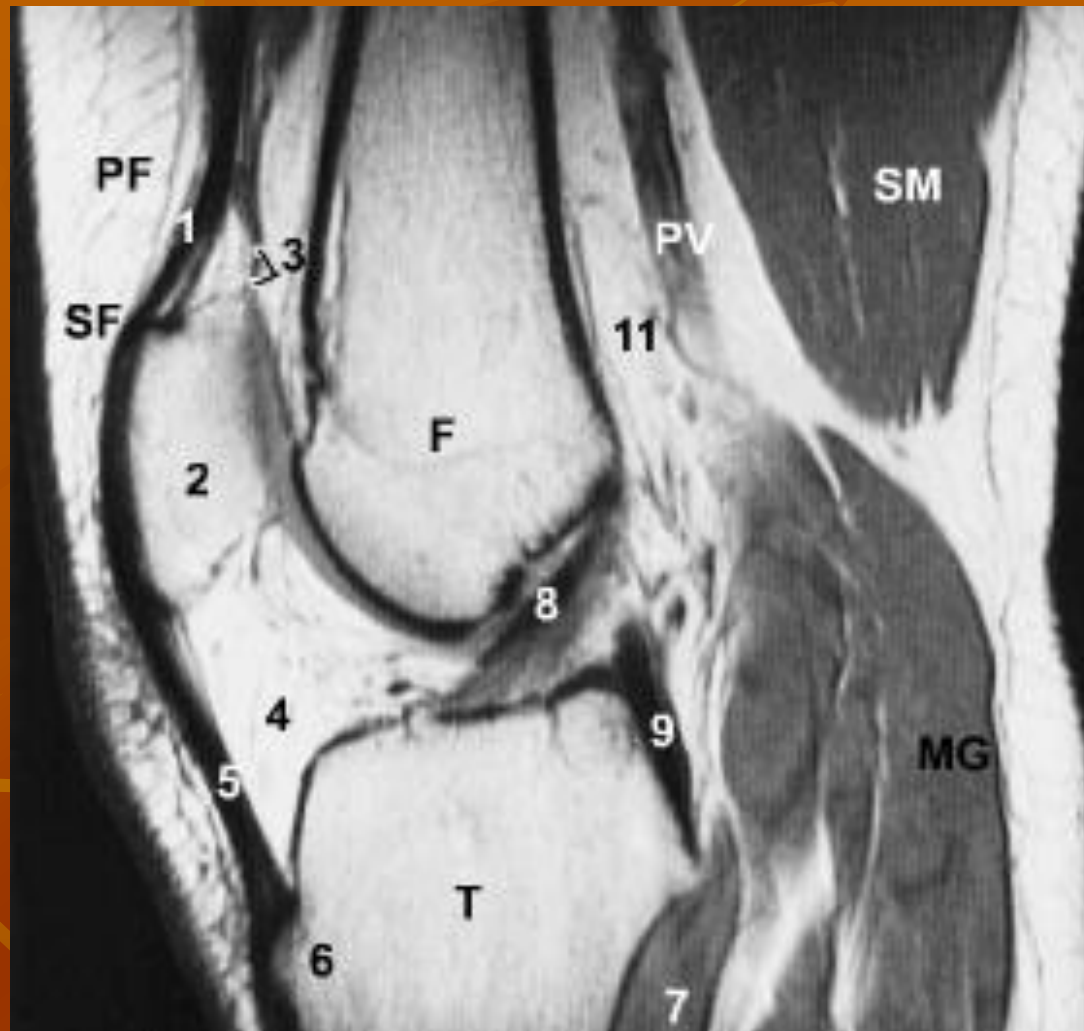
# Operative management (open vs arthroscopic)

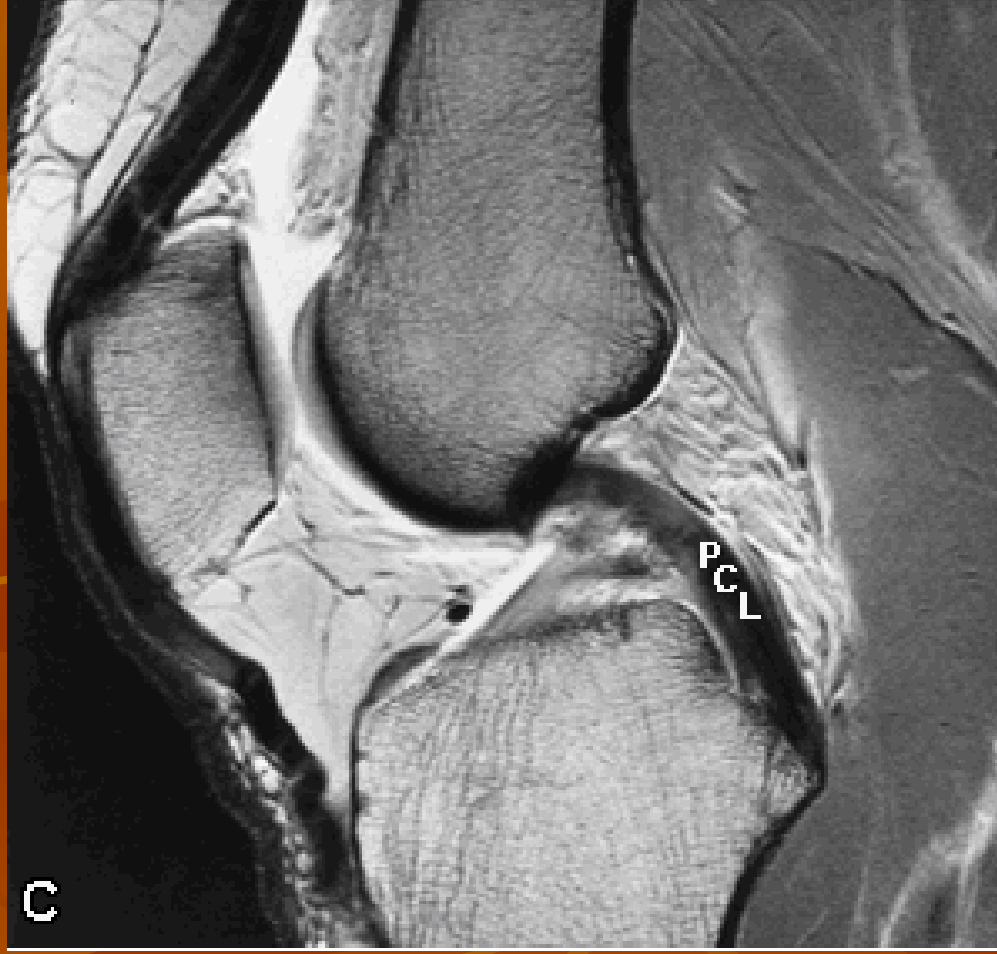
- Total meniscectomy ... irreparable complex tear
- Arthroscopic partial meniscectomy
- Meniscal repair
- Meniscal transplantation





# Ligamentous injuries







***Mechanism of Anterior Cruciate Ligament Injury in Agility Sports***

When trying to pivot around an opponent, an athlete decelerates and pivots on on a planted foot, causing the ACL injury.

# Diagnosis

- History of specific injury
- Symptoms:

Giving way

Locking: part of ACL impinged between femoral and tibial condyles.

Swelling (effusion

- Signs:

Atrophy of musculature around knee

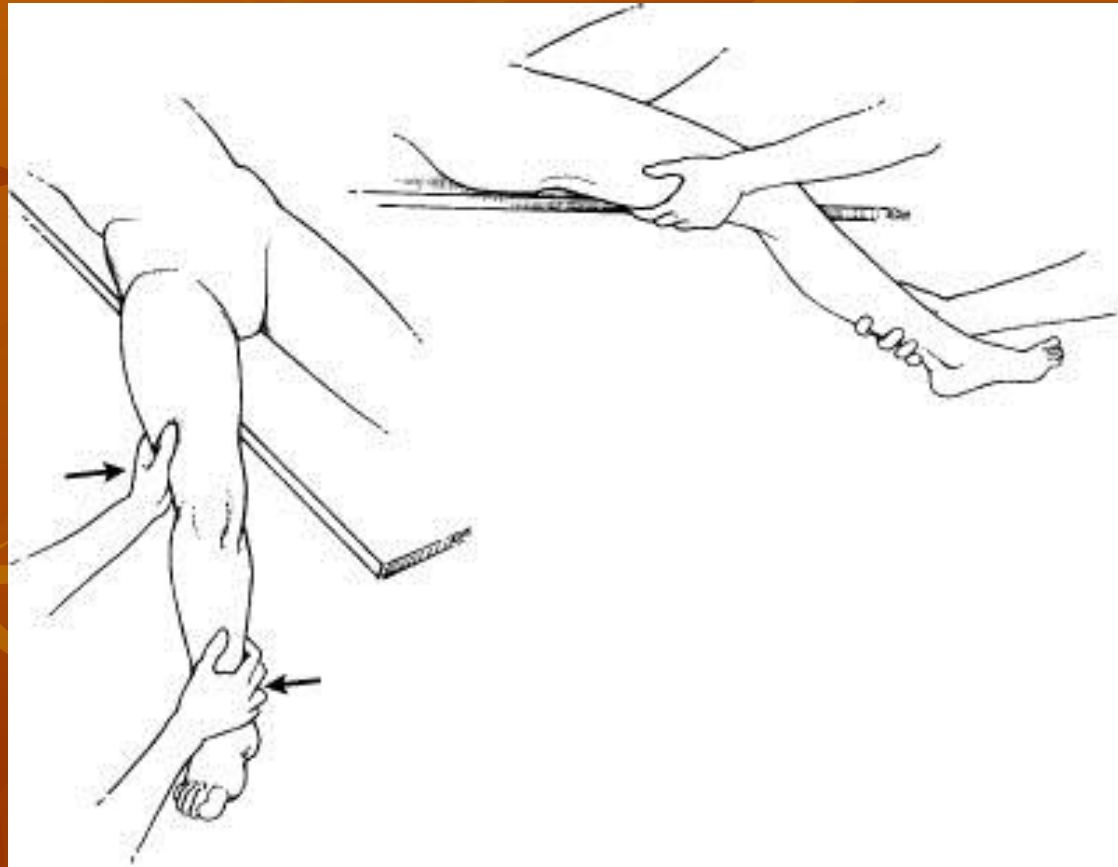
Effusion

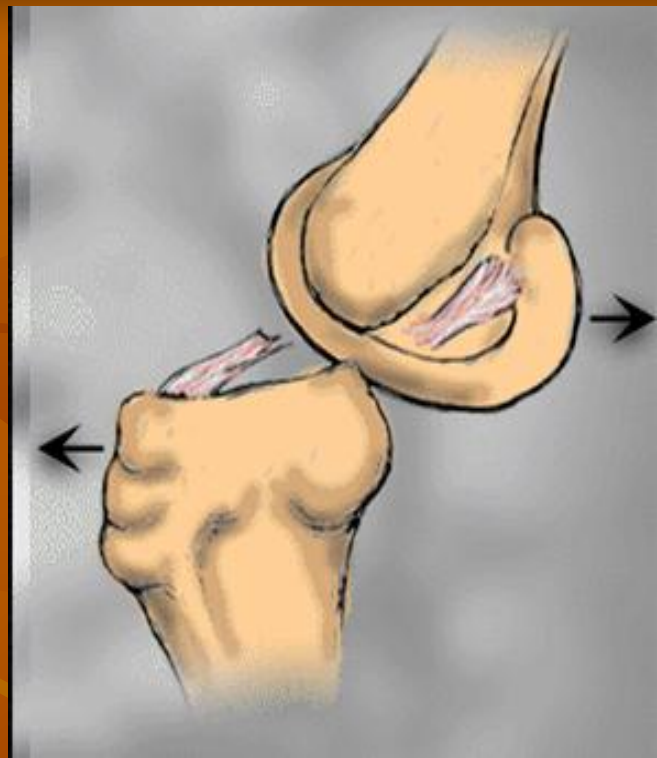
Diagnostic tests



# Diagnostic tests

- Collateral ligaments ... varus and valgus stress tests
- ACL
  - Ant. Drawer's test
  - Lachman's test
  - Lat. Pivot shift test
- PCL
  - Post. Drawer's test
  - Lachman's test



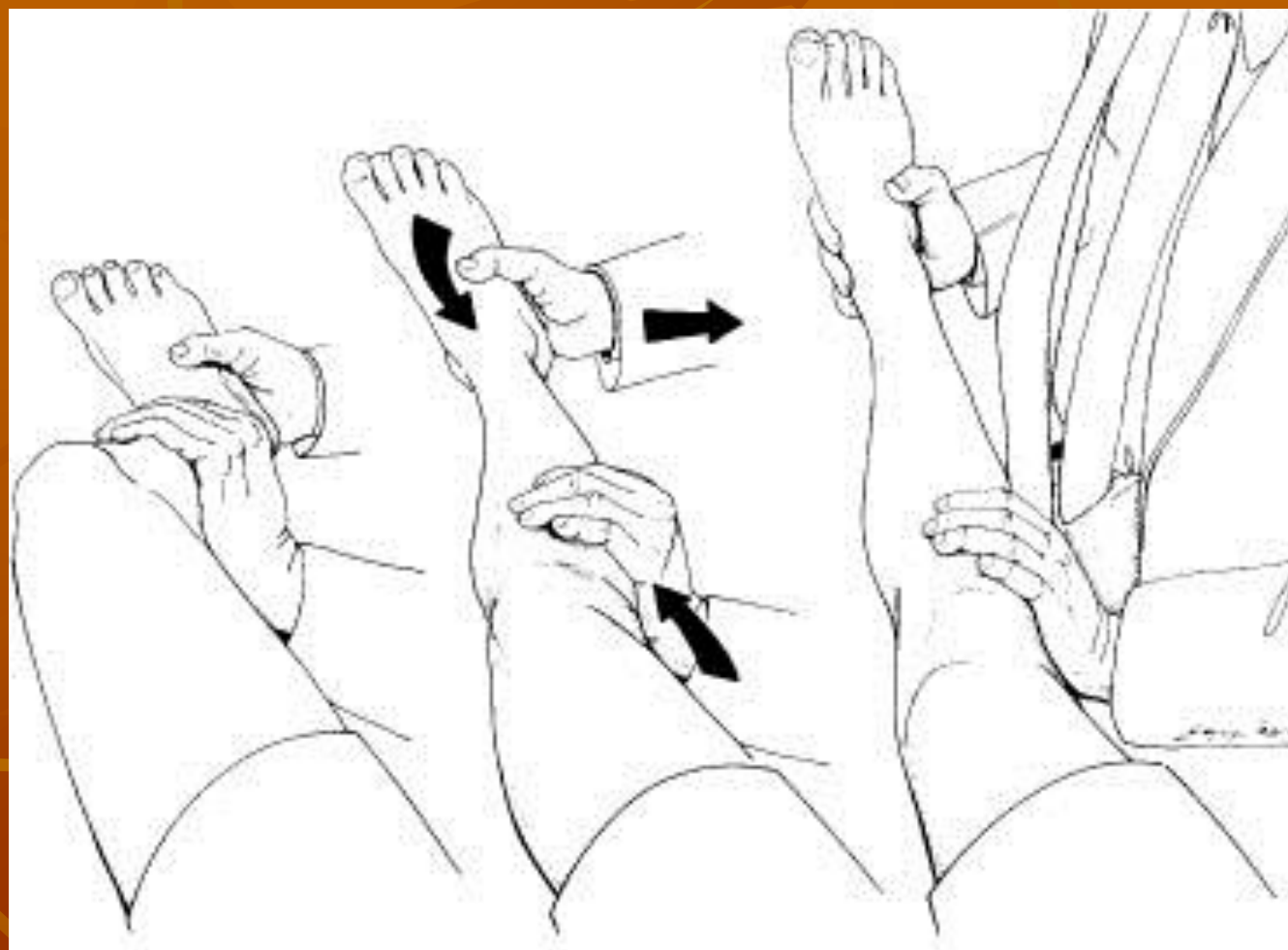




A



B







# Treatment

Arthroscopy Vs open surgery

Reconstruction of ACL or PCL by tendon graft  
from:

Bone – Patellar tendon – Bone graft

Hamstring tendons ( Semitendinosus)

Quadriceps tendon

Synthetic materials

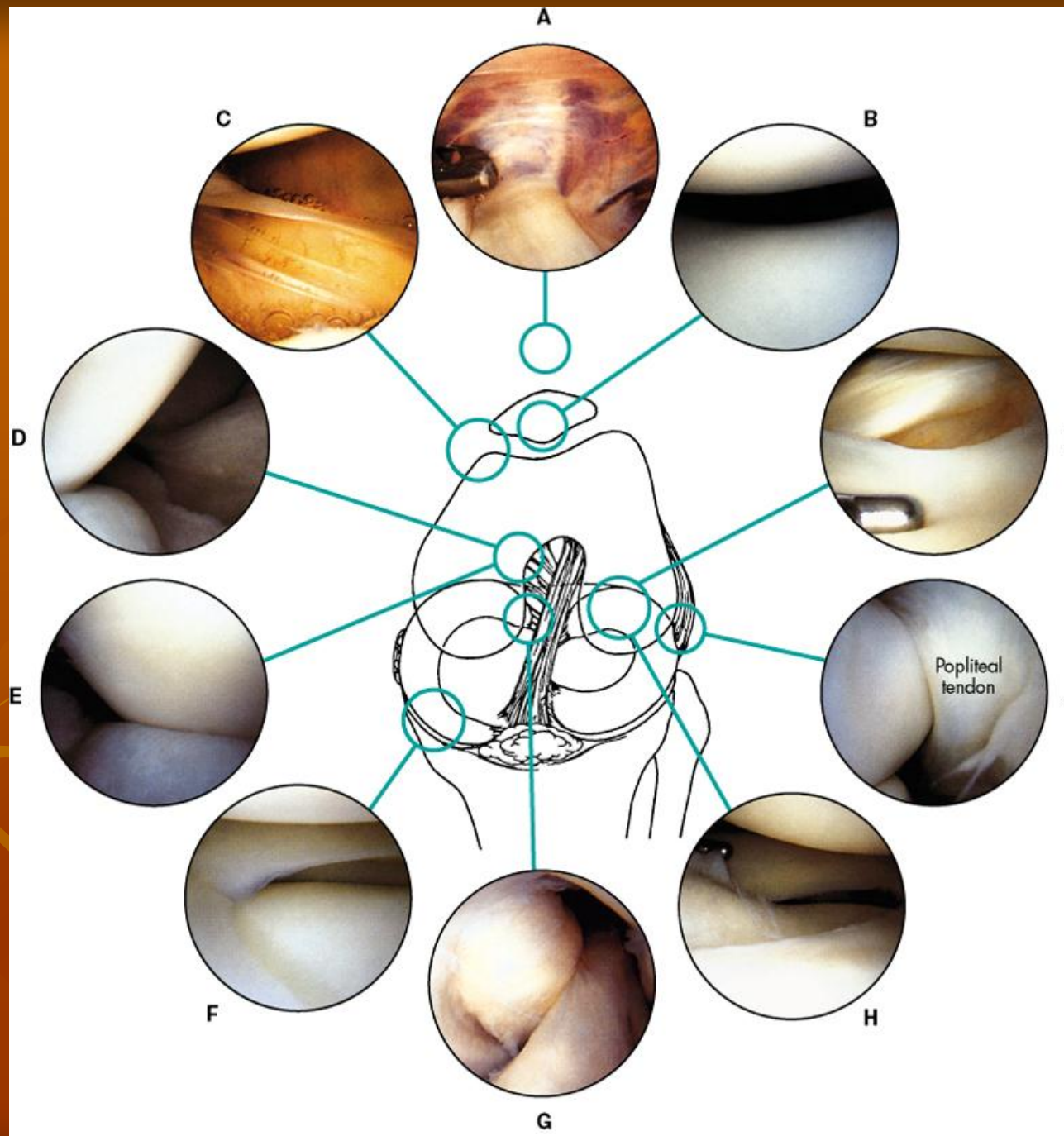




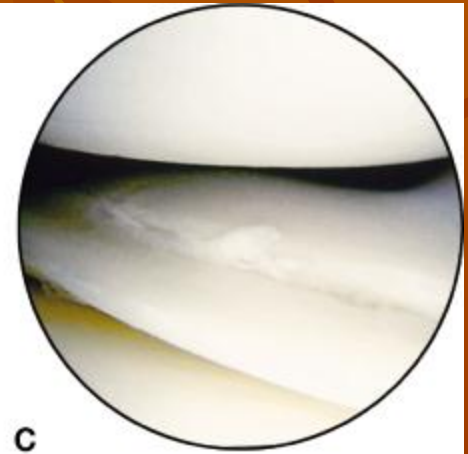
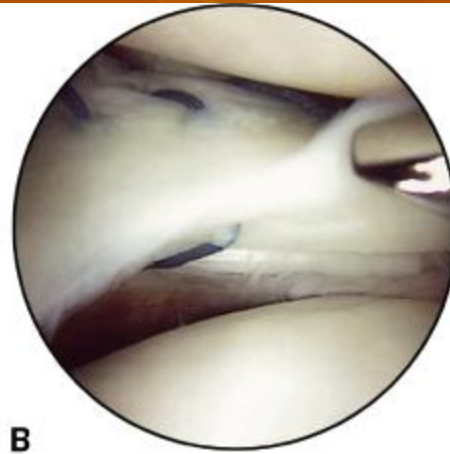
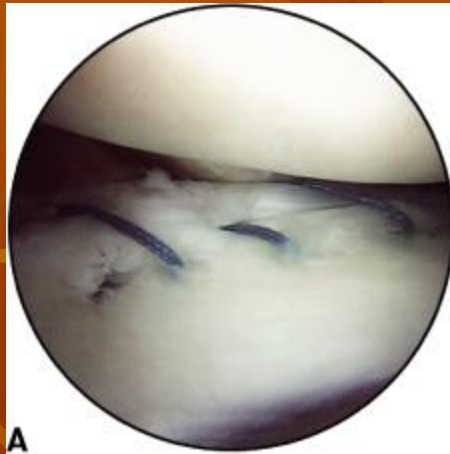
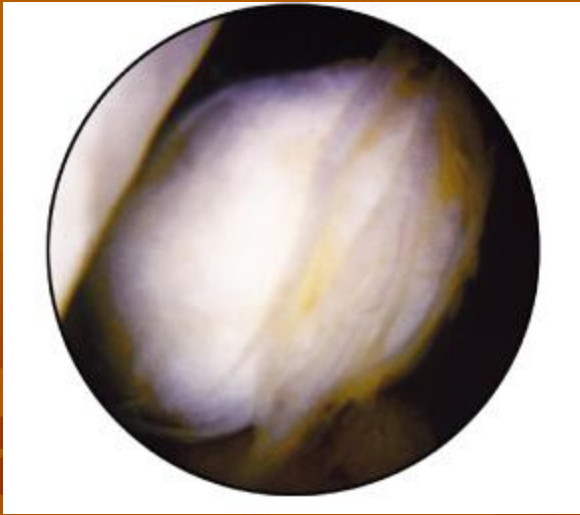
# **Knee arthroscopy**

# Indications of arthroscopy

- Synovial membrane
  - Synovial plicae
  - Synovectomy
- Articular cartilage surgery
  - Osteoarthritis ... debridement and abrasion arthroplasty
  - Chondral ulcers ... abrasion chondroplasty, autogenous osteochondral grafting
  - Osteochondritis dissecans
- Meniscal surgery
  - Partial, subtotal or total meniscectomy
  - Meniscal repair
  - Meniscal transplants
- Chondromalacia patellae
  - Lateral retinacular release
- Cruciate ligament reconstruction
- Loose bodies removal
- Drainage and debridement in pyoarthrosis
- Fractures
  - Arthroscopic assisted tibial plateau fixation
  - Tibial spine avulsions
- Arthrofibrosis



















# Advantages

- Reduced postoperative morbidity
- Smaller incision
- Less intense inflammatory response
- Improved thoroughness of diagnosis
- Absence of secondary effects
- Improved follow-up evaluation
- Reduced complication rate
- Possibility to perform surgical procedures that is difficult or impossible to perform through open arthrotomy

# Contraindications

- No absolute contraindications
- Relative contraindications
  - Risk of joint sepsis ... by either local skin condition or remote sepsis which can be seeded inside the joint
  - Ankylosed joints
  - collateral lig. and capsular disruption

# Complications

- **Damage to intra-articular structures**
  - Anterior of meniscus, fat pad
  - Cruciates ... during cruciate reconstruction by motorized shavers which debride the notch
- **Damage to extra-articular structure**
  - Blood vessels
    - Popliteal vessels ... during meniscectomy of posterior horn, meniscal repair through posterior sutures
    - Genicular vessels ... during extensive synovectomy
  - Nerves
    - Inferior branch of saphenous nerve and sartorial branch of femoral nerve
  - Ligaments and tendons
    - Tibial collateral ligament
    - Patellar tendon ... in transpatellar portal
- **Hemarthrosis**
- **Thrombophlebitis and deep venous thrombosis**
  - Tourniquet time > 60 min
  - Age > 50 y
  - Previous history of DVT
- **Infection**
- **Tourniquet paresis**
- **Synovial herniation and fistula**
- **Instrumental breakage**