

Ep 03 Notes- Meniscus- Dr. Strauss

Case: 29 y/o female with R knee pain and swelling. Pain started 3 days ago after twisting leg

1. HISTORY/PHYSICAL EXAM

- DDX: ACL injury, patellar instability, meniscus
- History Q's:
 - Did you hear/feel a pop? >> ACL direction
 - Were you able to bear weight? >> Probably not possible in ACL tear/ acute first time patellar dislocation
 - How swollen did knee get? >> patellar instability typically associated w/ larger effusion than meniscus
 - Any antecedent symptoms? Was this knee perfectly fine before this injury?
 - Localize their pain> have them point with 1 finger
 - Knee Locking, clicking, catching?
 - PMH, PSH, FH, Sports goals? What she wants to do?
- PE's:
 - Normal gait? Limp or on crutches?
 - Patient stand up>> look for standing alignment (are they holding their knee in flexed posture? Varus?)
 - Inspect
 - Palpate >Tenderness
 - Ligamentous evaluation (Lachman)
 - Patellar stability
 - Meniscus Specific Tests:
 - McMurray Test-Medial meniscus- have hand on medial joint line, flex knee, externally rotate leg and extend knee to test medial meniscus. Positive test is "clunk" at joint line. Most specific (98%) only 15 % sensitive
 - Apley Test- Patient prone w/ knee flexed 90 degrees, downward compressive force w/ lateral rotation of leg. Pain = meniscal rupture
 - Childress Test- patient squats and walks like duck + feels pain, or cant squat or clicking
 - **Joint line tenderness to palpation- most sensitive test**

2. RADIOGRAPHS

1. Bilateral weight bearing PA views
2. 45 degree flexion PA views
3. 20 degree flexion PF view
4. Lateral radiograph
5. MRI to confirm tear
 1. Tear patterns (location, pattern, size):
 1. Bucket Handle (large longitudinal)
 2. Displaced 180 degrees from where meniscus is supposed to stick
 3. Radial tear (perpendicular to meniscus tissue)
 4. Oblique flap/ Parrot beat tear
 1. Flap that traverses white/white > red/red zone
 5. Horizontal cleavage tear
 1. Split within the substance of the meniscus
 6. Root tear
 1. Meniscus attachment to underlying bone is avulsed
 7. Complex tears (multiple patterns)

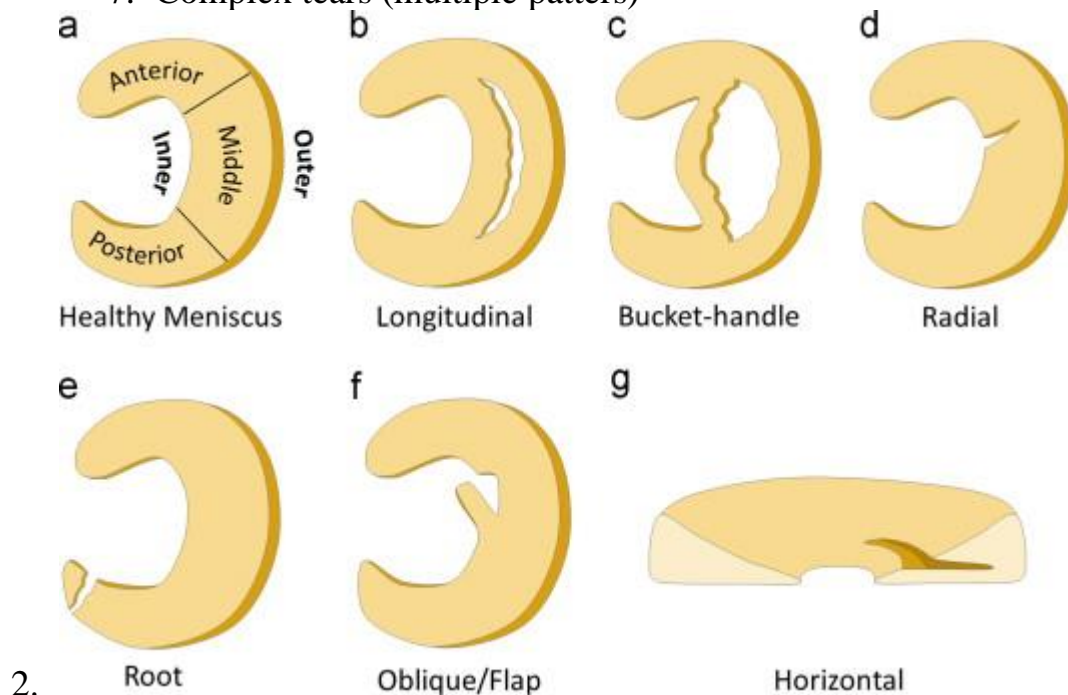


Image from Science Direct

3. ANATOMY/MECHANISM

- Meniscus
 - Fibrocartilagenous (predominately type 1 collagen- small amounts of type 2-6) distribute load- 50-70% extension and 85-90% flexion, shock absorb, stability. Most fibers arranged circumferentially. Some radial + perforating fibers. Arrangement of fibers can determine tear pattern
 - The proteoglycans have high content of carbs. Can trap 50x weight in water
 - Medial Meniscus- Semilunar in shape, larger A-P dimension than width, thick convex outer edge that tapers in, triangular cross section. larger + **important secondary stabilizer for tibia anterior translation**
 - Lateral meniscus- more circular shape, **covers more tibial surface** than medial meniscus

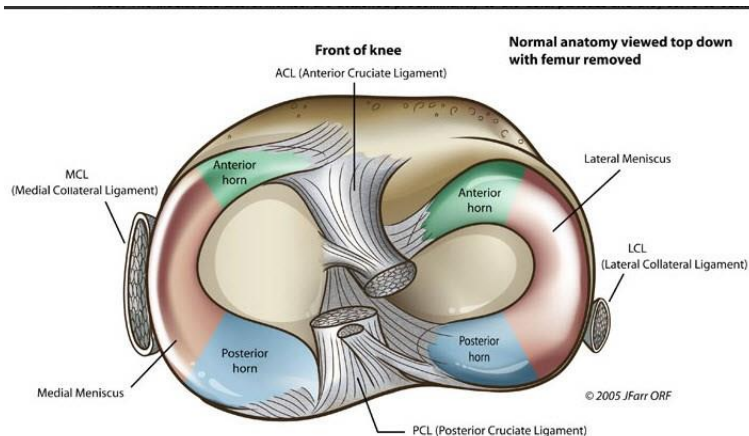


Image from Bone and Spine

- Vascular zones
 - Red-red/ red-white/ white-white (From peripheral >inner third) **Inner 1/3 not vascularized**
 - Vascular supply- Superior+inferior branches of medial and lateral geniculate artery form perimeniscal capillary plexus

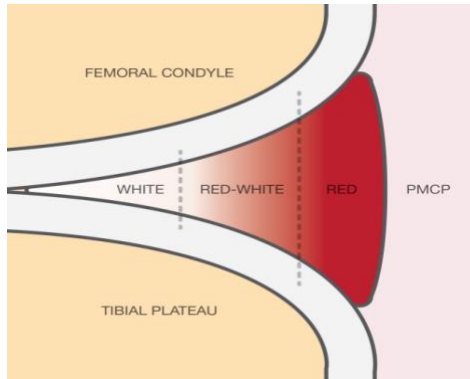


Image from Australian Medical Student Journal

- Meniscus Insertion to bone called enthsis (transition from uncalcified to calcified fibrocartilage)
 - Attachments are at horns of meniscus. + meniscofemoral ligaments
 - Medial Meniscus
 - Entire periphery is attached to capsule by coronary ligaments- which serve as fibers of MCL- this is why medial meniscus less mobile than lateral
 - Lateral meniscus
 - Not as fixed as medial. Has some capsular attachments
- Most common tear location- Posterior horn
- Torn **lateral meniscus** common w/ acute ACL tear
- Torn **medial meniscus** common w/ ACL deficiency

4. TREATMENT

Non-Operative

1. NSAIDS, steroids, Physical Therapy
2. Non on indications- asymptomatic partial thickness tears less than 5-10mm in length

Operative

Surgical Options

1. Meniscal repair- acute tears in red-red zone in non-degenerative knee - repair by suture
2. Arthroscopic partial meniscectomy- current standard of care- **causes increased contact pressures on articular cartilage**
3. Meniscal transplant

Suture Placement

- 2/3mm apart, vertical mattress , Sutures can be placed:
 - inside out manner (sutures passed from intra-articular to extra-articular w/ knots placed on capsule)
 - Outside in
 - All inside- you rely on capsular fixation
- **Vertically placed sutures** are strongest

Meniscal Allograft Candidate

- Patient who underwent previous total or near total meniscectomy + joint line pain, early/minimal chondral changes, normal limb alignment, and a ligamentous stable knee

Medial Approach to knee

- 3/4cm incision made w/ knee flexed at 90 degree just posterior to MCL. Open sartorial fascia w/ care to protect saphenous n+v,. Structures retracted and plane developed between Sartorius n capsule

Lateral Approach to knee (for meniscus repair)

- 3cm incision post to LCL. Interval between biceps femoris & IT band. Biceps tendon retracted posterior to protect peroneal n,> lateral head of gastroc is swept off capsule for visualization> deep retractor between lateral head of gastroc and capsule to protect structures

Repairs done w/ ACL injury have better outcomes

Notes made from:

Nailed It Ortho podcast episode 3

Orthobullets.com
AAOS Comprehensive Orthopaedic Review
Orthopaedic Secrets

Articles to read:

1. Gilat, R., & Cole, B. J. (2020). Meniscal Allograft Transplantation: Indications, Techniques, Outcomes. *Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association*, 36(4), 938.

2. Evaluation, Treatment, and Outcomes of Meniscal Root Tears: A Critical Analysis Review- Strauss – 2016- JBJS Reviews