

# Lower limb injuries

Traumatology

RHS 231

Dr. Einas Al-Eisa

# Patellar fractures

- May be **caused by**:
  - direct blow to the knee (e.g., a fall on the knee) causing comminuted fracture
  - sudden violent contraction of the quadriceps causing avulsion fracture (transverse fracture)

# Patellar fractures

- Usually visible in anteroposterior radiographs

# Patellar fractures

- **Treatment:**

- Internal fixation may be required if there is separation of fragments
- *Patellectomy* if the chances of regaining a smooth contour of the articular surfaces are low

# Patellar fractures (Types)

- **Comminuted fractures:**

- The patella is easily fractured by a blow to the flexed knee, such as in road traffic accidents
- *Treatment:* usually to remove the patella and encourage early movement (unless fragments can be easily reassembled)

# Patellar fractures (Types)

- **Stellate fractures:**

- A blow to the patella may crack it without displacing the fragments
- *Treatment:* conservatively by aspirating blood from the knee and supporting it in a long leg cast for 3 weeks, followed by mobilization

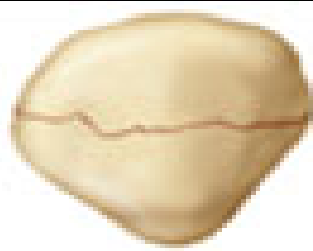
# Patellar fractures (Types)

- **Transverse fractures:**
  - The patella can be split transversely by indirect blow (e.g., a forced flexion injury caused by falling with the flexed knee under the body or stepping onto a non-existent step)
  - Such injury may split the quadriceps expansion on both sides as well

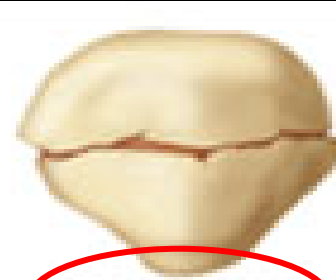
# Patellar fractures (Types)

- **Transverse fractures:**
  - *Treatment:* internal fixation is required (tension band wire)

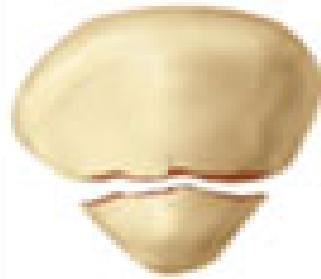




Undisplaced



Transverse



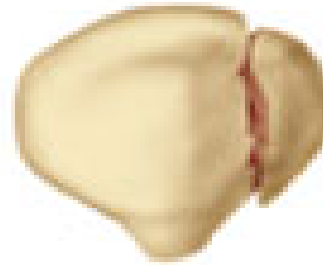
Lower pole  
(or upper)



Comminuted  
displaced



Comminuted  
undisplaced



Vertical



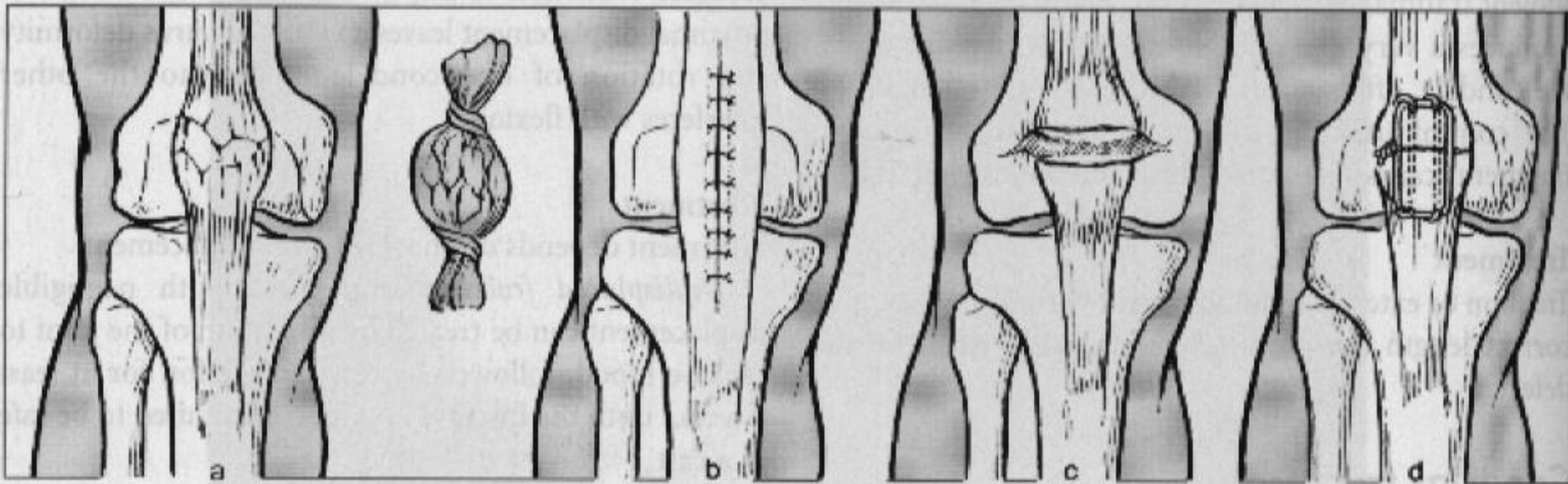
Osteochondral

Illustration © 1999 Chisby Kramas

**Stellate  
fracture**

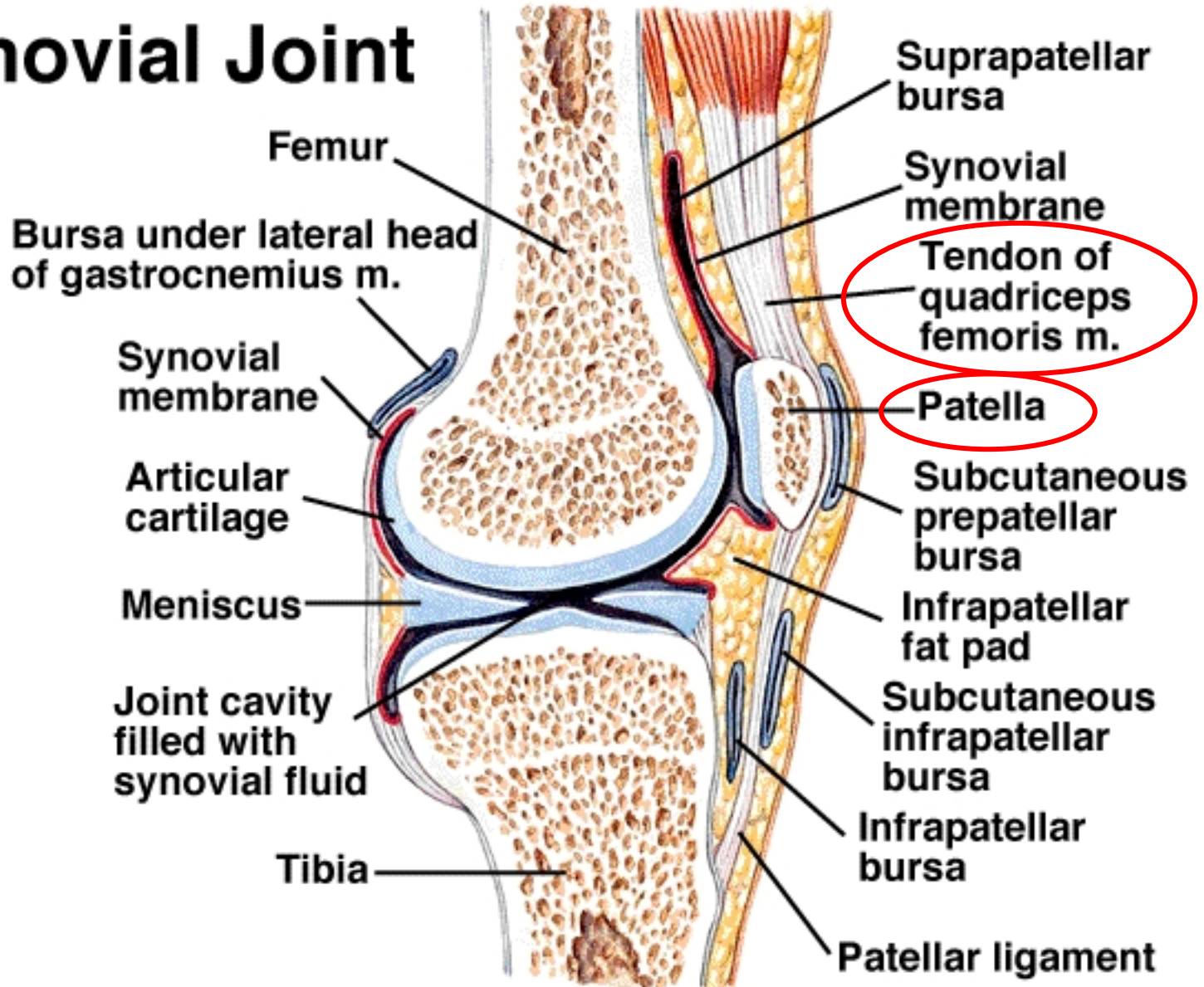
**Patellectomy**

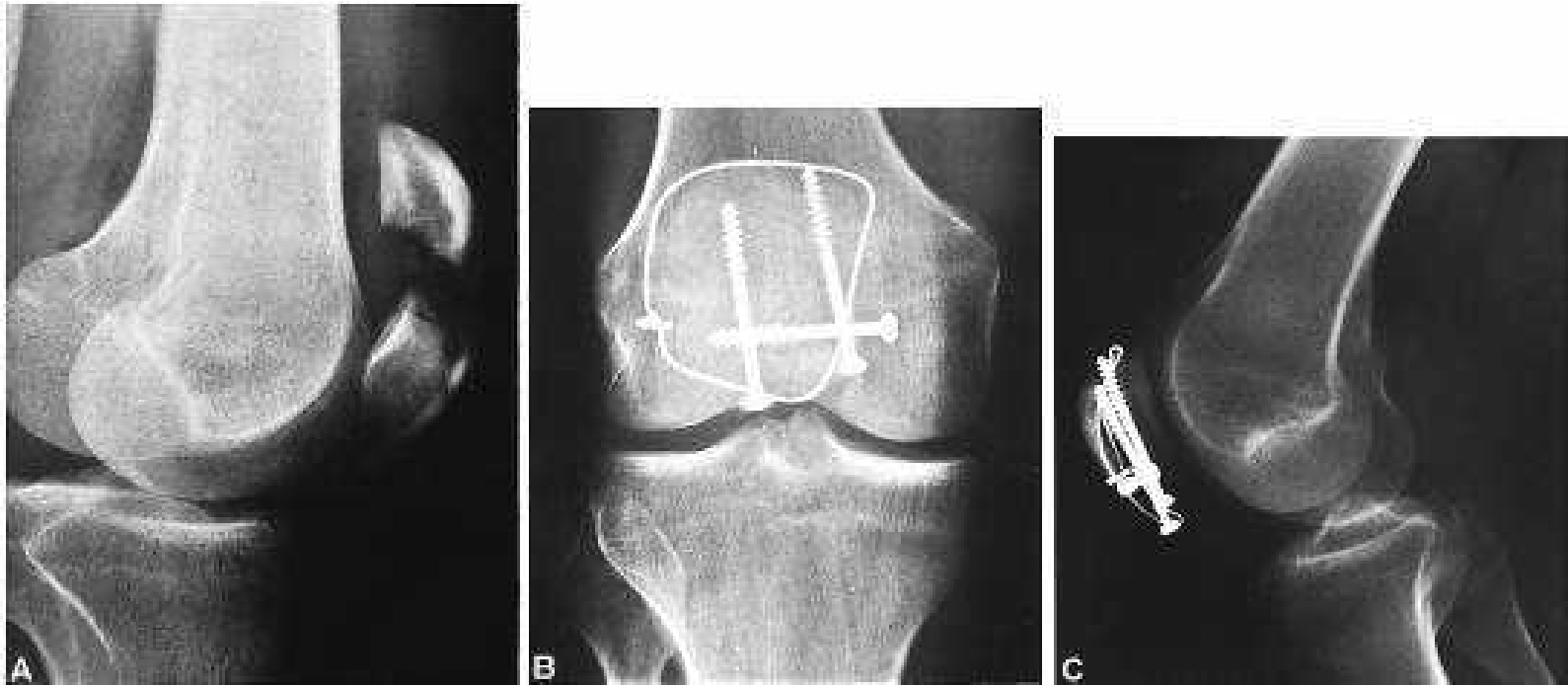
**Transverse  
fracture**



**Fig. 14.26** Fractures of the patella: (a) stellate fracture; (b) comminuted fracture treated by patellectomy; (c) transverse fracture; (d) transverse fracture treated by tension band wiring.

# Synovial Joint





Displaced fracture of patella  
treated with wire and screws

# Ligaments of the knee joint

- The knee depends heavily on ligaments for stability.....Why?
- Ligament injuries of the knee have more serious long term implications than a fracture of the femur or tibia.....Why?

# Ligaments of the knee joint

- **Anterior and posterior cruciate ligaments:** prevent anteroposterior displacement of the tibia
- **Medial and lateral collateral ligaments:** restrain rotation and lateral movement at the knee

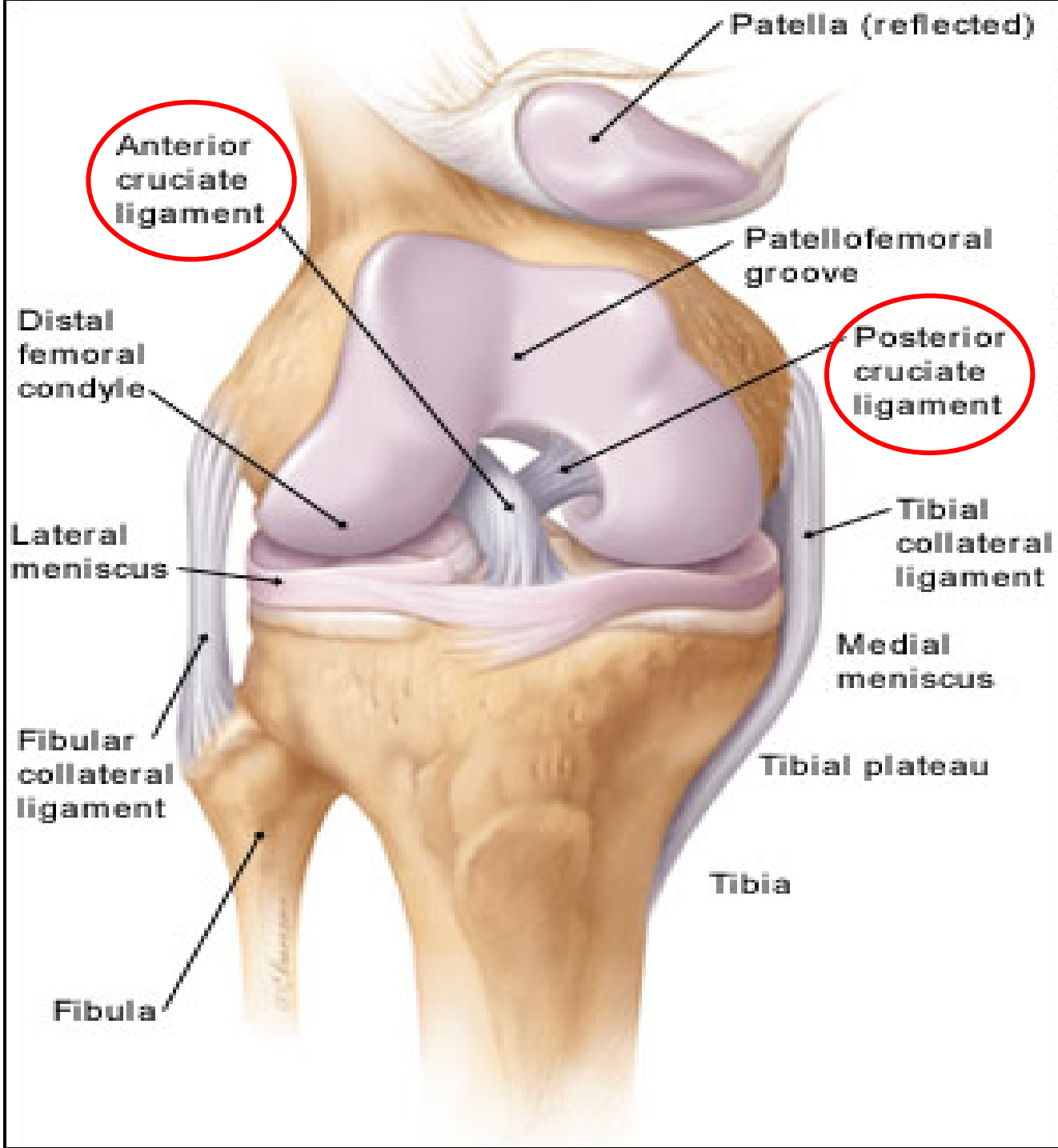
# Ligaments of the knee joint

- **Anterior cruciate ligament (ACL):** arises from the anterior intercondylar area of the tibial and runs posteriorly and laterally to attach to the back of the medial side of the lateral femoral condyle

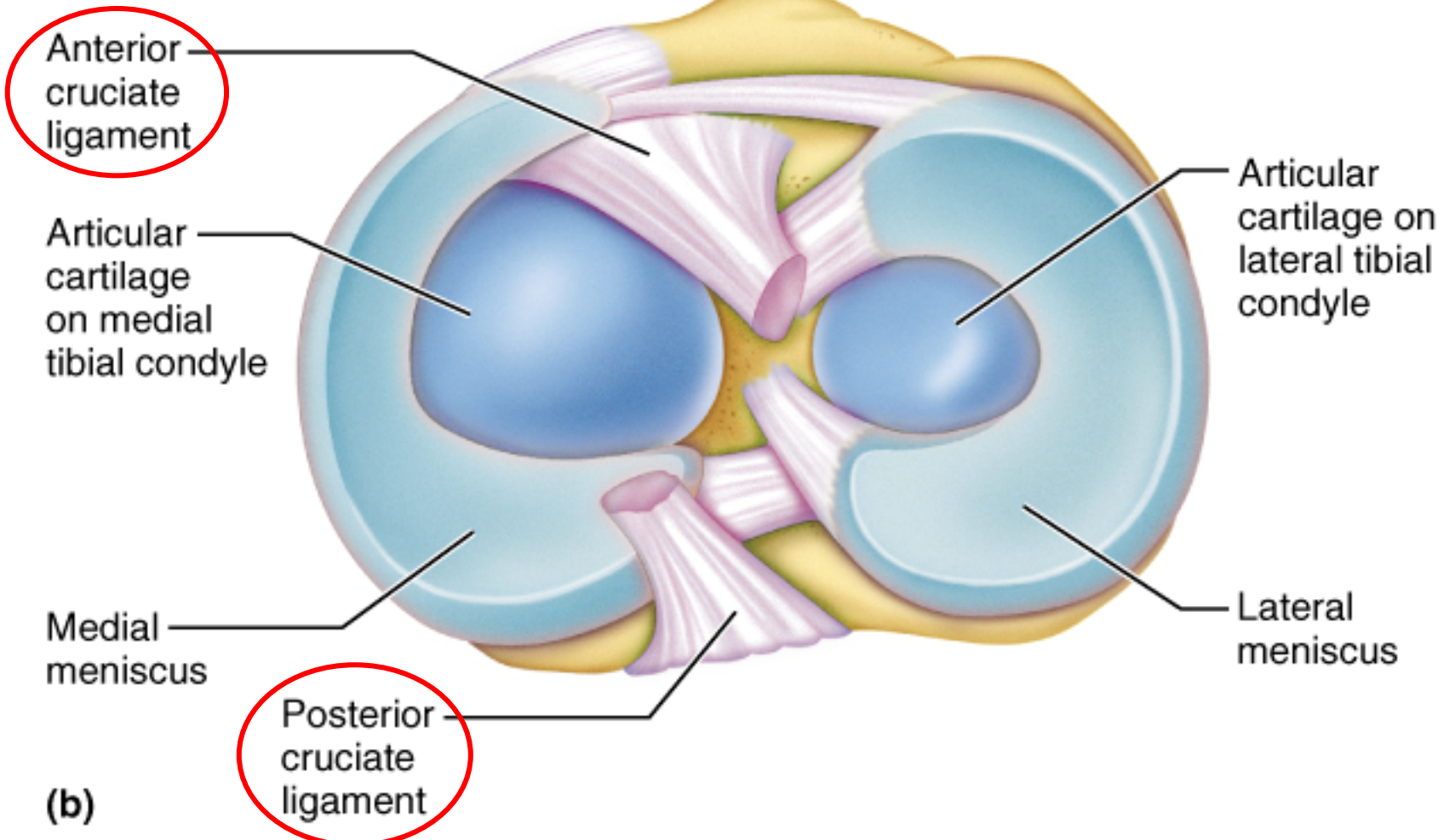
# Ligaments of the knee joint

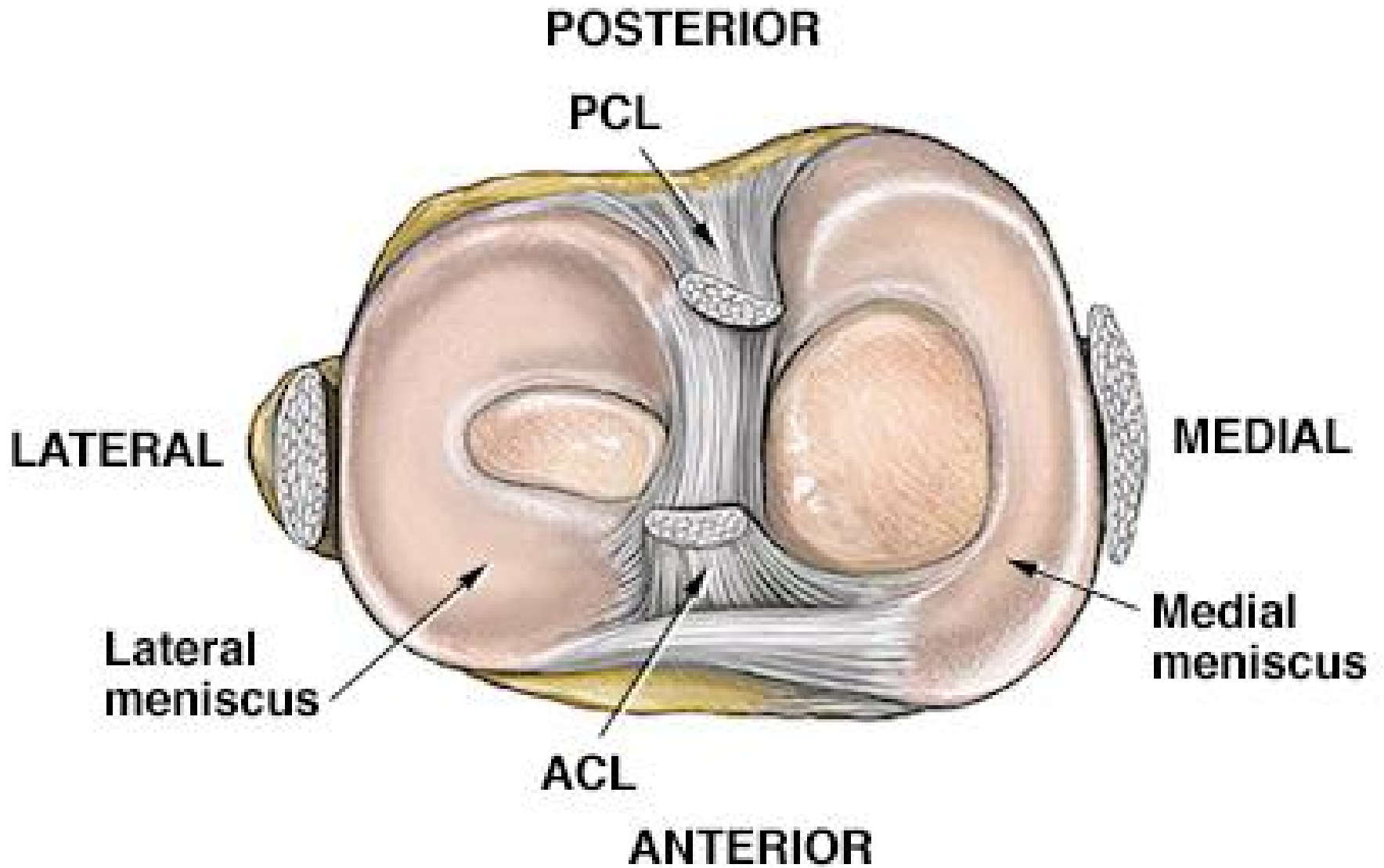
- **Posterior cruciate ligament (PCL):**  
arises from the posterior intercondylar area of the tibia and extends anteriorly and medially to attach to the lateral side of the medial femoral condyle

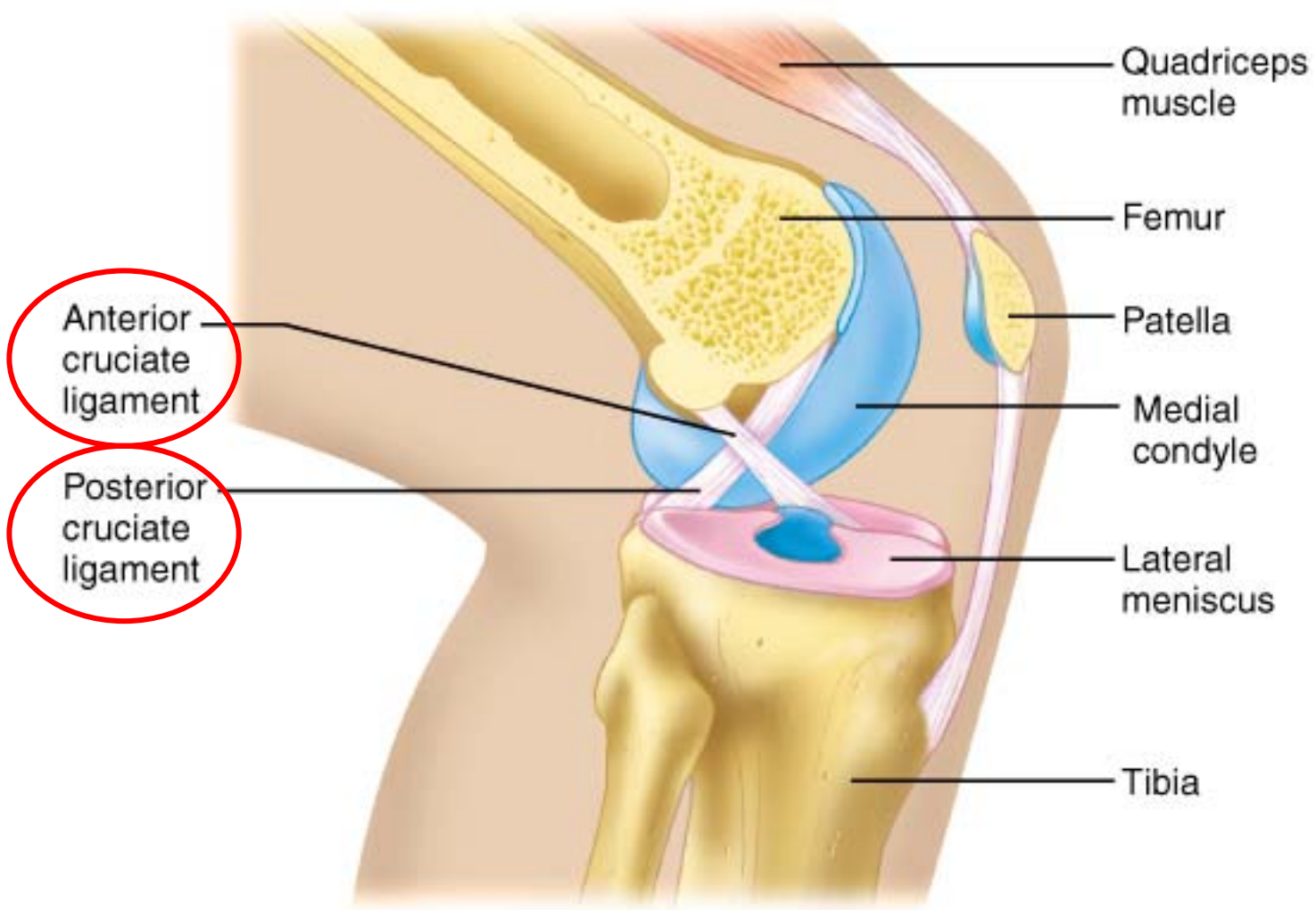




*Anterior*

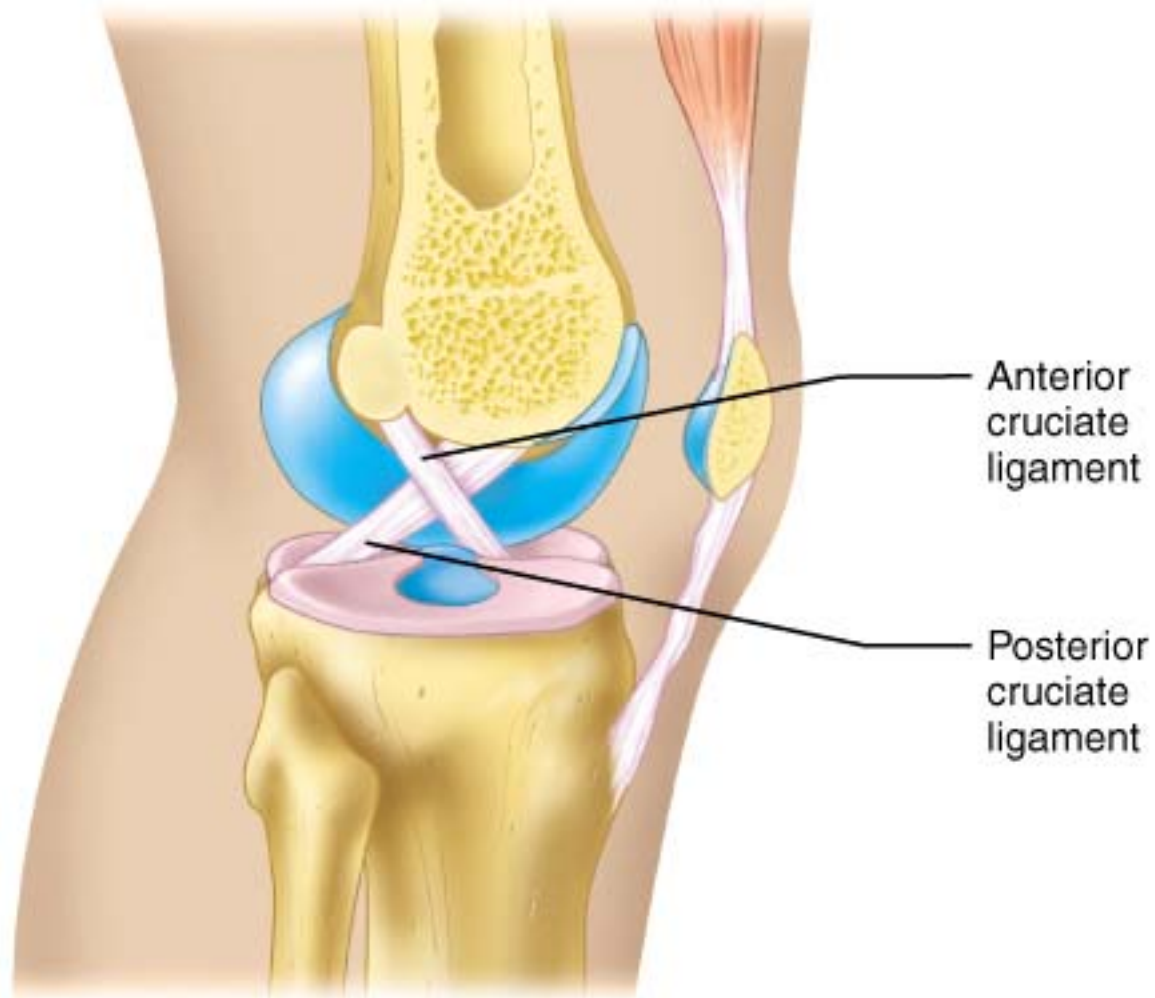






**(a)**

Copyright © 2001 Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.



**(b)**

Copyright © 2001 Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.

# Anterior cruciate injury

- The ACL limits forward movement of the tibia on the femur
- Often ruptured in sports by sharp twisting movement (very common injury)

# Anterior cruciate injury

- Rupture of a cruciate ligament makes a snapping sound or a “pop” often thought of as a broken bone
- Assessment is easy immediately after the injury, but is difficult after 15 minutes (due to bleeding, swelling, and muscle spasm)

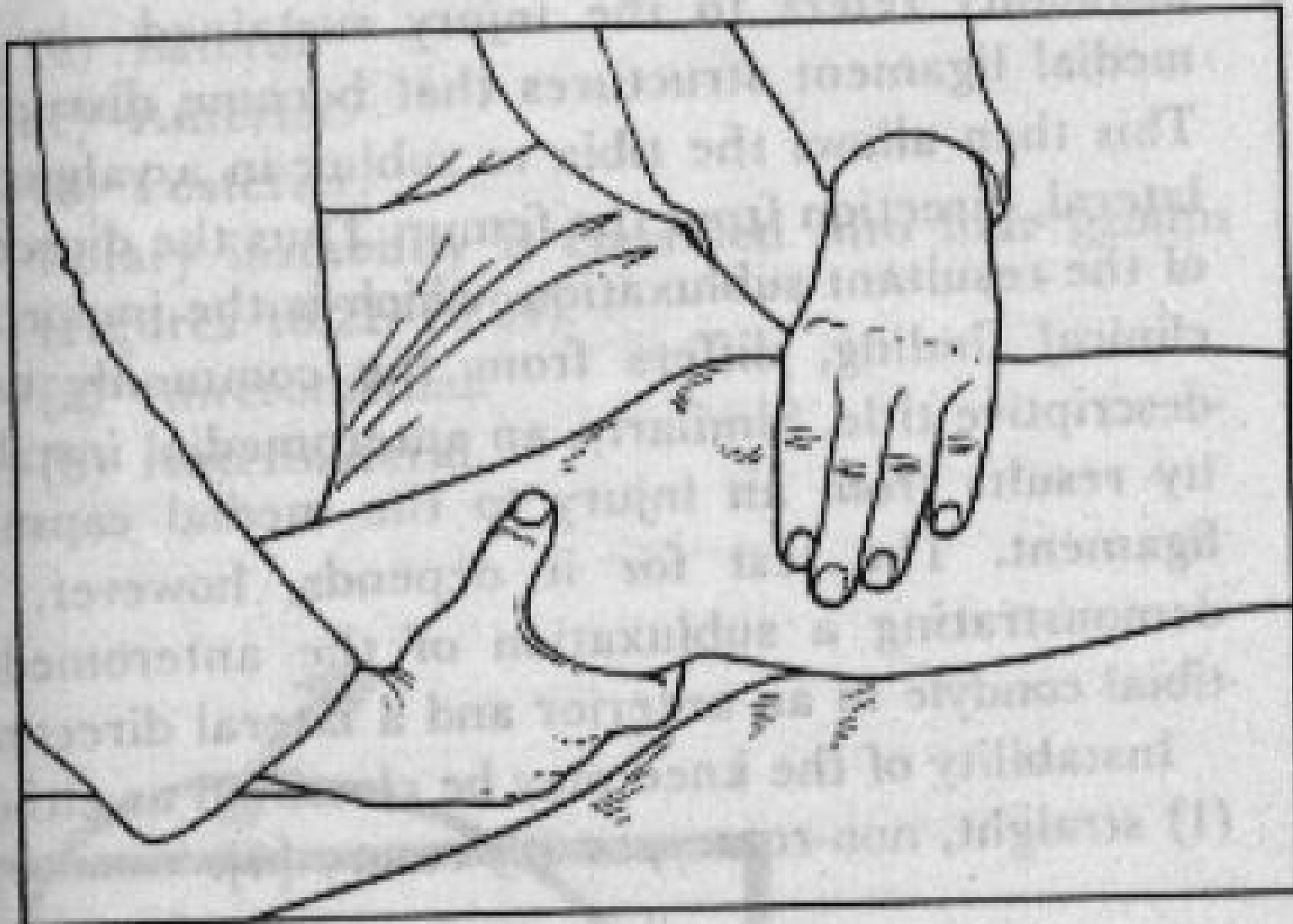
# Anterior cruciate injury

- Usually associated with severe haemarthrosis (within few hours of the injury) due to damage of the surrounding vessels



# Anterior cruciate injury

- Assessment: **Lachman test** for anterior translation of the tibia on the femur at 20° of flexion
  - The test is positive if the tibia can be moved forward on the femur with a soft end-feel



**Figure 10.18** Testing for ruptured anterior cruciate ligament, modified Lachman test

# Anterior cruciate injury

## Treatment

- **Conservative:**

- Removing blood from the knee by aspiration

- Arthroscopy to assess the condition of the intra-articular structures

# Anterior cruciate injury

## Treatment

- **Conservative:**

- If the knee remains clinically stable: a knee brace can be used for 6 weeks followed by a gradual weight bearing program

# Anterior cruciate injury

## Treatment

- **Conservative:**

- Physical therapy: focus on building the strength of the *hamstring* muscle as it prevents forward movement of the tibia
- Note: the quadriceps exacerbate the anterior draw

# Anterior cruciate injury

## Treatment

- **Operative:**

- An avulsed bony fragment (e.g., lateral tibial condyle) should be repositioned surgically

# Anterior cruciate injury

## Treatment

- **Operative:**

- Effective repair of the ACL is impossible (because the ligament crosses the synovial cavity of the knee joint)

# Anterior cruciate injury Treatment

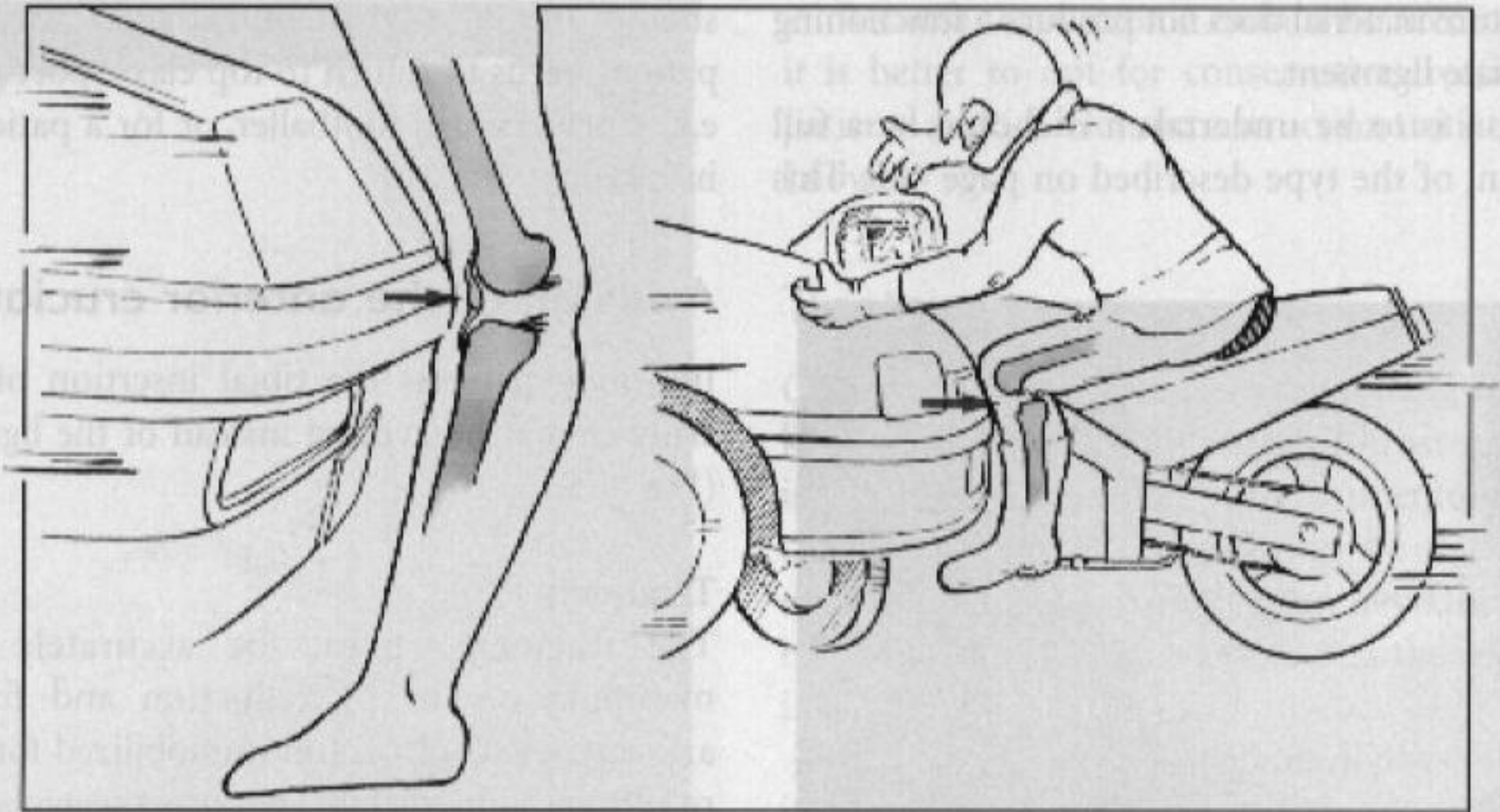
- **Operative:**

- Full reconstruction is more promising



# Posterior cruciate injury

- PCL can be torn in 2 ways:
  - A blow to the upper end of the tibia when the knee is flexed (e.g., head on collision while seated on a motor cycle)
  - Hyperextension



**Fig. 14.38** Mechanism of rupture of the posterior cruciate ligament by (a) hyperextension: (b) impact to the upper end of the tibia with the knee flexed.

# Posterior cruciate injury

- Assessment: **posterior drawer sign** with the knee flexed to 90° and the tibia is passively pushed posteriorly on the femur

# Posterior cruciate injury

## Treatment

- **Conservative:**
  - Removing blood from the knee by aspiration or arthroscopy, then immobilizing the knee in extension

# Posterior cruciate injury

## Treatment

- **Conservative:**
  - Following removal of the cast, start vigorous *quadriceps* exercises (should be continued until the quadriceps on the injured side is more powerful than the uninjured side)

# Posterior cruciate injury

## Treatment

- **Operative:**

Should be considered if there is:

- Considerable instability
- Damage to other ligamentous structures
- Avulsion of the PCL with a piece of bone from the tibia

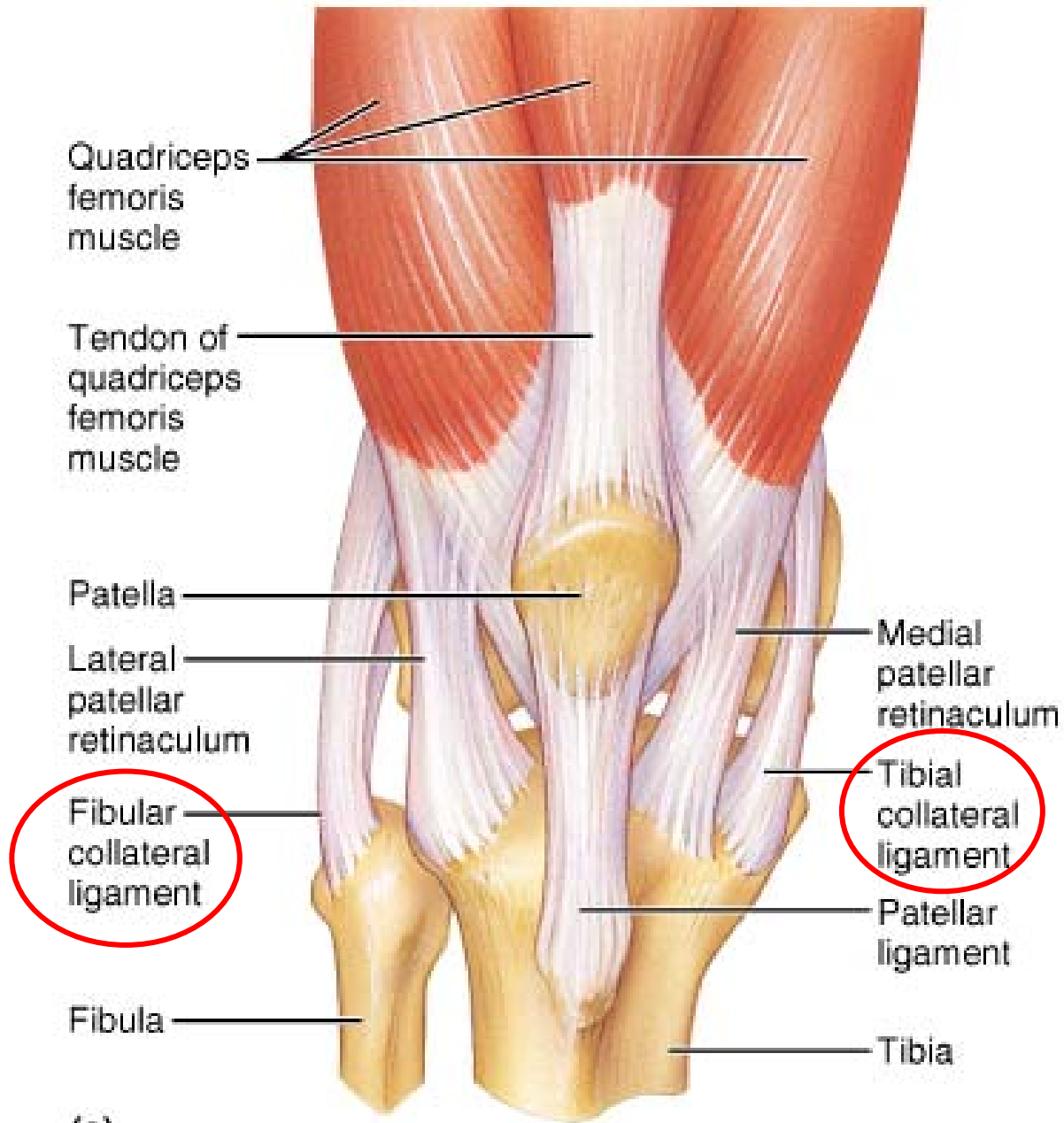
# Ligaments of the knee joint

- **Medial (tibial) collateral ligament:** pass from the medial epicondyle of the femur to the medial surface of the proximal end of tibia
- Fused posteriorly with the capsule of the knee joint

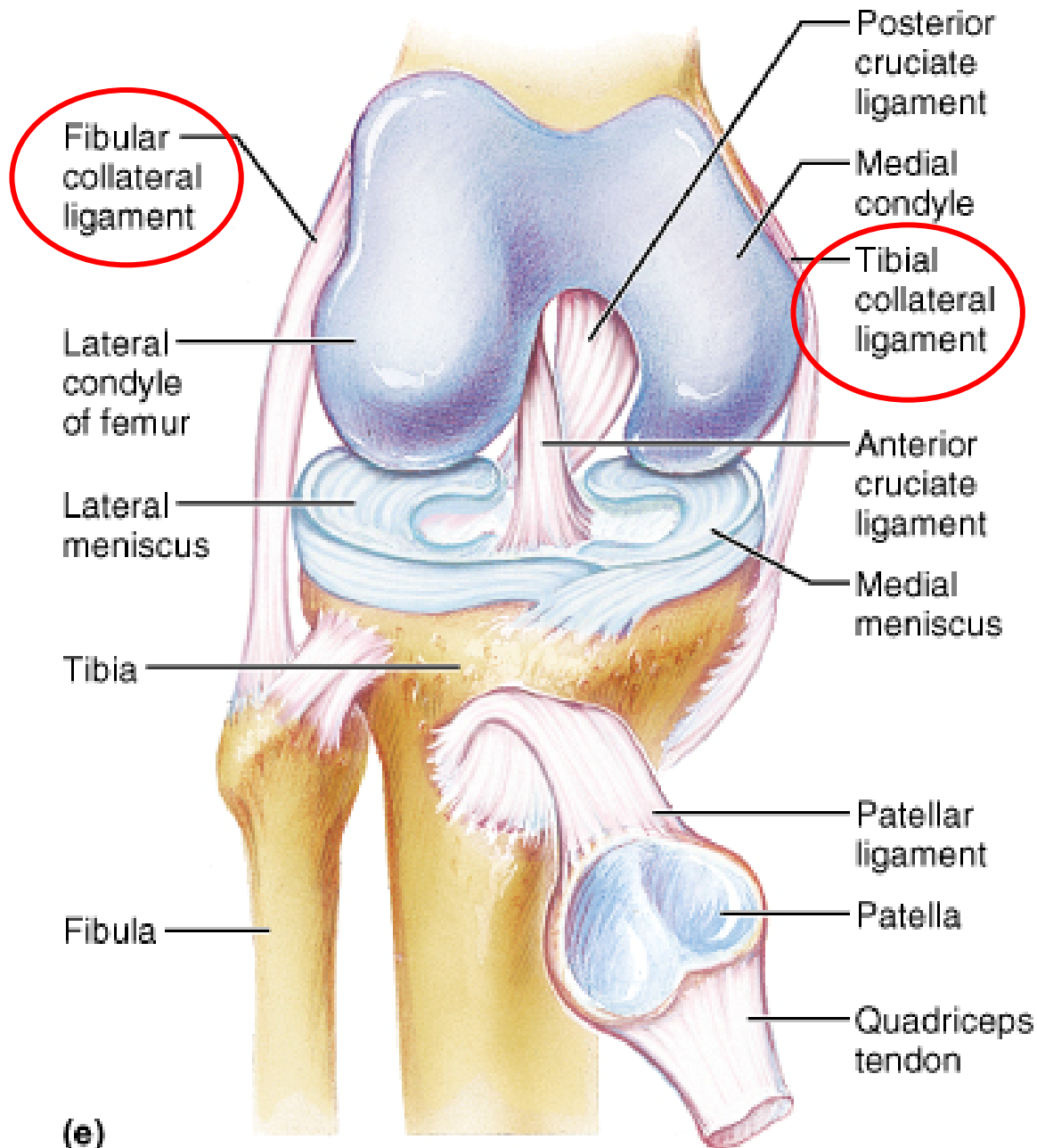
# Ligaments of the knee joint

- **Lateral (fibular) collateral ligament:**  
pass from the lateral epicondyle of the femur to the head of fibula
- Lateral to and free of the joint capsule





(c)



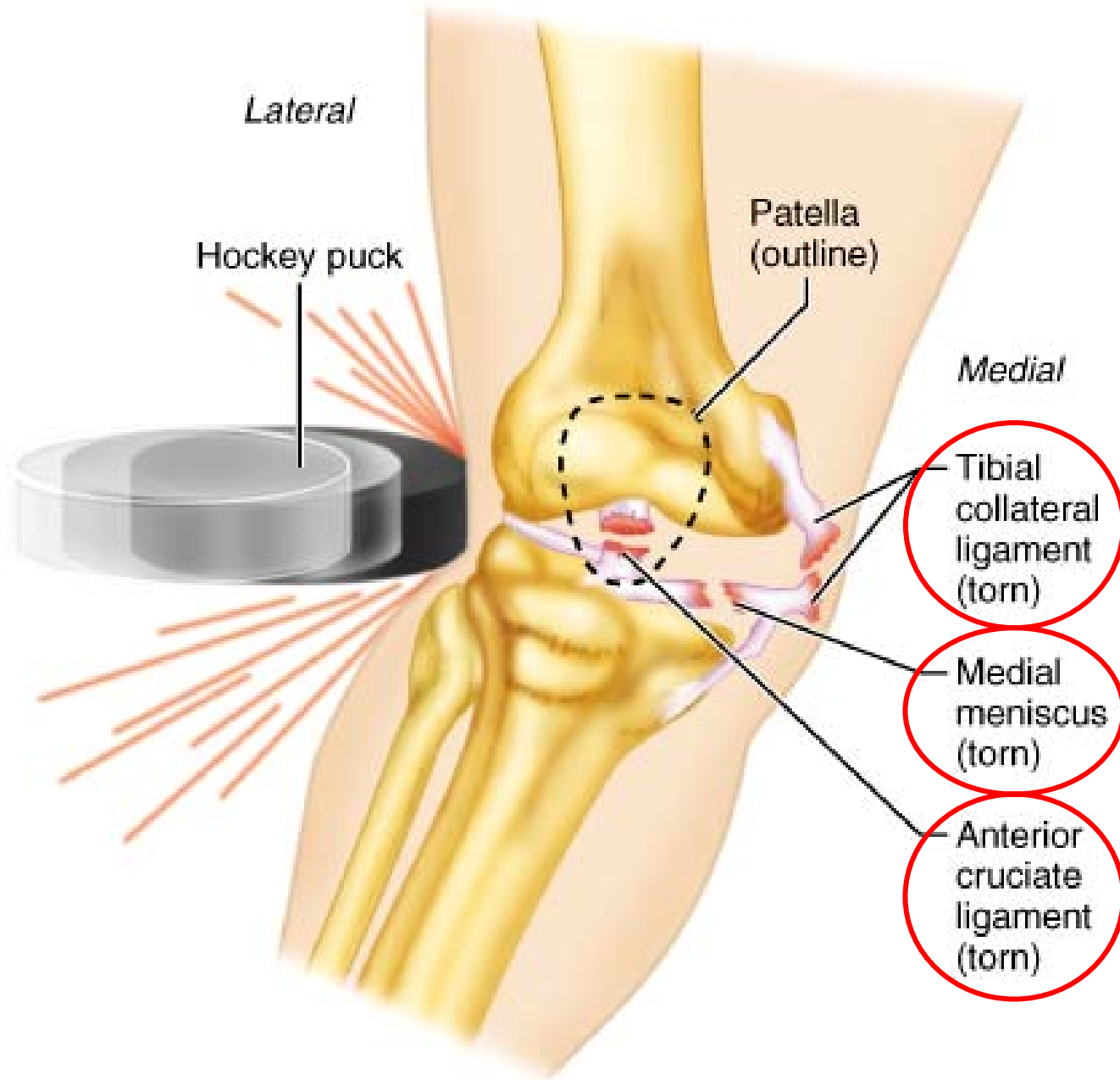
**(e)**

# Medial collateral injury

- Usually associated with tear of the ACL
- Caused by valgus strain

# Medial collateral injury (Treatment)

- Apply a long leg cast from the groin to the ankle for 6 weeks
- The brace should allow some knee flexion (to aid ligamentous healing)
- Isolated tears of medial collateral usually heal well



# Lateral collateral injury

- Rarely injured on its own, except in lacerations
- Not as important as the other ligaments
- If injured, there is a high incidence of injury to the common peroneal nerve

# Lateral collateral injury (Treatment)

- Early operative repair is preferable because conservative management is often unsatisfactory

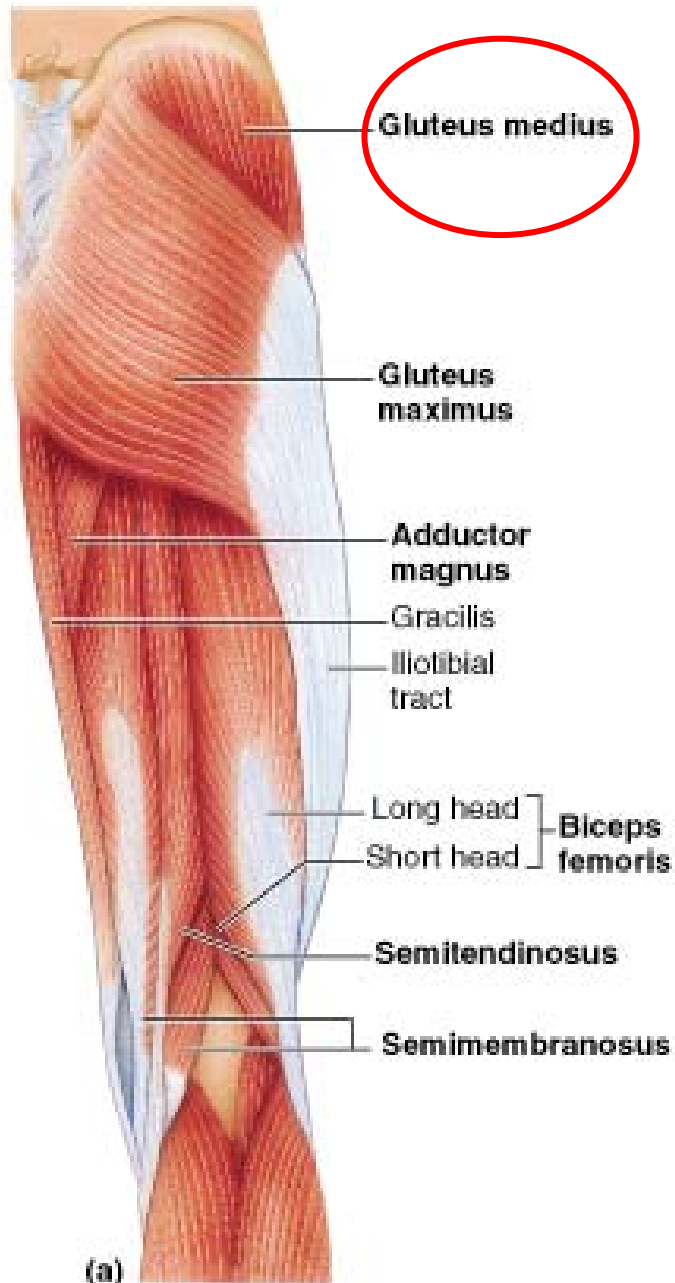
# Gluteal tendinitis & trochanteric bursitis

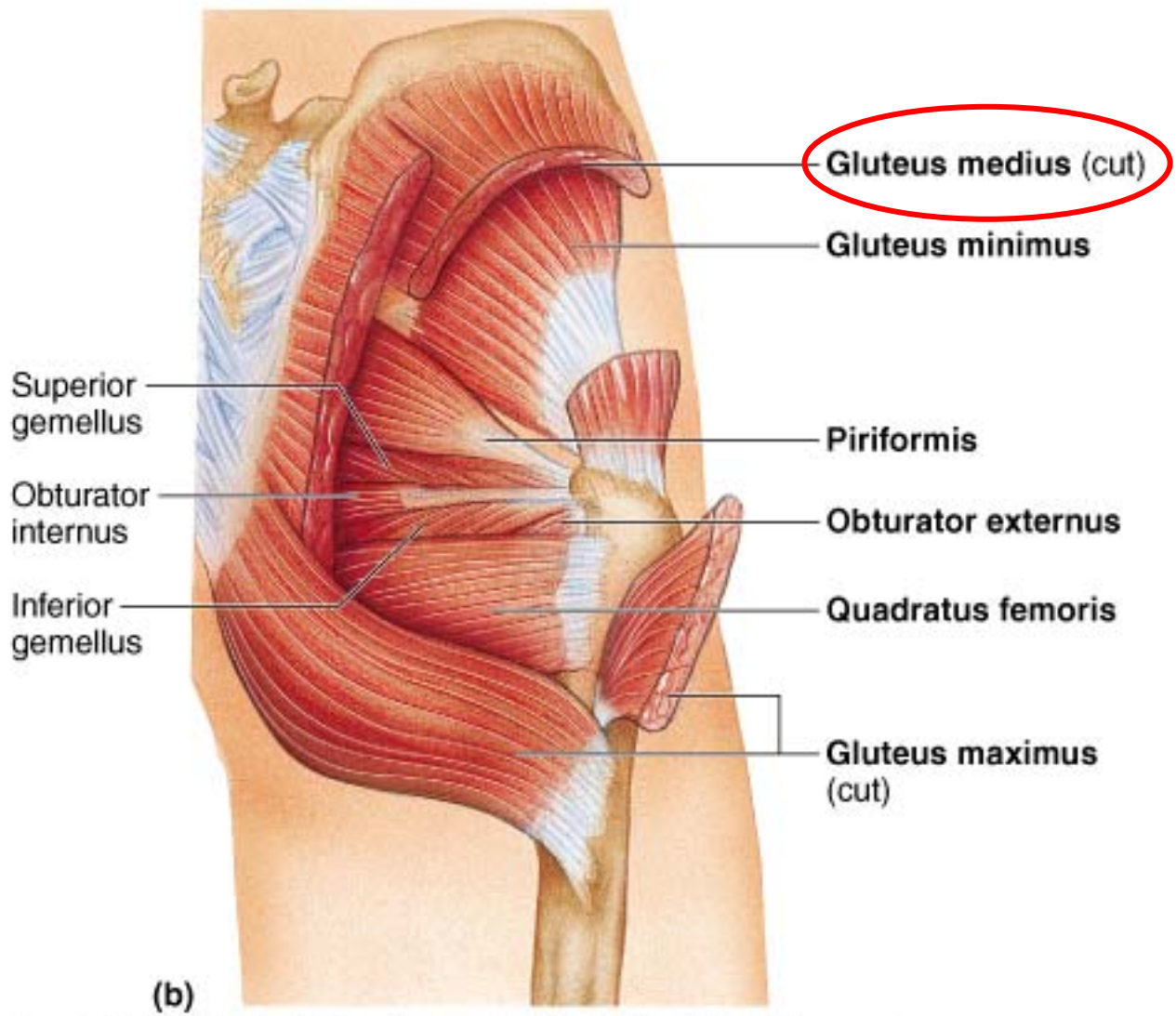
- The most common soft tissue lesions around the hip joint
- Usually occur together



# Gluteal tendinitis & trochanteric bursitis

- The gluteus medius tendon inserts into the greater trochanter of the femur, and is separated on its lateral aspect from the tensor fascia lata by the large trochanteric bursa





**(b)**

# Gluteal tendinitis & trochanteric bursitis

- **Pain:**

- usually *localized* over the outer surface of the greater trochanter
- when severe, may *radiate* down the lateral or posterolateral aspect of the thigh
- may disturb sleep

# Gluteal tendinitis & trochanteric bursitis

- **Caused by:**

- hip movement especially walking, running, climbing stairs, or crossing legs
- may follow direct trauma
- may occur in elderly patients with degenerative changes

# Gluteal tendinitis & trochanteric bursitis

- **Signs:**

- Pain is reproduced by stretching or contracting the gluteus maximus (against resistance)
- Localized tenderness on the outer aspect of the lateral trochanter

# Gluteal tendinitis & trochanteric bursitis

- **Management:**

- Rest from activities that produce pain

- Anti-inflammatory drugs

- Physical methods to relieve the pain: heat, ice, stretching of the tendon, and deep pressure

# Gluteal tendinitis & trochanteric bursitis

- **Management:**

- Mobilization techniques

- Injections of local anaesthetics and corticosteroids

- Abdominal and pelvic tilting exercises