

# Evidence Based Management of Meniscal Tears

Kenneth G. Swan, Jr., MD

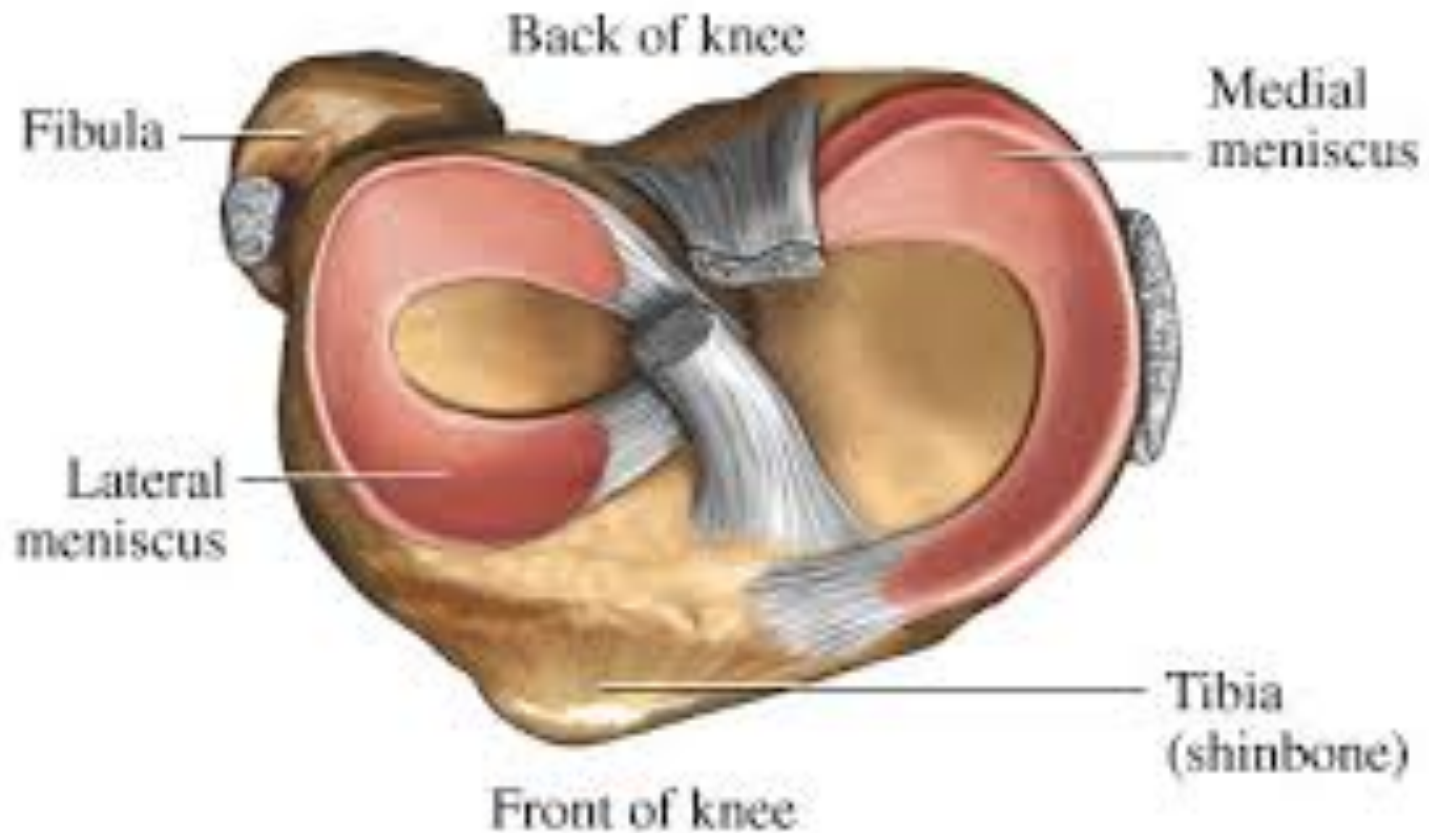


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- 
- NO DISCLOSURES

Superior (top) view of right knee

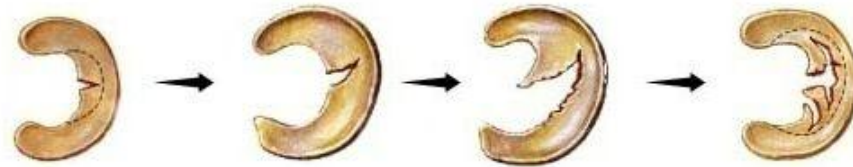


# Meniscus

- Once thought to be a vestigial muscle remnant with no known purpose, now known to be:
  - Important structure for knee force distribution
  - Secondary stabilizer of the knee
  - Loss of entire mensicus (open meniscectomy) leads to progressive degenerative changes decades later
    - Fairbanks, *JBJS*, 1948

# Meniscus Tear

- Common
  - 35% of people over the age of 50 have a meniscus tear
  - 2/3 of these people are ASYMPTOMATIC
  - In the presence of osteoarthritis, prevalence increases to 100% if Grade IV arthritic changes
- Can be traumatic or degenerative....



A: Radial Tear (small)

Radial Tear (large)

Progresses to a Flap Tear

Progresses to Complex or Degenerative Tear



B:

Flap Tear



Flap Tear



Double Flap Tear



C: Discoid Meniscus



D: Peripheral Tear



Repaired Peripheral Tear



E: Horizontal Flap Tear



Displaced Flap Tear (horizontal)



F: Longitudinal Tear (short)

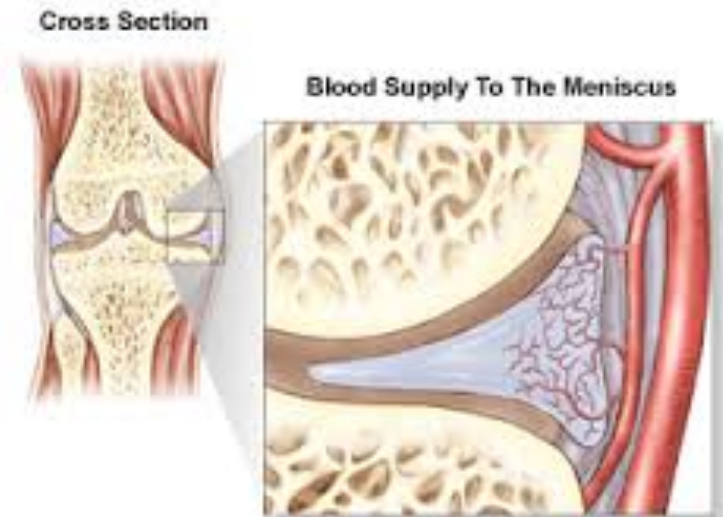
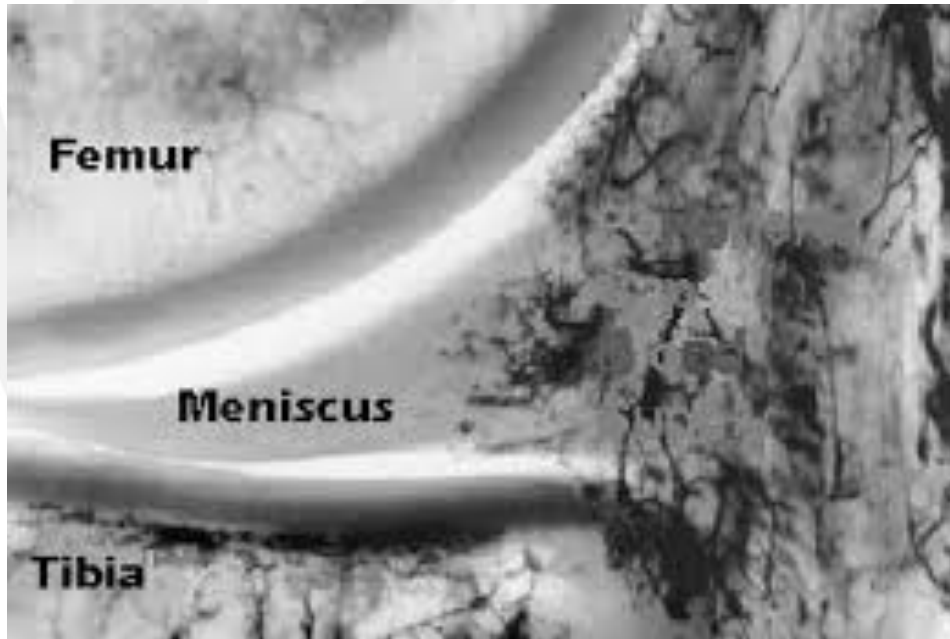


Longitudinal Tear (long)

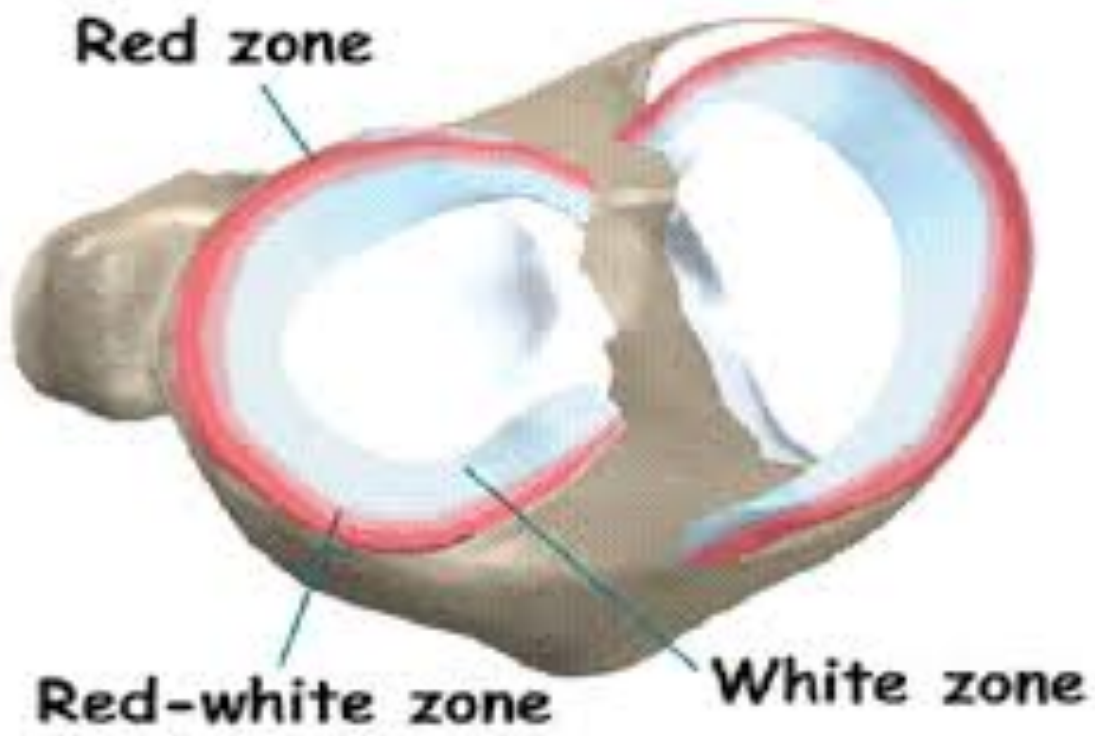


Longitudinal Tear (displaced bucket-handle)

“....its all about the blood supply...”



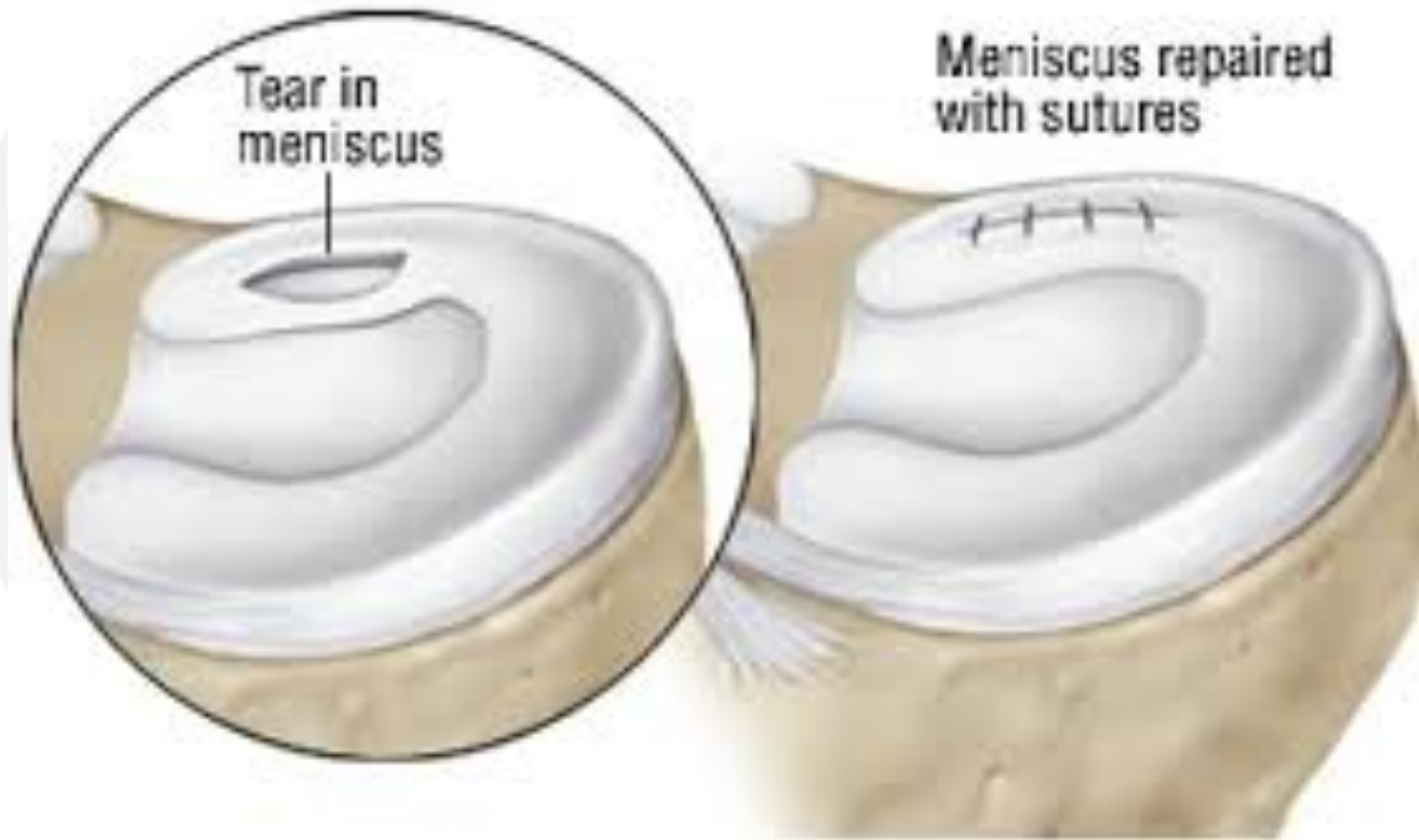
Arnonczyk, *AJSM*, 1982



© 1998 1003



# Meniscus Repair



# Meniscus Injury



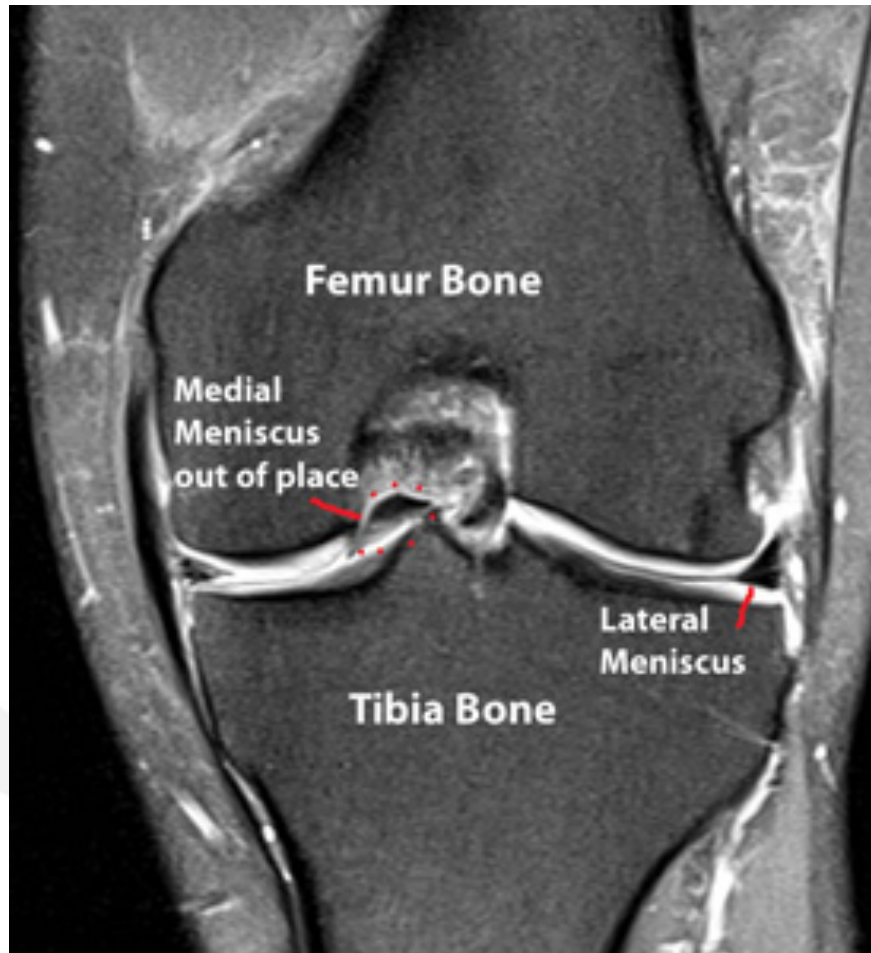
- Traumatic vs atraumatic/degenerative
  - Traumatic: Younger, acutely painful swollen knee
  - Degenerative: Middle age-older, chronic vs acute-on-chronic vs acutely painful knee
- Catching, clicking, locking of the knee may occur
- Exam may include painful range of motion, affected joint line tenderness, and positive provocative maneuvers (McMurray's, Appley's)

# Meniscus Injury: Diagnosis

- History, Physical
- Plain Radiographs!
- MRI







# Meniscal Injury Treatment: Young patient

- Non operative treatment NOT typically recommended
- Surgery to PRESERVE the meniscus (i.e., repair or debride, prevent tear progression)
- Definition of young?
  - <25 years old?
  - <35 years old?
  - <50 years old?
- Why?

# MENISCECTOMY

- REMOVAL OF MENISCAL TISSUE DECREASES CONTACT STRESS AREA, INCREASING STRESS ON THE ARTICULAR CARTILAGE
- INCREASED STRESS IS IN PROPORTION TO THE AMOUNT OF MENISCUS REMOVED
- INCREASED STRESS INEVITABLY LEADS TO DEGENERATION OF THE JOINT





# Meniscectomy and Osteoarthritis

- Fairbanks, *JBJS*, 1948
  - Described progressive radiographic changes after open meniscectomy, with up to 14yrs f/u
  - \*No correlation with clinical findings
- Jorgensen, *JBJS*, 1987
  - 4.5 and 14.5 yr clinical and radiographic f/u of athletes after open meniscectomy
  - c/l knee radiographs for control
    - 89% radiographic changes
    - 67% symptomatic
    - 34% no sports (due to knee pain)



## Kellgren and Lawrence Radiographic Criteria for Assessment of OA\*



Radiographic grade	0	I	II	III	IV
Classification	Normal	Doubtful	Mild	Moderate	Severe
Description	No features of OA	Minute osteophyte; doubtful significance	Definite osteophyte; normal joint space	Moderate joint-space reduction	Joint space greatly reduced; subchondral sclerosis

\*Radiography does not reliably correlate with symptoms.

Cooper C et al. In: Brandt KD, Doherty M, Lohmander LS, eds. Osteoarthritis. Oxford, NY: Oxford University Press; 1996:237-249.

# OA after arthroscopic meniscus repair vs partial meniscectomy

- Stein, *AJSM*, 2010
- Level 3 Cohort
- 4.5 and 9 yr blinded radiographic f/u
- Young(ish) patients: avg age ~31
- Isolated, “traumatic tears”; both groups, vertical tears/bucket handle
- Results at 9 years:
  - Meniscectomy: 60% OA changes (Grade I Fairbanks)
  - Meniscus repair: 20% OA changes (Grade I Fairbanks)
  - No Grade 2 or 3 changes seen
- Repair much higher return to prior sport (96% vs 50%)

A large, light gray, stylized human figure is positioned on the left side of the slide. The figure is composed of simple, curved lines, with one arm raised and the other bent at the elbow. The figure is semi-transparent, allowing the text to be seen through it.

**"SAVE THE MENISCUS..."**

# Meniscus Tear, Young Pt.: REPAIR WHEN POSSIBLE


- Young, healthy patient
  - Non smoker
- Red Zone, Red-White Zone
- Favorable tear pattern (Vertical, Bucket handle)
- Acute?
- In conjunction with ACL reconstruction\*
- Stable knee
  - Morgan, *AJSM* 1991

# Meniscus Repair Healing Rate

- ~82%
  - If an isolated repair: ~50% healing rate
  - \*\*If in conjunction with ACLR: ~90% healing rate
- 
- Tenuta, *AJSM*, 1994 (West Point, A/A eval)
  - Cannon, *AJSM*, 1992 (arthrogram or A/A)
  - Westerman, *AJSM*, 2014 (MOON GROUP)

# CLINICAL QUESTION

*WHAT IS THE OPTIMAL TREATMENT OF A MIDDLE AGED PATIENT WITH A SYMPTOMATIC MENISCUS TEAR?*

- 
- PubMed Search
    - Relevant articles
    - Search terms “meniscus”, “meniscus repair”, “meniscectomy”, “meniscal healing”
    - All levels of studies considered for historical purposes
    - Level I and II studies included in outcomes review



# Levels of Evidence

Medscape®		www.medscape.com
Level of Evidence	Grading Criteria	Grade of Recommendation
1a	Systematic review of RCTs including meta-analysis	A
1b	Individual RCT with narrow confidence interval	A
1c	All and none studies	B
2a	Systematic review of cohort studies	B
2b	Individual cohort study and low quality RCT	B
2c	Outcome research study	C
3a	Systematic review of case-control studies	C
3b	Individual case-control study	C
4	Case-series, poor quality cohort and case-control studies	C
5	Expert opinion	D

Source: Ann Surg © 2004 Lippincott Williams & Wilkins

# Knee Arthroscopy

- ~700,000 arthroscopic partial medial meniscectomies/year in the U.S. in 2006
- But should we be doing this?



# CAUTION



Knee MRI Magnetic  
Field!

Electromagnetic forces  
may cause doctor to  
lose common sense!

# Meniscus Tear

- Common
  - 35% of people over the age of 50 have a meniscus tear
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- Can be traumatic or degenerative....

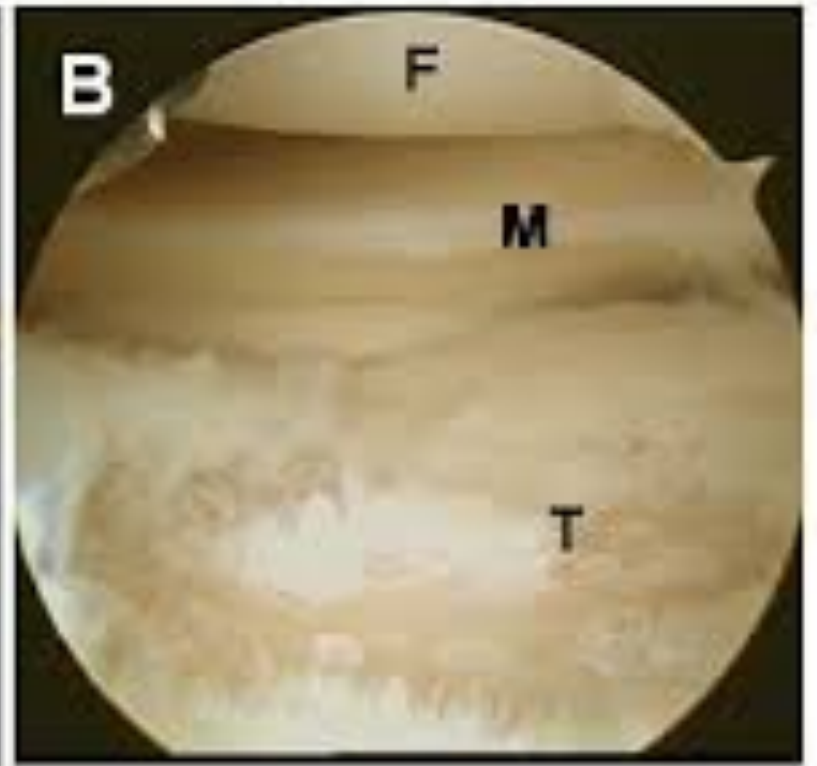
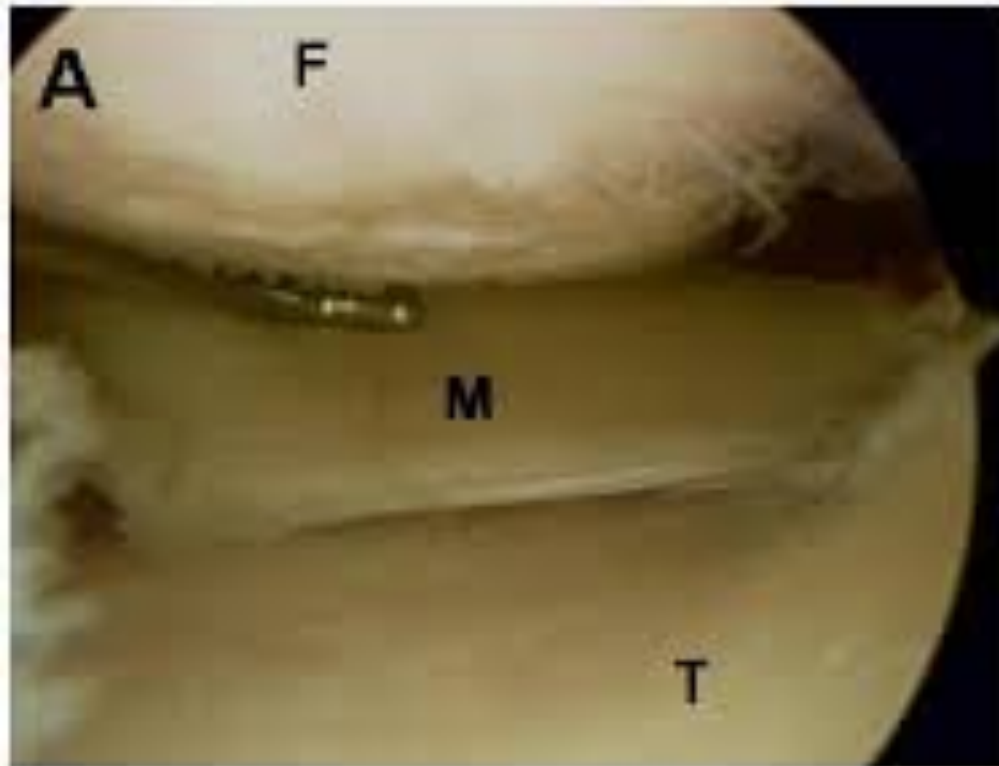


# Arthroscopy for Osteoarthritis?

- Mosely, *N Eng J Med*, 2002
- RCT, Level I
- Arthroscopy with debridement and meniscectomy vs. lavage surgery vs. sham surgery
- Conclusions: NO DIFFERENCE AMONG GROUPS!
  - Kirkley, *N Eng J Med*, 2008, similar findings

Should we 'scope this patient's knee for their meniscus tear?





# Arthroscopy and Osteoarthritis

- *In General: Doing an arthroscopy for a patient with advanced arthritis no longer appropriate!*
- *What about knee arthroscopy for meniscus tear in a patient with mild arthritic changes?*
- *No arthritis?*



# Arthroscopy vs Sham Surgery for Degenerative Meniscus Tears

- Sihvonen, *N Eng J Med*, 2013
- Multicenter RCT, Level 2 Evidence
- Arthroscopic partial meniscectomy vs. sham surgery in patients without OA
- Findings: NO DIFFERENCE b/t GROUPS @ 12mos
  - Importantly, statistical difference in severity of non-radiographic appearance of arthritis seen in surgical vs. sham group.

# Knee arthroscopy vs PT for meniscus tears

- Herrlin, *KSSTA*, 2013
- RCT, Level 1
- No or minimal OA ( $\leq$  grade 1)
- Middle aged patients
- Findings:
  - PT group did as well as Arthroscopy/PT group at 5 years

# The New York Times

- *Arthritis Surgery In Ailing Knees Is Cited as Sham*
  - By GINA KOLATA
  - Published: July 11, 2002
- *Common Knee Surgery Does Very Little for Some, Study Suggests*
  - By Pam Belluck
  - Published: December 25, 2013
- *The Placebo Effect Doesn't Apply Just to Pills*
  - OCT. 6, 2014

# Knee arthroscopy vs PT for meniscus tears

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  - **HOWEVER: 33% of patients had crossed over into the surgical group, and improved after arthroscopy!!**

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  - No progression of OA in surgical group

# Arthroscopy vs PT for Meniscus Tear and [mild-moderate] Osteoarthritis

- Katz, *N Eng J Med*, 2013
- RCT, multicentered, Level I Evidence
- Arthroscopy and PT vs PT alone
- 12 mos f/u, pt. age >45 yrs
  
- Results: NO DIFFERENCE!

# Arthroscopy vs PT for Meniscus Tear and [mild-moderate] Osteoarthritis

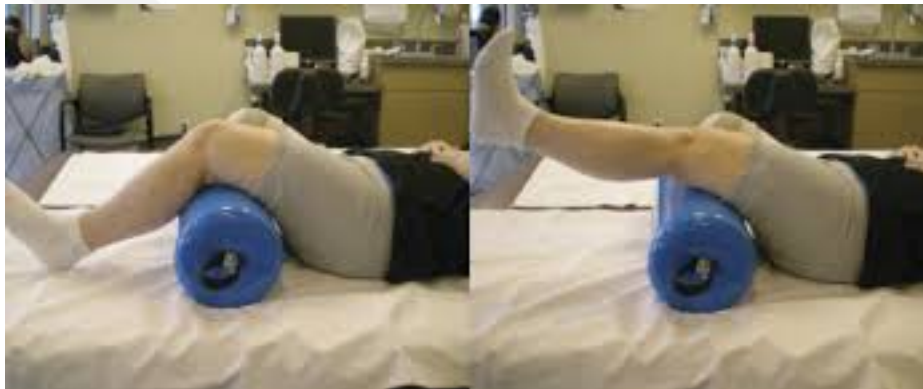
- Katz, *N Eng J Med*, 2013
- RCT, multicentered, Level I Evidence
- Arthroscopy and PT vs PT alone
- 12 mos f/u, pt. age >45 yrs
- Results: NO DIFFERENCE!
  - **But:**
    - **35% crossover, with improved results**
    - **Treatment failure: PT alone (49%), Arthroscopy (25%)**
      - (WOMAC)

# Arthroscopy vs Conservative Tx for Meniscus Tears

- “Not all meniscus tears need surgery..”
- “This does not mean all meniscus tears do not need surgery”
  - Robert Brophy, MD
  - Washington University, St. Louis, MO
  - *JBJS*, 2014



# Non-Op Treatment, Meniscus



# Does knee arthroscopy and meniscectomy lead to osteoarthritis?

- Paxton, *Arthroscopy*, 2011
- Systematic Review, Level IV
- 10 years s/p meniscectomy, 36% of patients had Fairbanks I/II changes (none had III/IV)
- Meniscus repair, 21% had I/II changes
- Reoperation rate: Meniscectomy(3.9%), Repair (21%)
- But: DIFFERENT PT POPULATIONS/AVG AGE....

# Knee arthroscopy vs PT for meniscus tears

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  - **HOWEVER: 33% of patients had crossed over into the surgical group, and improved after arthroscopy!!**
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# CLINICAL QUESTION

*WHAT IS THE OPTIMAL TREATMENT OF A MIDDLE AGED PATIENT WITH A SYMPTOMATIC MENISCUS TEAR?*

- *Non-operative management is an appropriate first step, with physical therapy, activity modifications, +/- medications, +/- bracing*
- *Arthroscopy and partial meniscectomy may be considered in those who fail non-operative measures*
- *Arthroscopy unpredictable in those with more advanced arthritis, and should not be the first line of treatment in these patients*

# SUMMARY

- *Non-operative management is an appropriate first step, with physical therapy, activity modifications, +/- medications, +/- bracing*
- *Many patients will do well without surgery*
- *Arthroscopy and partial meniscectomy may be considered in those who fail non-operative measures*
- *Literature not conclusive on partial meniscectomy and osteoarthritis: cause or effect?*
- *Arthroscopy unpredictable in those with more advanced arthritis, and should not be the first line of treatment in these patients*

## Meniscus References

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A large, light gray, stylized graphic of a person with their arms raised in a 'V' shape, positioned on the left side of the slide. The person's head is represented by a simple oval shape.

***THANK YOU!***

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