



Knee Injury Assessment

Clinical Anatomy — p. 186

- Femur
 - Medial condyle
 - Lateral condyle
 - Femoral trochlea
- Tibia
 - Intercondylar notch
 - Tibial tuberosity
 - Tibial plateau
- Fibula
 - Fibular head
- Patella



Clinical Anatomy—Muscles—

p. 190

- Quadriceps
- Hamstrings
- Pes Anserine Group
 - Gracilis, sartorius, semitendinosus
- Iliotibial Band



History—p. 197

- Location of pain:
 - “inside the knee”=cruciate injury or meniscus
 - Jointline pain=meniscus
 - Posterior pain=cruciate injury
- Weight-bearing status (dictates tibial rotation)
- PMH: may signal future injury
- Mechanism:
 - Rotational=ligament + meniscus
 - Single plane=single ligament pathology
- Cruciate injuries:
 - Feel/hear a “pop”
 - Noncontact injury
 - Females>males
- “Giving way” sensation=quad weakness or meniscus tear

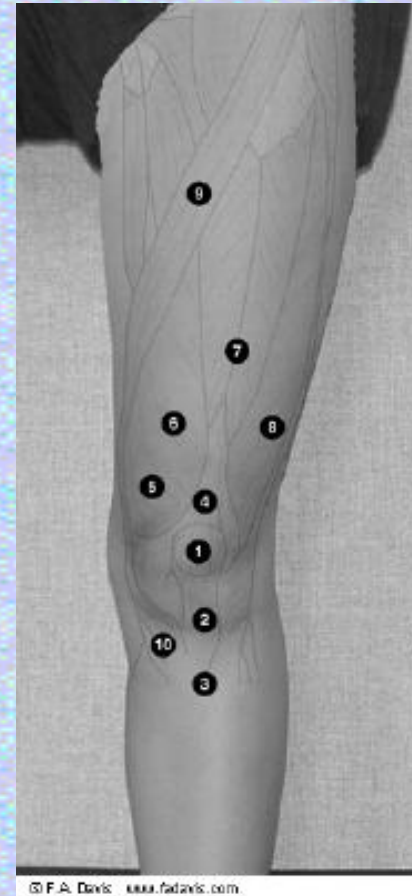
Inspection—p. 198

- Girth deficits
- Deformity rare (fx or dislocation?)
- Patella alignment
- Genu varum/ genu valgum / genu recurvatum
- Tibial tuberosity enlargement



Palpation—p. 201

- Patella (poles)
- Patella tendon
- Tibial tuberosity
- Jointline
- Fibular head
- IT Band
- Musculature
- Popliteal fossa



Uniplanar Knee Sprains

p.217

- Single ligament injuries
- Single plane of force (no rotation)
- +/- meniscus injury



Medial Collateral Ligament--

p. 187

- Medial stabilizer of the knee
- Deep & superficial layers
- Attaches 7-10cm below joint line
- Ant. fibers taut in midrange; post. fibers taut in full flex.
- Prevents valgus movement and ER
- Assists in prevention of ant. translation of tibia
- Attaches to joint capsule and Med. Meniscus

Uniplanar MCL Sprains — p.218

- Table 6-4, p. 218
- Painful medial joint line
- Delayed localized swelling
- Valgus mechanism
- Generally tears distally
- Suspect Med.Men. tear
- Pain ↑ with end ranges of flex. & ext.
- May accompany patellar dislocation
- Usually repairs without surgery



MCL Testing

- Valgus Stress Test
- P. 215, Box 6-9
- Stabilize joint line & abduct distal leg
- 2 positions:
 - Full extension—
 - (+)=possible sprain of MCL, cruciates, and medial capsule
 - 25°-30° flexion—
 - (+)=MCL sprain
- (+)Apley's Distraction test



Lateral Collateral Ligament

— p. 188

- No attachment to joint capsule or meniscus
- Restrains varus movement in final 30° of ext
- Assists with IR and ER restraint
- Greater laxity than MCL
- Easily palpated in figure-4 position

Uniplanar LCL Sprains—p. 219

- Table 6-5, p. 219
- Due to varus stress
- LCL is extracapsular ('d laxity vs. MCL)
- Tender at lateral jointline
- Less pain in AROM than with MCL sprain
- Diffuse swelling



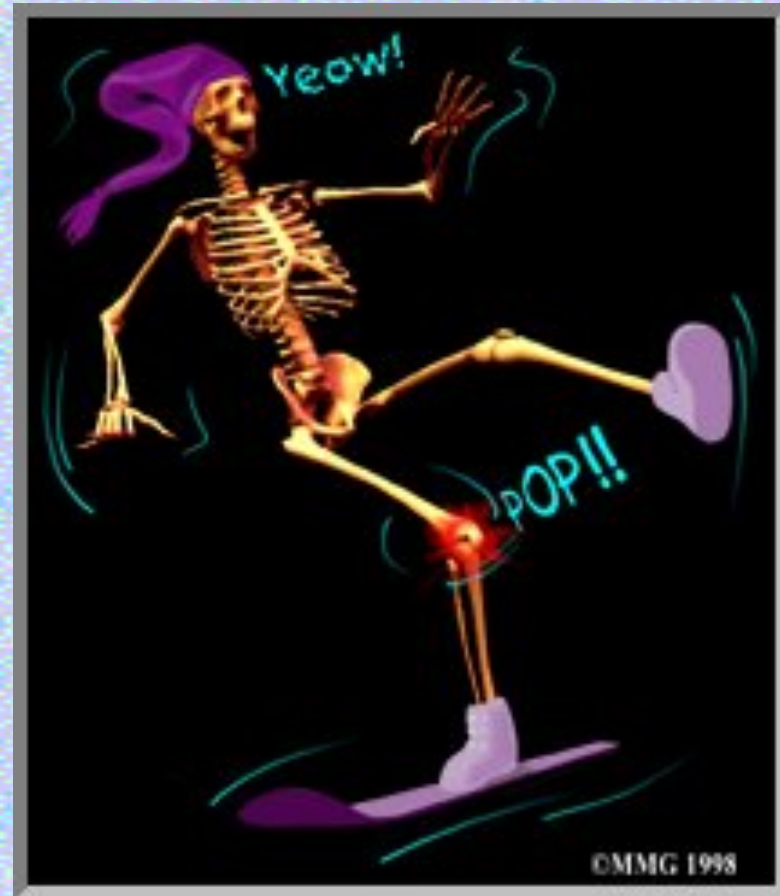
LCL Testing

- Varus Stress Test
 - Box 6-10, p. 216
 - Stabilize the jointline and ADD distal leg
 - 2 positions:
 - Full ext.—
 - (+)=Indicates LCL, cruciate, or lat. capsule pathology
 - 25°-30°flexion—
 - (+)=LCL sprain
- (+) Apley's Distraction test



Cruciate Ligaments—p. 189

- Prevents A/P translation and tibial rotation
- Intraarticular/ extracapsular



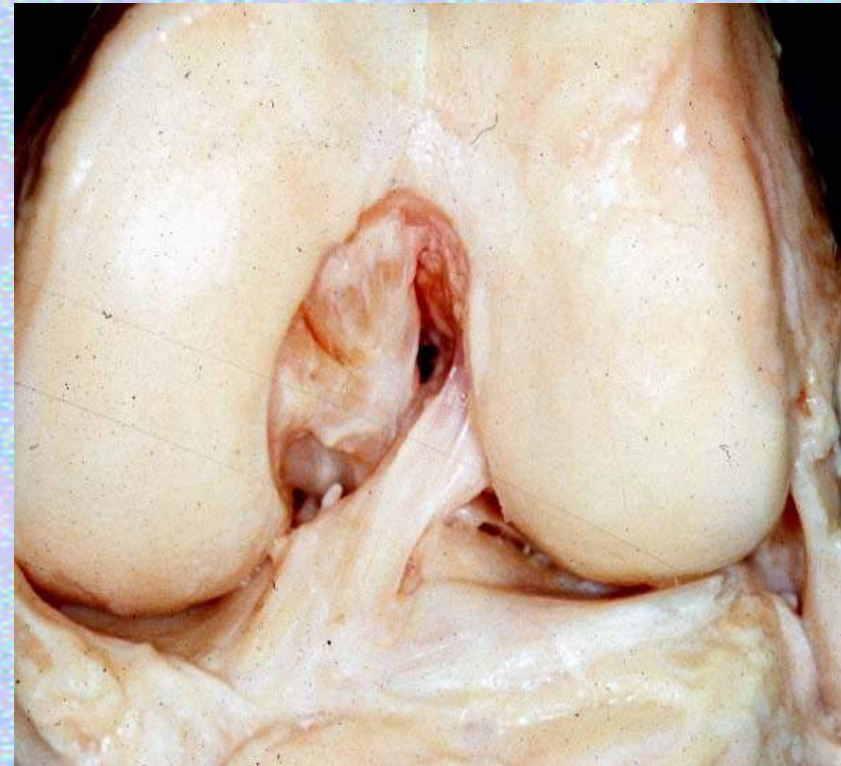
Screw Home Mechanism—p.195

- ER of tibia due to:
 - Differing sizes of femoral condyles rolling on tibial plateau
 - Winding of cruciates in knee ext
 - LM serves as pivot pt.
- In non-weight-bearing: 5° - 7° of ER of tibia

Anterior Cruciate Ligament

— p. 189

- 2 Bundles—tension varies by to knee position
- Extends from post. femur to ant. tibia
- Prevents tibial rotation
- Tibia IR occurs at final 15° of ext.



Segments of the ACL

Anteromedial Bundle: tight when flexed

Posterolateral Bundle: tight when extended

See pg. 189

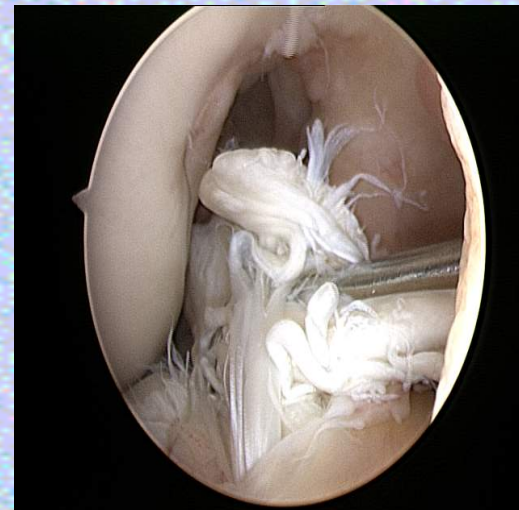
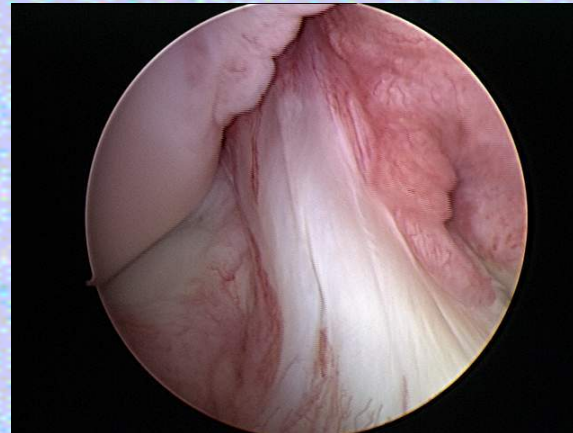
Uniplanar ACL Sprains—

p. 219

- Table 6-7, p. 221
- Excessive rotation/ ant. displacement of tibia
- Predisposing factors: Table 6-6, p. 220
- Segond's fracture
- Most will:
 - feel/hear a “pop”
 - be noncontact injuries
- More common in females
- Rapid effusion
- Pain in full flexion
- Posterior jointline pain
- Important to assess early for true picture
- “Partially torn ACL”
- May accompany or lead to meniscus pathologies

ACL Testing

- Anterior Drawer
- Lachman's test
- Alternate Lachman's test
- Pivot Shift Test



Anterior Drawer Testing

p.209

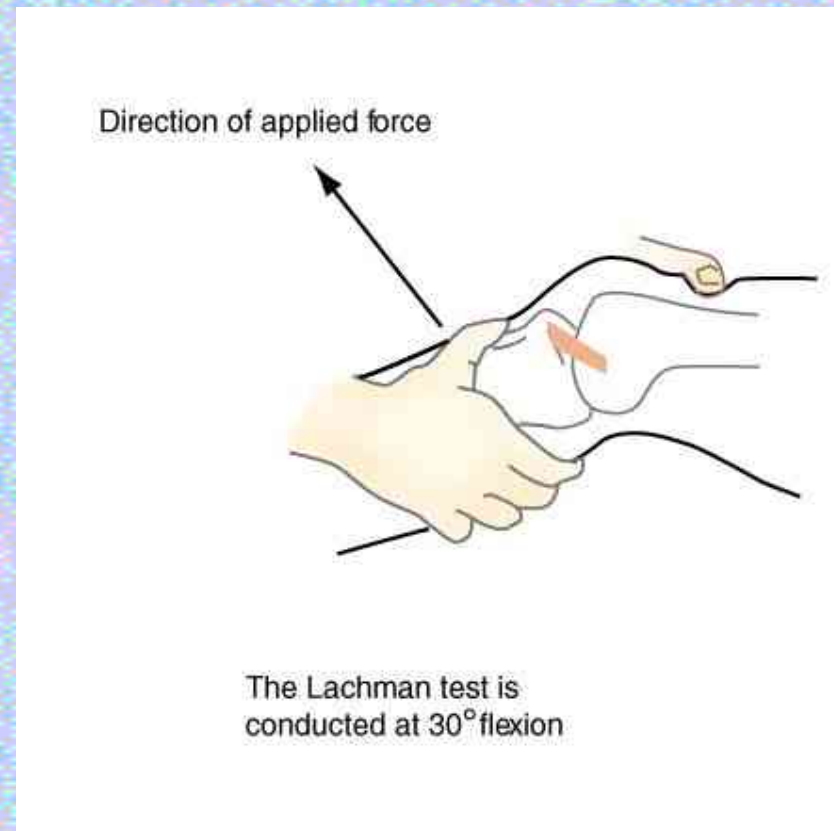
- Box 6-4, p. 209
- Hip flexed to 45° with knee at 90 °
- Foot stabilized and neutral
- Hamstrings *must* be relaxed
- Fingers at jointline parallel to patella tendon
- Anterior force applied



Lachman's test

p. 210

- Femur stabilized with knee slightly flexed
- Ant. Force applied to tibia
- Hands placed at tibial tuberosity and proximal to femoral condyles
- Heel remains on table/ground
- PCL sprain may lead to false (+) Lachman's



Alternate Lachman's test

p. 212

- Box 6-6, p. 212
- Athlete is prone with knee slightly flexed and femur stabilized
- Anterior force applied to tibia
- Helps to rule out false (+) caused by PCL sprains

Pivot Shift Test

- Box 6-14, p. 226
- Subluxing the tibia on the femur 2° to torn ACL
- IR, axial loading, and valgus stress on knee during flexion
- False (-) may be caused by torn meniscus blocking PROM



Posterior Cruciate Ligament

— p. 189

- Extends from post. tibia to ant. femur
- Prevents posterior translation of tibia
- Assists in prevention of ER
- Primary stabilizer of the knee
- 3 Bundles

Uniplanar PCL Sprains—p. 221

- Mechanisms:
 - Falling on tibia
 - Dashboard injuries
 - Hyperextension or hyperflexion
- Often nonoperative
- Usually requires extensive rehab to prevent secondary injuries
- Posterior pain sometimes
- Minimal pain & dysfunction initially due to dynamic stabilization of knee by quads

PCL Testing

- Posterior Drawer

- Knee flexed to 90° and hip to 45°
- Posterior force applied to tibia
- Beware of false (-)
- Increased posterior translation = (+) test
- P. 213, Box 6-7

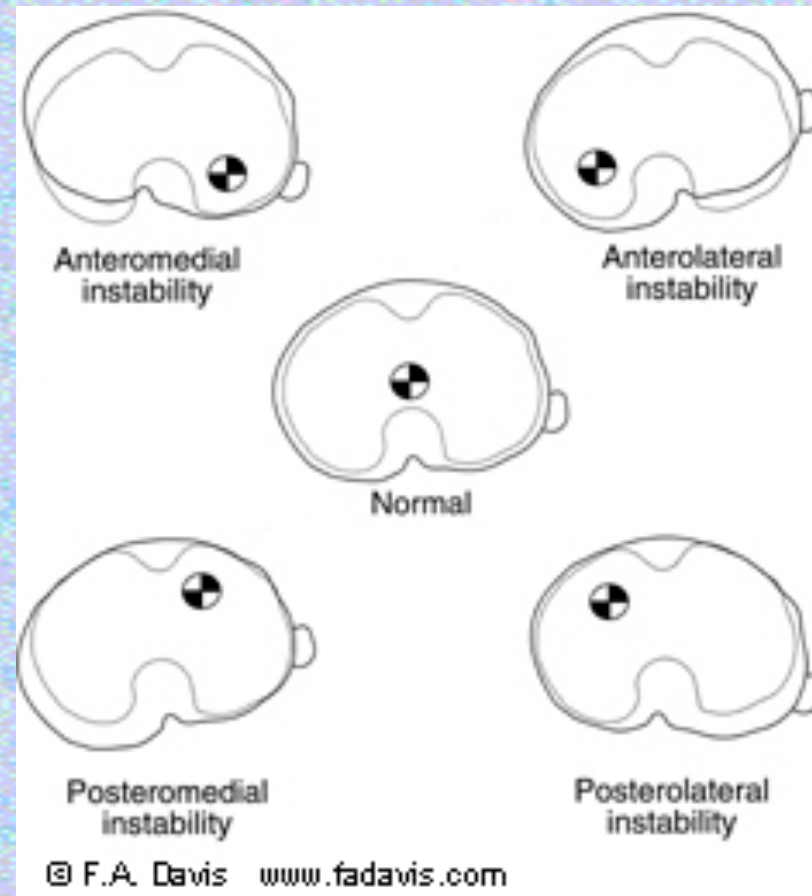
- Godfrey's Test

- Hips and knees both flexed to 90° bilaterally
- Observe level of ant. Tibias
- (+) test = posterior displacement of tibia compared to uninvolved extremity

Rotational Knee Instability—

p. p.222

- Multiple ligaments sprained (Cruciate + collateral)
- Mechanism usually involves rotational component
- “Rotatory Instability”
- Knee “gives way”
- Uniplanar tests may only be mildly (+)
- P.223, Table 6-9



ALRI & AMRI Sprains—p.223

- ACL + LCL sprain = ALRI

- ACL + MCL sprain = AMRI

- Worsened by injury to muscles or meniscus

- Slocum Drawer Tests:

- Modified Ant. Drawer

- Foot IR to test ALRI

- Foot ER to test AMRI

- Box 6-12, p. 224

PMRI & PLRI Sprains — p.223

- PMRI= MCL + PCL
- PLRI= LCL + PCL
- Less common injuries, yet longer recovery time needed
- Testing=
 - Hughston Test
 - External Rotation test

Hughston Test for PMRI/ PLRI

- Modified Posterior Drawer with foot in IR or ER
- Posterior force applied
- Laxity with:
 - ER=PCL/LCL
 - IR=PCL/MCL

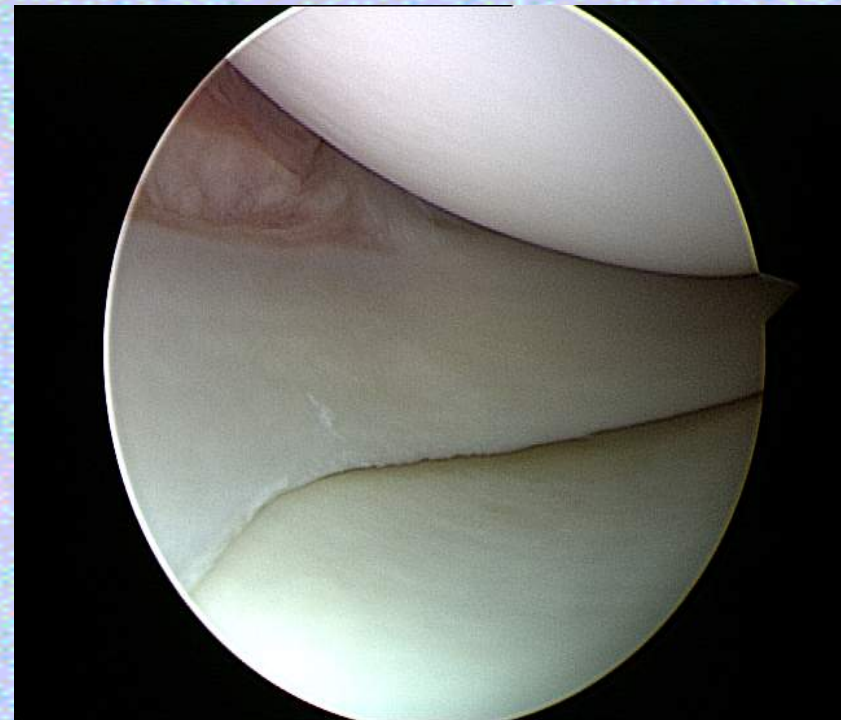
External Rotation Test

p. 230

- Box 6-17
- Primarily for PLRI
- Prone or supine
- Performed at 30° and 90° knee flexion
- Tibias are passively ER
- (+) = >10° bilateral difference

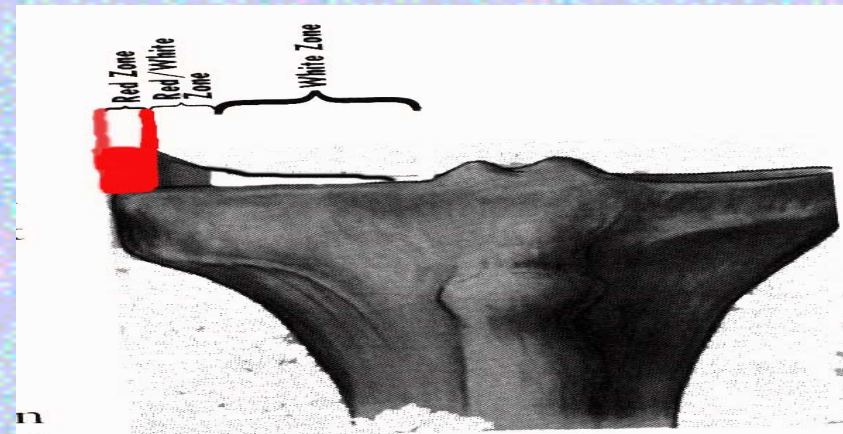
The Menisci—p. 190

- Shock absorbers
- Stabilizers
- “Spacer washers” of the knee
- Mobile, yet attached to tibial plateau
- Vascular/ Avascular zones
- MM attached to MCL



Meniscal Tears—p.228

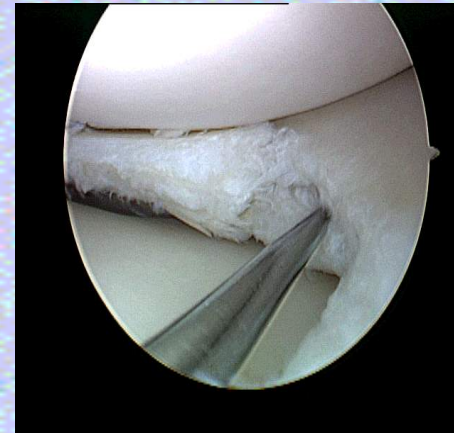
- LM > MM tears
- Table 6-11, p. 233
- Acute onset
- Tender at jointline
- Usually a rotational mechanism
- Often feels a “pop” or “click” with ambulation
- Symptoms may disappear/recur
- Suspect meniscus tear with all cruciate tears



- Tears may be horizontal, radial, or bucket handle

5 Signs of Meniscal Injury

- (+) McMurray's test
- Pain in Full Flexion
- Popping/Clicking
- (+) Apley's test
- Pain in Weightbearing



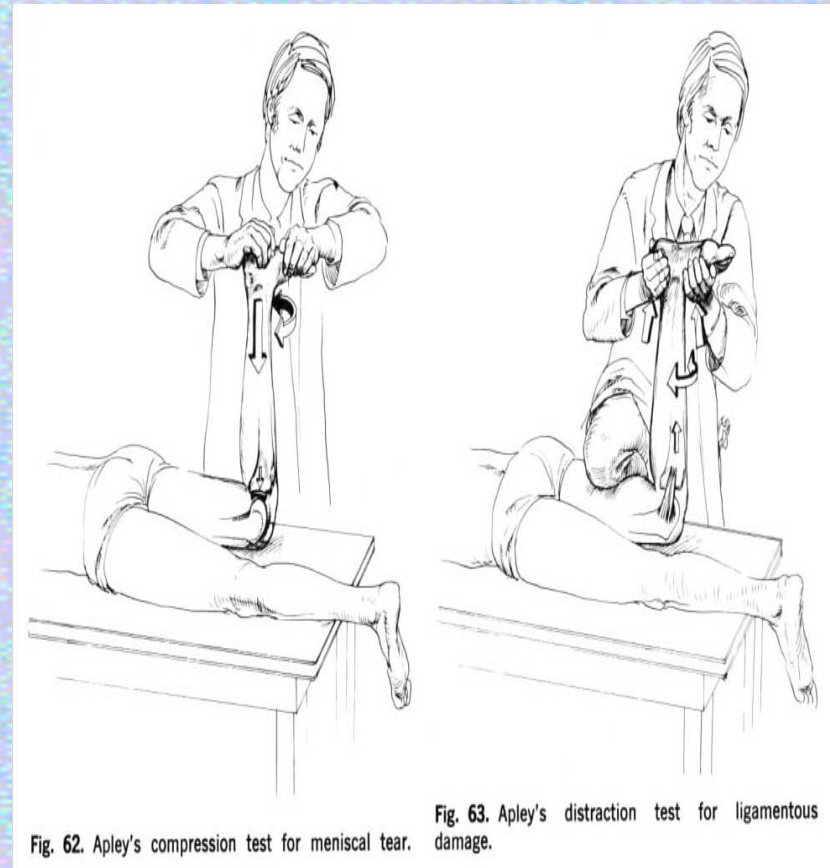
Meniscus Testing

- McMurray's Test
- Box 6-18, p. 231
- 3 passes with knee in neutral, IR, and ER
- Valgus stress applied as knee extended
- Varus stress applied as knee is flexed
- (+)= pain at jointline or clicking/popping felt at jointline



Meniscus Testing

- Apley's Compression Test
- Box 6-19, p. 232
- Knee flexed with axial loading of tibia into femur while tibia is rotated
- (+) = pain or popping at jointline



Osteochondral Defects—p. 229

- “OCD” lesions/ fractures
- Deterioration of articular cartilage on femur
- 80% are medial femoral condyle
- Caused by compression or shear forces
- Acute or Gradual onset
- AKA: “Osteochondritis Dissecans”
- Wilson’s Test
 - Box 6-20, p. 234
 - Knee is extended with tibia IR
 - At point of pain, tibia is ER
 - (+)= relief of pain with ER

Iliotibial Band Friction Syndrome—p. 235

- Table 6-12, p. 235
- Insidious onset
- Pain/popping with knee extension
- Predisposed by tight ITB
- Tender at ITB at femoral condyle
- More common in pronators and g. varum athletes
- Noble's Compression Test:
 - Box 6-21, p. 236
 - Pressure on ITB @ femoral condyle while PROM ext of knee
 - (+)=pain at ITB with popping
- Ober's test
 - Box 6-22, p. 237
 - Confirms tight ITB

Arcuate Ligament Complex—

p. 190

- Group of structures that provide post-lat. stability:
 - arcuate ligament, LCL, oblique popliteal ligament, & lateral gastroc origin
- Assists cruciates in stabilizing the knee



Proximal Tibiofibular Syndesmosis—p. 190

- Greater stability than distal tib-fib articulation
- Stability through ligaments and interosseous membrane
- Ant. Displacement of fibula is rare
- Post. Displacement could endanger the peroneal nerve

