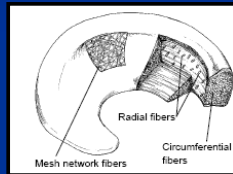


Treatment Options for Meniscal Lesions

Barton R Branam, MD
April 28, 2016

Meniscus

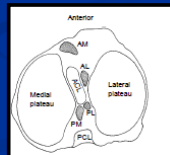
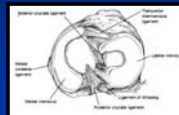
- Fibrocartilage
 - Collagen 60-70% dry weight of meniscus
 - 90% type 1
 - Elastin
 - Non collagenous proteins
- Fiber orientation
 - Circumferential
 - Resist compressive force
 - Radial
 - Resist longitudinal force
 - Mesh network
 - Distribute shear force



Greis PE, et al, JAAOS 2002

Meniscus Anatomy

- Medial meniscus
 - Confluent with coronary lig
 - Deep MCL
- Lateral meniscus
 - Semicircular
 - Covers more tibia
 - Sometimes discoid
- Intermentiscal ligament



Johnson DL. Arthroscopy 1995

Function of Meniscus

- Cushions the articular cartilage
- Secondary stabilizer
- Proprioception
- Joint congruity

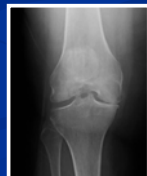


Meniscal Decisions

- Who gets surgery?
- What do we do in surgery?
- If meniscal repair, how do we fix it?

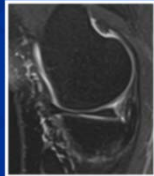
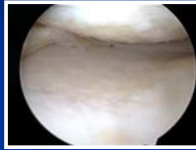
Who Get's Surgery

- Extremes are easy
 - Young healthy patients with meniscal injuries get surgery
 - Older patients with severe arthritis are treated conservatively



Who Get's Surgery

- What do we do with the patients where the answer isn't so obvious?
- 50 year old patient with meniscal tear and mild/moderate arthritis?
- Equivocal tears?



Controversies

- Arthroscopic Partial Meniscectomy versus sham surgery for a degenerative meniscal tear.
- Sihvonen, et al, NEJM, 2013
- No significant differences in any primary outcome

Controversies

- A comparative study of meniscectomy and nonoperative treatment for degenerative horizontal tears of the medial meniscus
- Yim et al, AJSM, 2013
- Randomized controlled trial
- 102 patients w pain, deg tear, 1/07-7/09
- 81 female, 21 males
- 50 scope, 52 strengthening exercises

Yim et al, AJSM, 2013

- Results
 - No sig differences in VAS, Lysholm scores, Tegner Scores,
 - Patients initially had intense pain and mechanical symptoms, yet both groups had ↓ pain, ↑ function, high satisfaction($p < .05$ for all)
 - Conc-no sig differences in pain, function or satisfaction at 2 y post op.

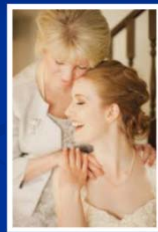
Degenerative Tears-Non Op?

- Often not so gray
- History often reveals a subtle event, mechanical symptoms
- PE often focal or largely negative
- My job → information, let the patient decide
- We treat patients, not knees
- Predictability



Decisions

- History
 - Nuisance
 - Debilitating
- Exam
 - Negative if largely arthritic
 - Very focal and reproducible if meniscal
- Take a step back
- Inject, Monitor, ?PT
- Manage expectations
 - Vacation/Event



What do we do in surgery?

- Partial meniscectomy
- Repair

Surgery-Meniscectomy

- Tibiofemoral contact mechanics after serial medial meniscectomies in the human cadaveric knee
- Cadaver study
- Serial 20mm PMM sections
 - Intact, 50, 75, segmental, total
 - Loaded at 3 flexion angles

Lee SJ, et al, ASJM, 2006

Lee SJ, et al, ASJM, 2006 -Meniscectomy

- Results
 - ↓ contact areas, ↑ contact stresses proportional to amount of meniscus removed
 - Segmental meniscectomy (no hoop stresses) = total meniscectomy in load bearing terms
 - Peripheral meniscus more critical in terms of increasing contact areas and decreasing stresses
- SAVE as much meniscus as possible

Meniscal Healing

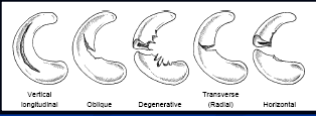
- Location-only peripheral 1/3 of the meniscus has a blood supply
- Quality
 - Macerated
- Patient age
 - Physiologic
- Chronicity
- Other knee pathology
 - Stability
 - Cartilage



Greis PE, et al, JAAOS 2002

Meniscal Tear Patterns

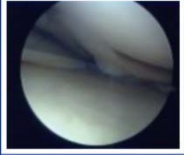

- Horizontal
- Vertical
- Radial
- Bucket
- Root avulsion
- Flap/parrot beak



Greis PE, et al, JAAOS 2002

Menisectomy

- Minimize excision
- Debride to stable tissue
- Aggressive in older patients/degenerative tears
- Probe remaining tissue
- Stay off cartilage
- Minimize debridement if rehab time critical

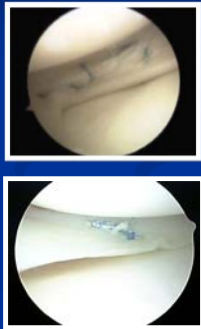


- ### Meniscal Repair
- Inside/out
 - All highly unstable tears
 - SCOPE IPSILATERAL
 - All inside
 - Small tears
 - Concomitant ACL R
 - Outside/In
 - Anterior horn
 - Often easier procedure can be clue to most effective?

- ### If repair, how do we do it?
- | | |
|--|--|
| <ul style="list-style-type: none">■ Suture<ul style="list-style-type: none">■ Gold standard■ Protect vital structures■ Easier to control tension and reduction■ Requires a “team approach”■ Maximally invasive■ Time-concomitant procedures | <ul style="list-style-type: none">■ Devices<ul style="list-style-type: none">■ Fast■ Minimally invasive■ Often easier to get posterior■ Improving instrumentation■ Newer, less proven■ Blind fixation■ Learning curve■ Difficult to reduce and set tension■ Implant in knee? |
|--|--|

Repair Technique

- Both techniques have value
- Can use both techniques on same knee
- Can use both techniques on same meniscus



Current Controversies

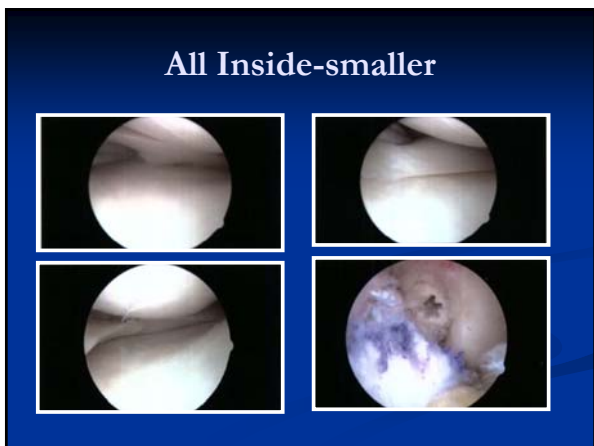
- Meta-analysis on biomechanical properties of meniscus repairs: are devices better than sutures?
- M Buckland D, et al, Knee Surg Sports Traumatol Arthrosc, 2014
- 41 studies, 1995-2013
- Sutures had higher load to failure and stiffness than devices ($p < .05$)
- 2nd generation devices were sig stronger than first generation devices

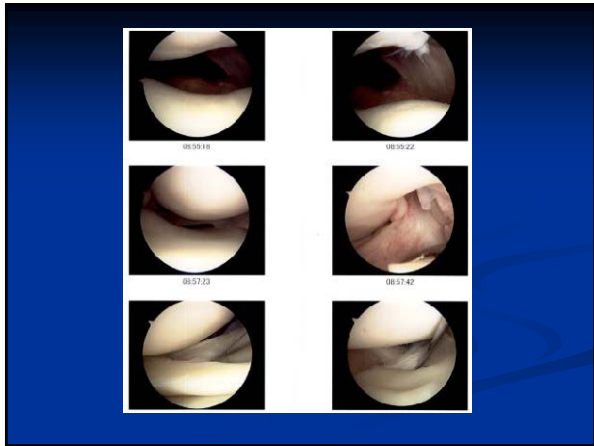
Clinical Relevance

- Suture repair with vertical mattress sutures remain the gold standard
- Vertical mattress had higher load to failure than horizontal mattress
- Some promise for devices with similar properties to suture
- Role for both suture and devices

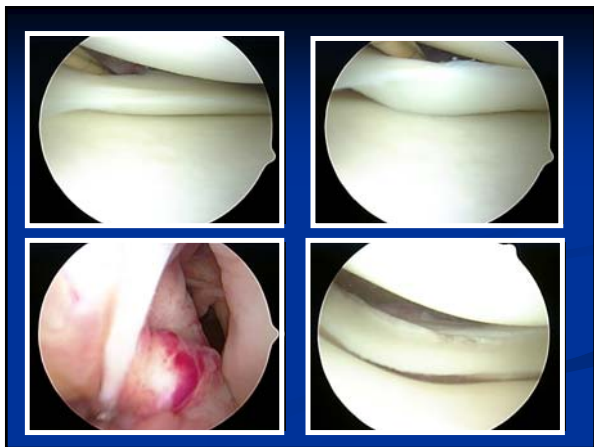


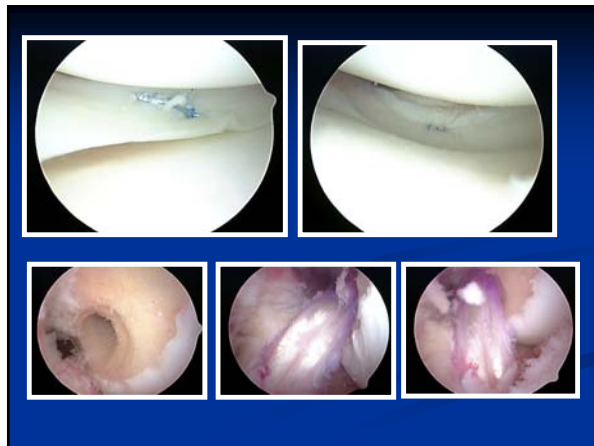












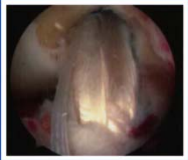
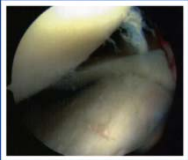
Meniscal Root Repair

- Used for an unstable root avulsion
- Restore the root
- Avoid extrusion
- Restore hoop forces



Root Repair-Technique

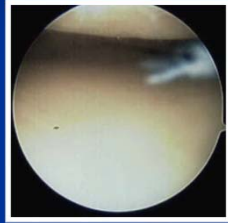
- Do before ACL R if applicable
- Shoulder instruments
- 3 portals
- Simple suture x 2
- ACL tibial tip guide at root attachment
- Suture passer
- Tie over post
- Early ROM



Meniscal Transplant

■ Indications

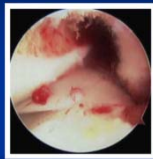
- Meniscal deficient knee
- Stable
- Normal alignment
- Young
- Normal body habitus
- Focal jointline tenderness with minimal to no deg changes
- Reasonable expectations
 - Good, not great
- Challenging
 - Requires team



Technique

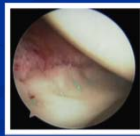
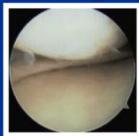
■ Medial

- Small bone plug posterior
- Larger bone plug anterior
- Inferior notchplasty
- Posteromedial portal
- Inside out repair



■ Lateral

- Bone block
- Can press fit
- Inside out



Meniscal Transplant



Summary

- Multiple treatment options
- Individualize the treatment
- Discussion with the patient
- Reasonable expectations

Thank You