Treatment Options for Meniscal Lesions

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Meniscus

- Fibrocartilage
  - Collagen 60-70% dry weight of meniscus
  - 90% type I
  - 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
  - Intermeniscal 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?
- Equivoctal tears?

Controversies

- Arthroscopic Partial Menisectomy versus sham surgery for a degenerative meniscal tear.
  - 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-Menisectomy

- 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


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

Meniscal Tear Patterns

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

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
Menisectomy

- 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?

- Suture
  - Gold standard
  - Protect vital structures
  - Easier to control tension and reduction
  - Requires a “team approach”
  - Maximally invasive
  - Time-concomitant procedures

- Devices
  - 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?
  - 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
Summary

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

Thank You