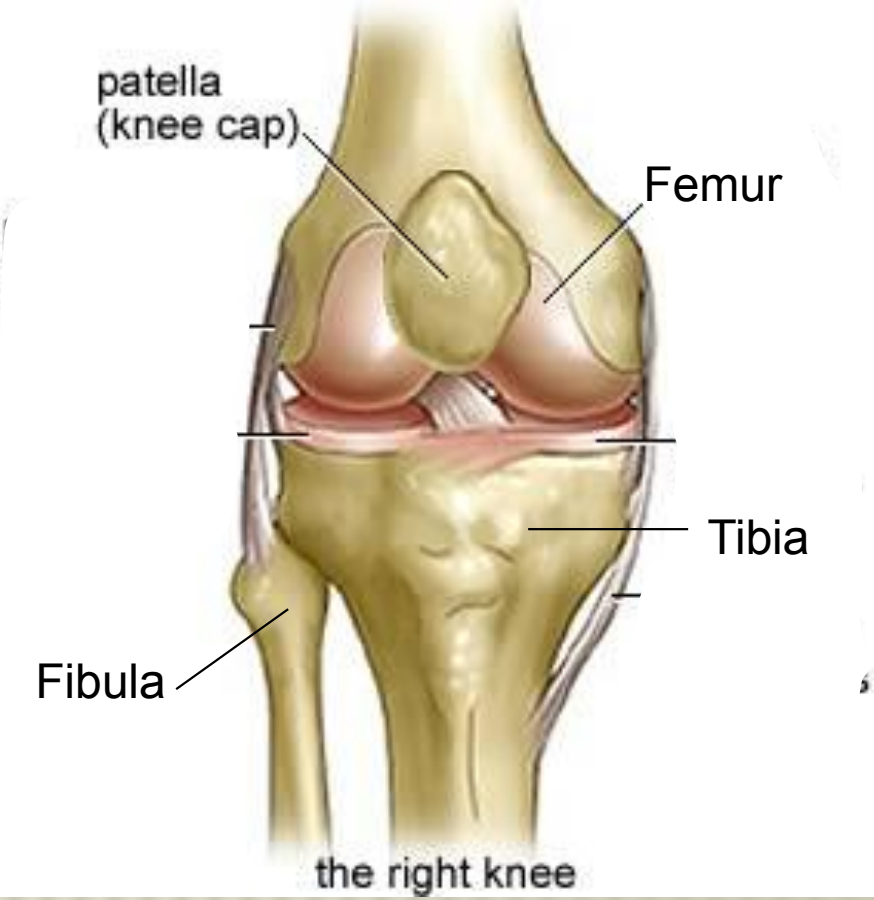
THE KNEE

OBJECTIVES

- Review knee anatomy
- Learn the basic physical exam of the knee
- Discuss acute knee injuries
- Discuss causes of chronic knee pain

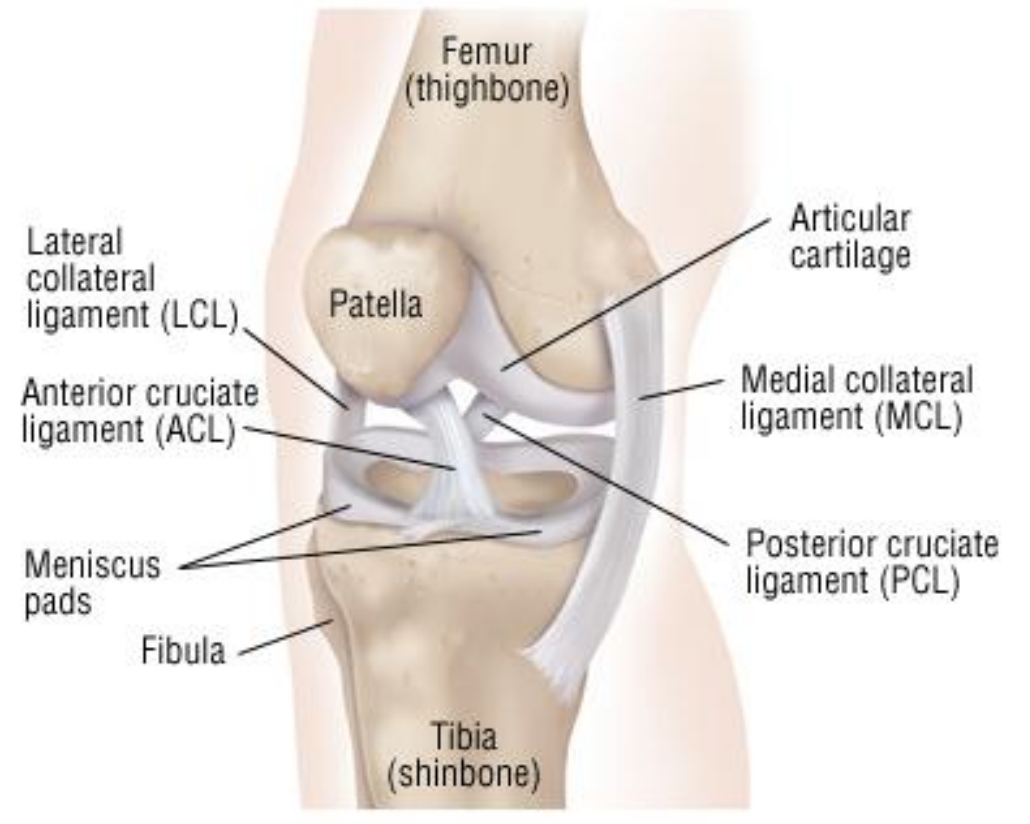
ANATOMY

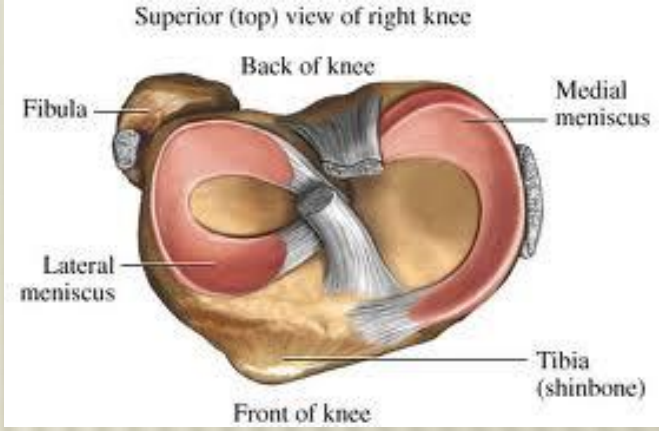
- Bones



ANATOMY

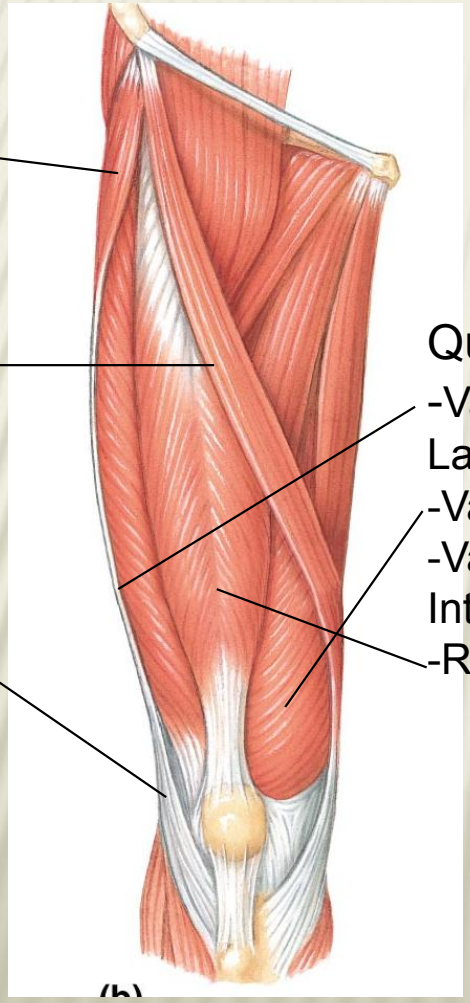
- Cartilage and ligaments





ANATOMY

- Muscles

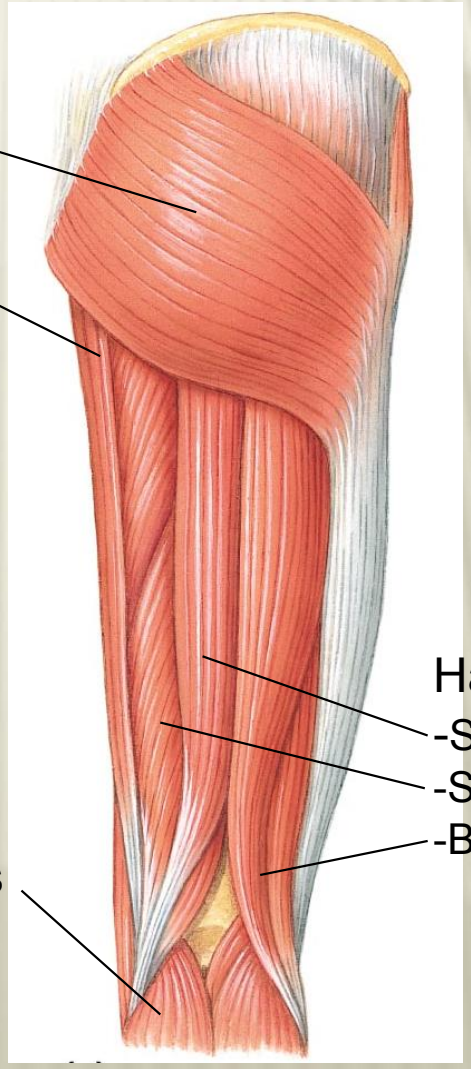


TFL

Sartorius

IT band

Quadriceps:
-Vastus Lateralis
-Vastus Medialis
-Vastus Intermedius
-Rectus femoris



Glut max

Gracilis

Hamstring
-Semitendinosus
-Semimembranosus
-Biceps femoris

Gastrucnemius

THE EXAM

- Inspection
- Palpation
- ROM
  - Active
  - Resisted
  - Passive
- Provocative tests
- Functional tests

INSPECTION

- Bruising
- Swelling
- Deformity
- Scars
- Effusion

PALPATION


Quadriceps tendon
Lateral femoral condyle
Patella
Lateral joint line
Patellar tendon
Medial joint line
Gerdy's tubricle
Pes anerinus tendons
Tibial tuberosity

PALPATION

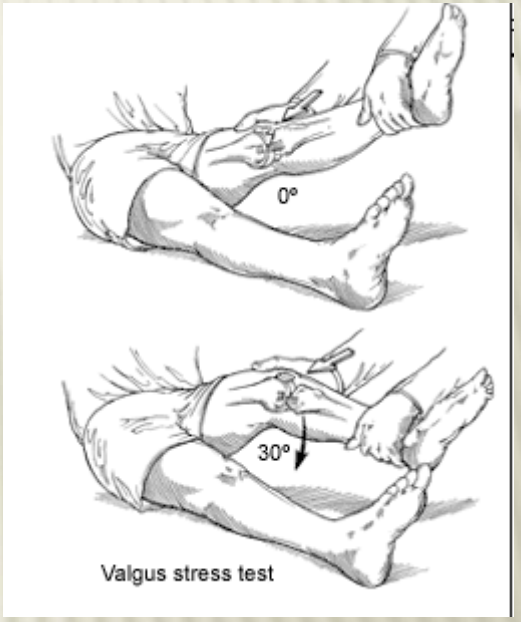
- Patella
  - Patellofermoral Syndrome – tenderness on the underside of patella
  - Patellar Instability – apprehension with patellar glide
- Gerdy's tubricle – IT band syndrome
- Tibial tuberosity – Osgood-Schlatter's
- Patellar tendon – tendonitis/Jumpers' knee
- Medial or lateral joint line - meniscus

RANGE OF MOTION

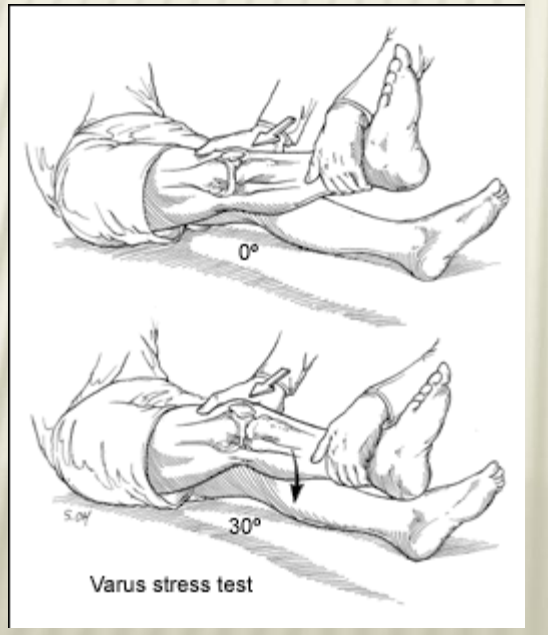
- Flexion
- Extension

PROVOCATIVE TESTS

- Valgus stress – MCL stability

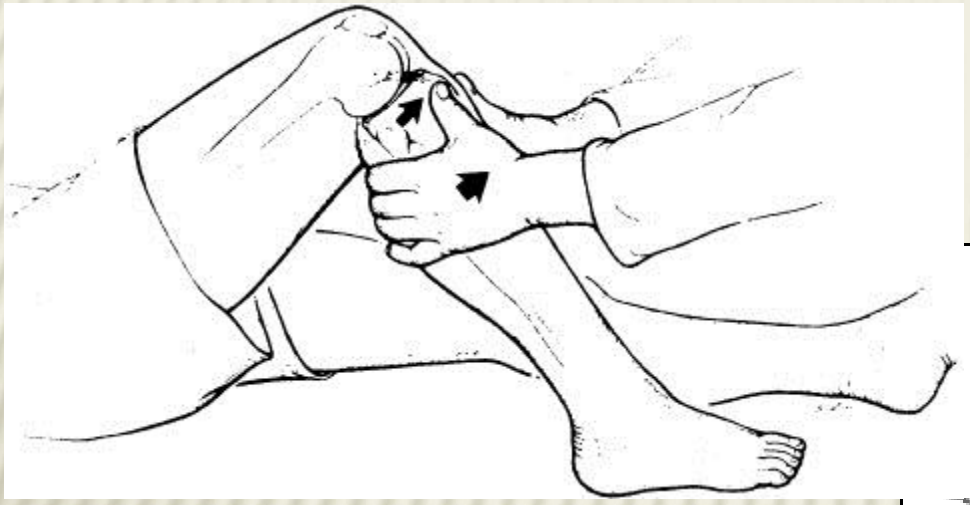


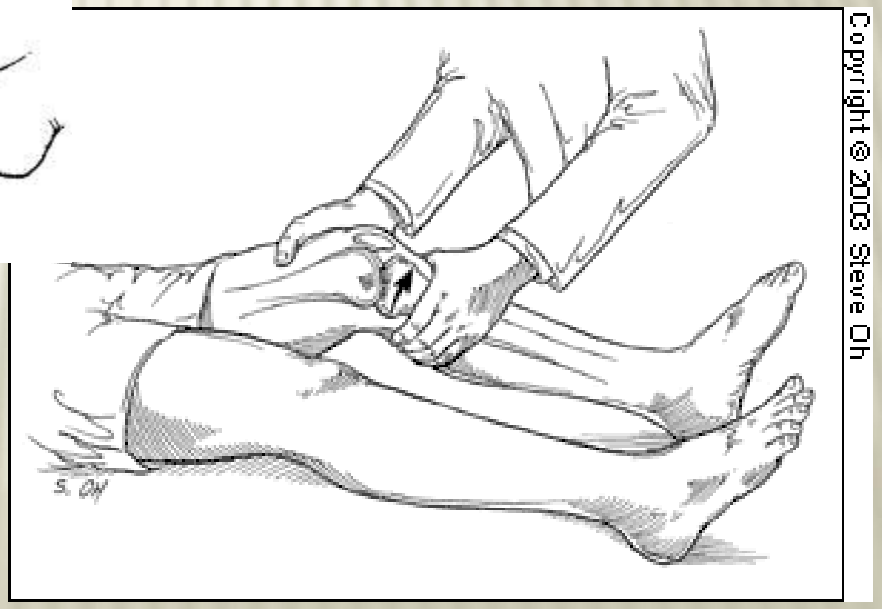
- Varus stress – LCL stability



PROVOCATIVE TESTS

- Lachman and Anterior Drawer – ACL stability





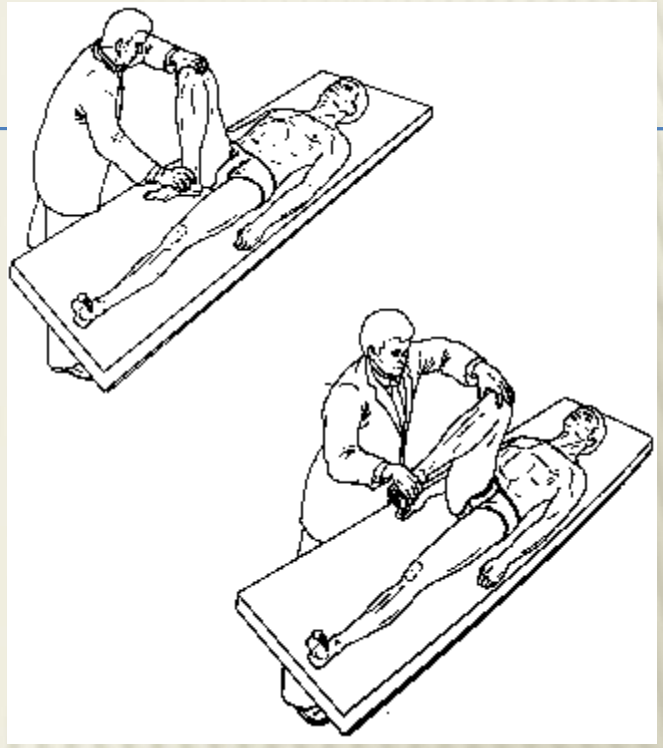
https://www.youtube.com/watch?v=5_zUEzew9Rk

PROVOCATIVE TESTS

- Posterior Drawer – PCL stability

PROVOCATIVE TESTS

- Meniscus tear
  - + McMurray's
  - + Apley's
  - + Thessaly's



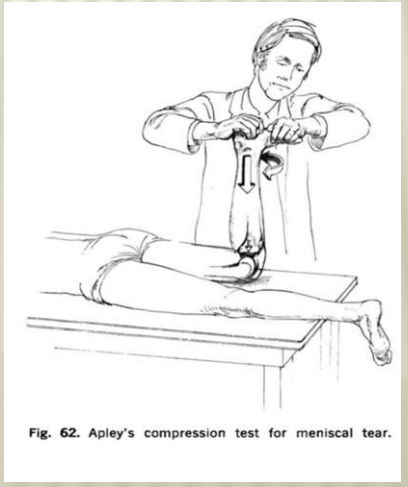


Fig. 62. Apley's compression test for meniscal tear.

https://www.youtube.com/watch?v=IwBW-X4n1fU

PROVACATIVE TESTS

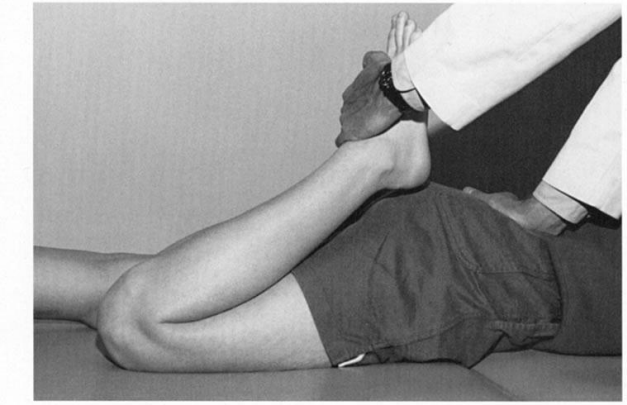
- Bounce Home – joint pathology

PROVACATIVE TESTS

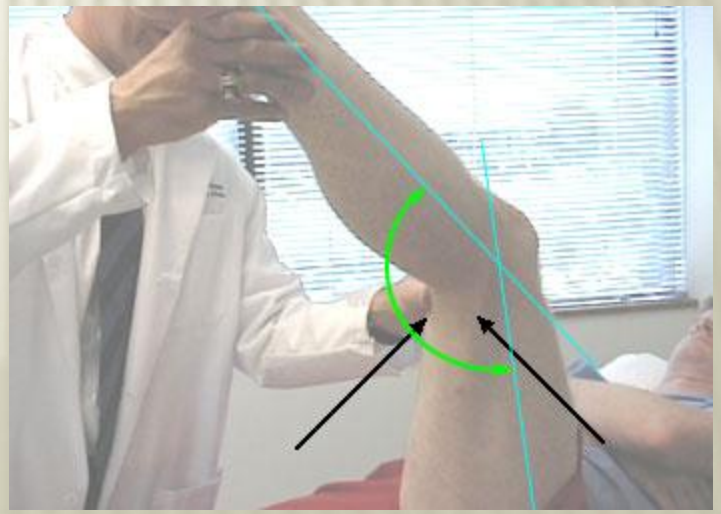
- Noble's compression test; IT band syndrome

FLEXIBILITY TESTING

- Quads



- Hamstring; popliteal angle



FLEXIBILITY TESTING

- Hip flexors: Thomas test

- Hip abductors, IT band: Ober's test

https://www.youtube.com/watch?v=A0C0WBw4l4s

FUNCTIONAL TESTS

- Single leg squat

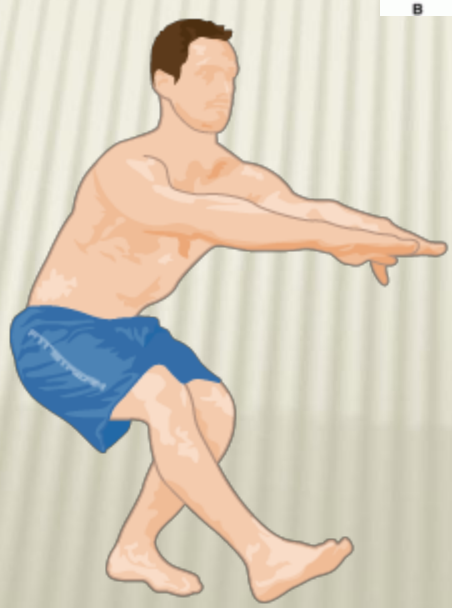


Figure 2.1 Trendelenburg sign.

CAUSES OF ACUTE KNEE PAIN

- ACL tear
- Meniscus tear
- MCL tear
- Patellar dislocation
- PCL tear

ACUTE INJURY

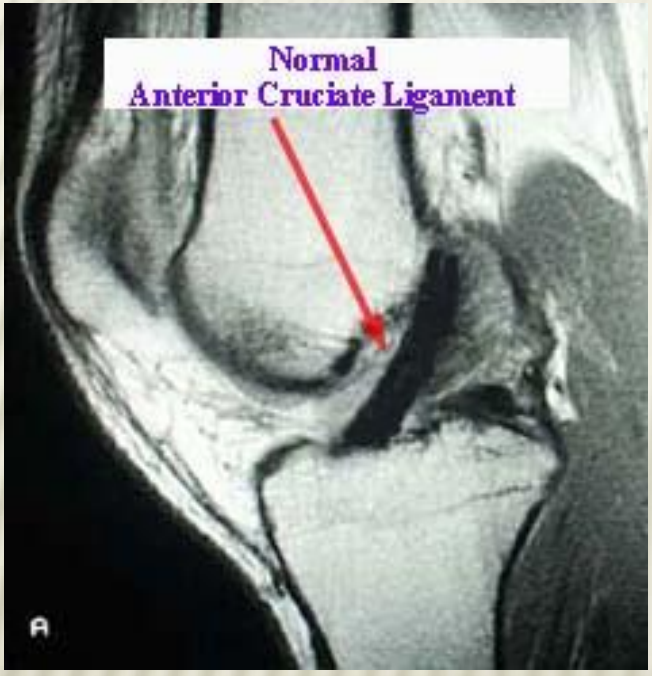
- ACL tear
  - History: happens upon landing or pivoting, pop or snap, swelling, giving way
  - PE: effusion, + Lachman and anterior drawer
- PCL tear
  - History: dashboard injury, fall on hyperflexed knee or hyperextension injury
  - PE: + posterior drawer or sag
- Patellar dislocation
  - +Apprehension test, increased patellar glide

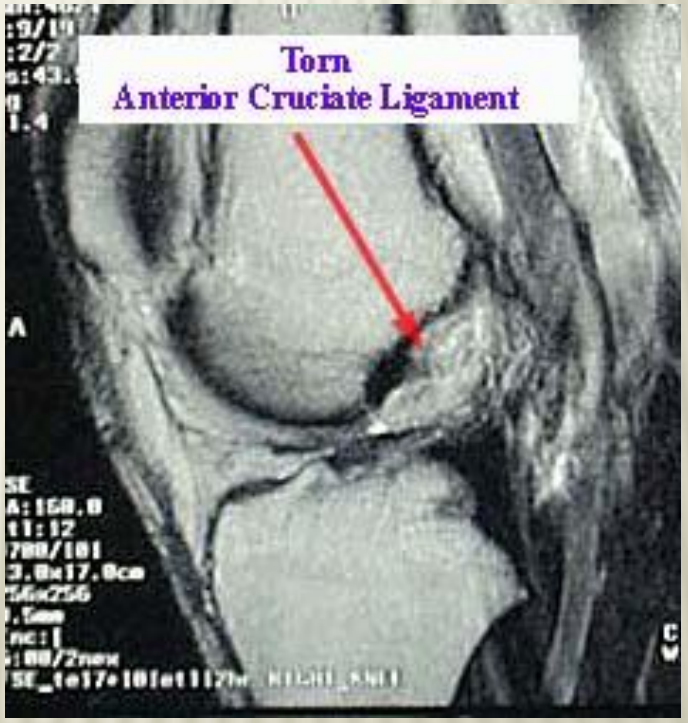
ACUTE INJURY

- MCL tear
  - History: valgus stress on partially flexed knee
  - PE: tenderness over medial joint line, + valgus stress test
- Meniscus tear
  - History: twisting on a planted foot, slow or no swelling, possible locking/catching
  - PE: joint line tenderness, + McMurray, bounce home, Apley's and/or Thessaly's

RADIOLOGY

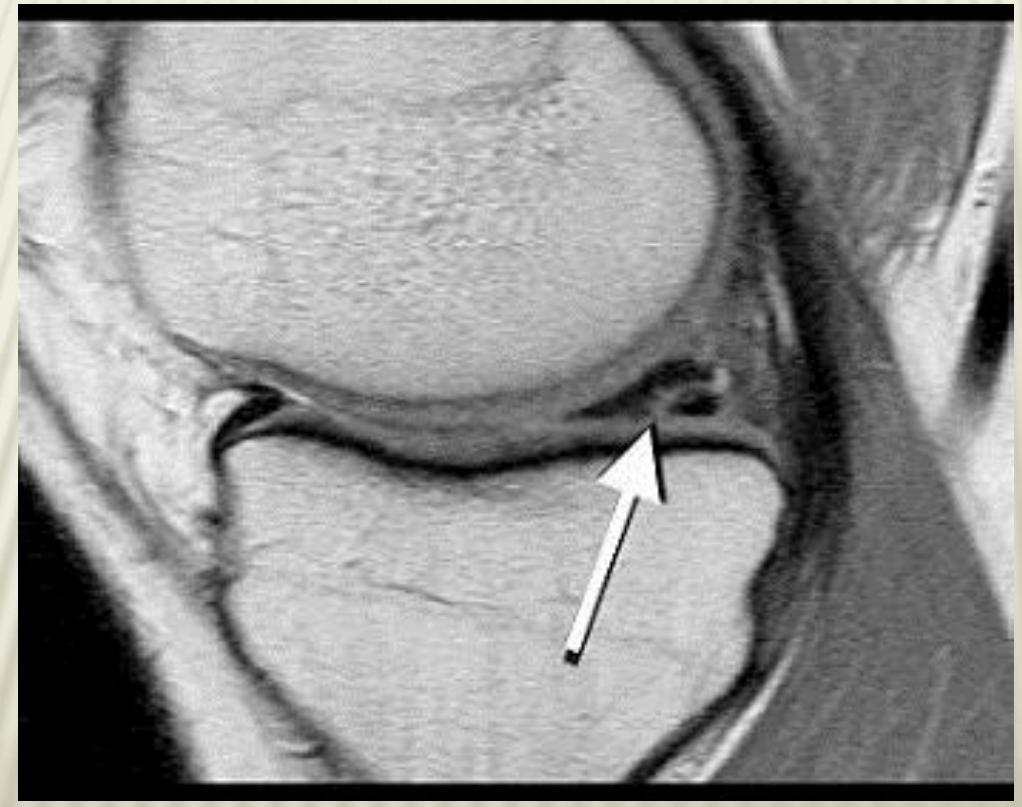
- Torn ACL





RADIOLOGY

- Torn meniscus



CAUSES OF CHRONIC KNEE PAIN

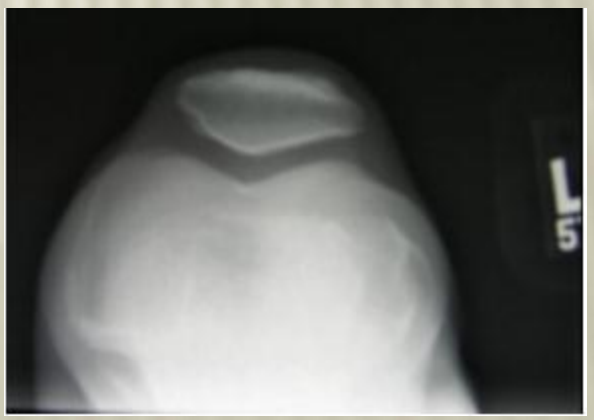
- Patellofemoral pain
- Patellar tendinopathy
- IT band syndrome
- Pes anserine bursitis/tendonitis
- Osgood-Schlatter's disease/Sinding-Larsen-Johansson lesion
- Osteoarthritis
- Osteochondritis Dissecans

PATELLOFEMORAL DYSFUNCTION

- Patellofemoral dysfunction

PATELLOFEMORAL DYSFUNCTION

- Patellofemoral dysfunction
  - Caused by increased stress at the patellofemoral junction – intrinsic or extrinsic
  - History: pain located around knee cap, increased with repeated activity
  - Exam: tenderness over patellar facets, poor mechanics of single leg squat



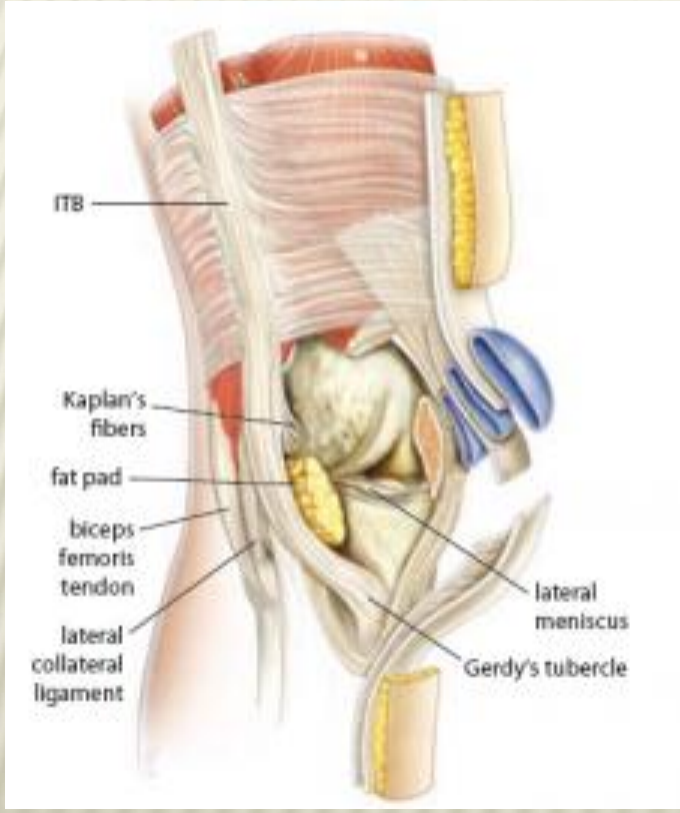
PATELLAR TENDONITIS

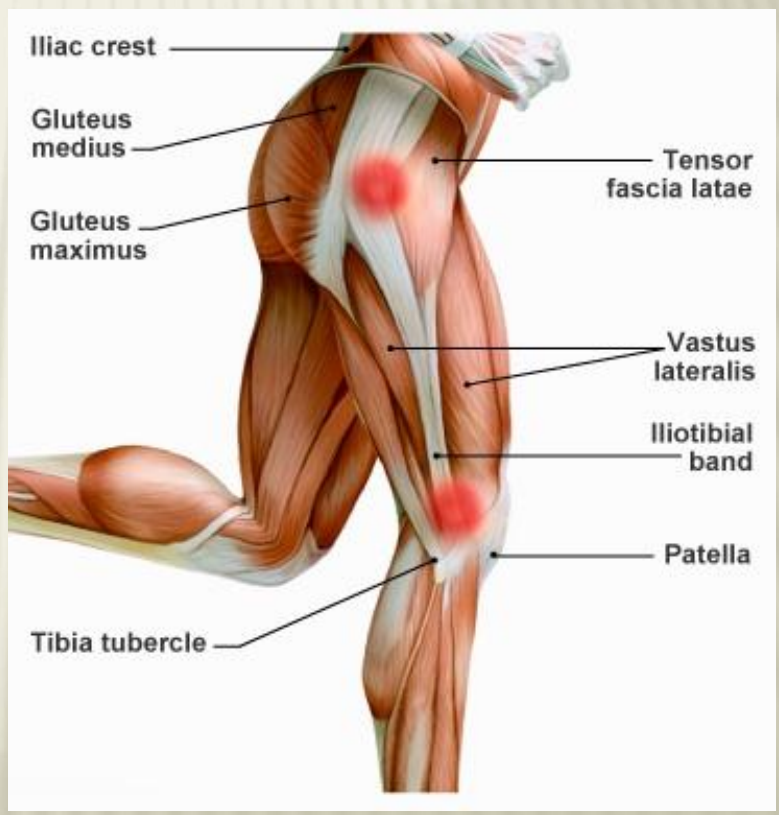
- Patellar tendonitis
  - Also known as jumper's knee
  - Exam: pain along patellar tendon, pain with squatting or hopping
  - US or MRI can help differentiate between tendonitis and tendonosis

ILIOTIBIAL BAND SYNDROME

- IT band syndrome
  - History: Lateral knee pain with activity
  - Exam: tenderness along TFL/ITB, lateral femoral condyle, or at Gerdy's tubercle, positive Noble's test, positive Ober's test

ILIOTIBIAL BAND SYNDROME





PES ANSERINUS TENDONITIS OR BURSITIS

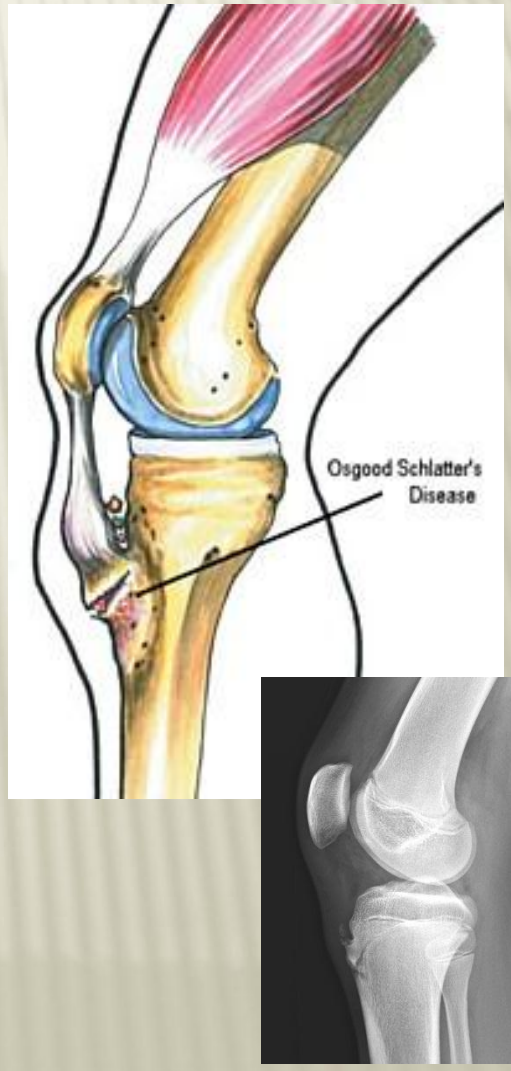
- Pes anserinus tendon = sartorius, gracilis, semitendinosus

PES ANSURINUS TEDONITIS OR BURSITIS

- History: medial knee pain
- Exam: tenderness over the pes ansurinus insertion or bursa, exacerbated by contraction of muscles

OSGOOD-SCHLATTER DISEASE

- Apophysitis of the tibial tuberosity
- History: pain and swelling at the tibial tuberosity in an adolescent during their growth spurt
- Exam: tenderness over tibial tuberosity (no need for an x-ray)

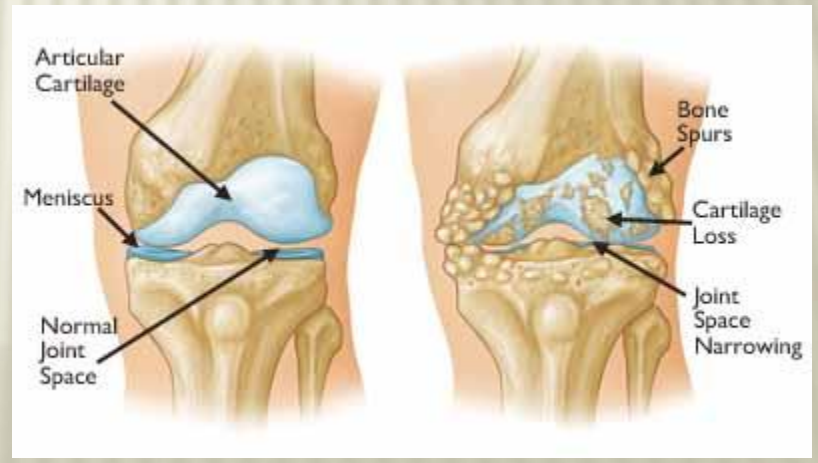


SINDING-LARSEN-JOHANSSON LESION

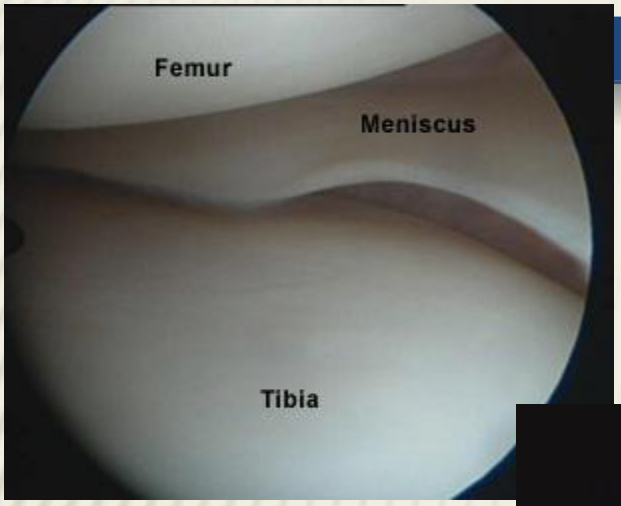
- Apophysitis of the inferior patella
- History: pain at inferior pole of the patella in an adolescent during their growth spurt
- Exam: tenderness over inferior pole of the patella

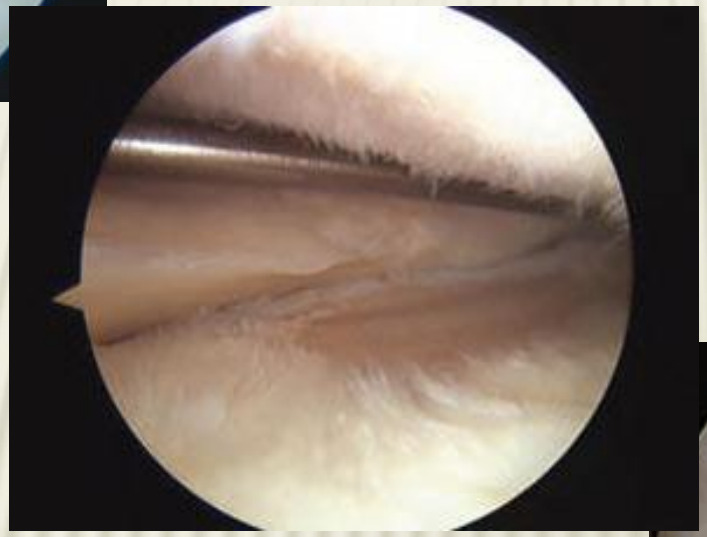
OSTEOARTHRITIS

- Degeneration of articular cartilage
- History: pain, stiffness in older adults
- Exam: crepitus, swelling, decreased ROM



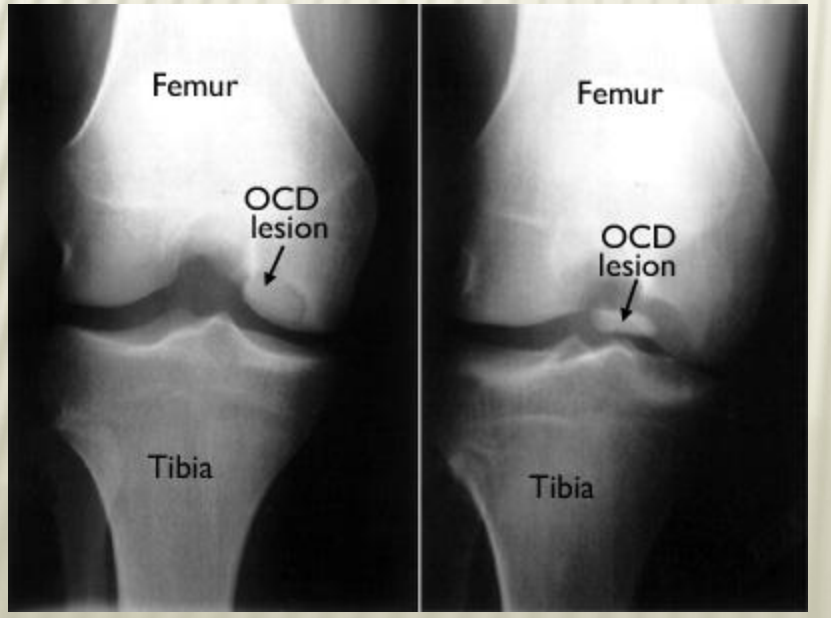
TIS





OSTEOCHONDRITIS DISSECANS

- Disruption of blood supply to a small section of bone causing it to separate; may involve articular cartilage
- Exam: pain that is difficult to reproduce



PRACTICE QUESTION

- A 16-year-old girl comes to your office because of a knee injury that occurred several hours ago. She reports that while playing basketball her left knee “gave out” when she landed after jumping up to shoot a basket. She heard a pop and felt immediate pain. She has been unable to walk since the injury because of pain and knee instability. She has applied ice and taken ibuprofen, but the pain is persistent. On physical examination, her left knee is moderately swollen. She has no knee joint laxity with varus or valgus stress. Anterior traction on her left lower leg (Lachman test) causes significant tibial-femoral translation. Of the following, the MOST appropriate next step is to

A. Immobilize the knee
B. Obtain MRI of the knee
C. Obtain radiographs of the knee
D. Perform therapeutic arthrocentesis
E. Refer her for emergent orthopedic evaluation