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Meniscus Tears – A guide for physios

When to rehab? When to refer

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Outline

- Anatomy and function of the menisci.
- Clinical assessment of meniscus tears.
- Investigations and tips for interpreting MRI scans.
- Common patterns of meniscus tear
  - Natural history
  - Rehab vs Orthopaedic referral
  - Surgical treatment

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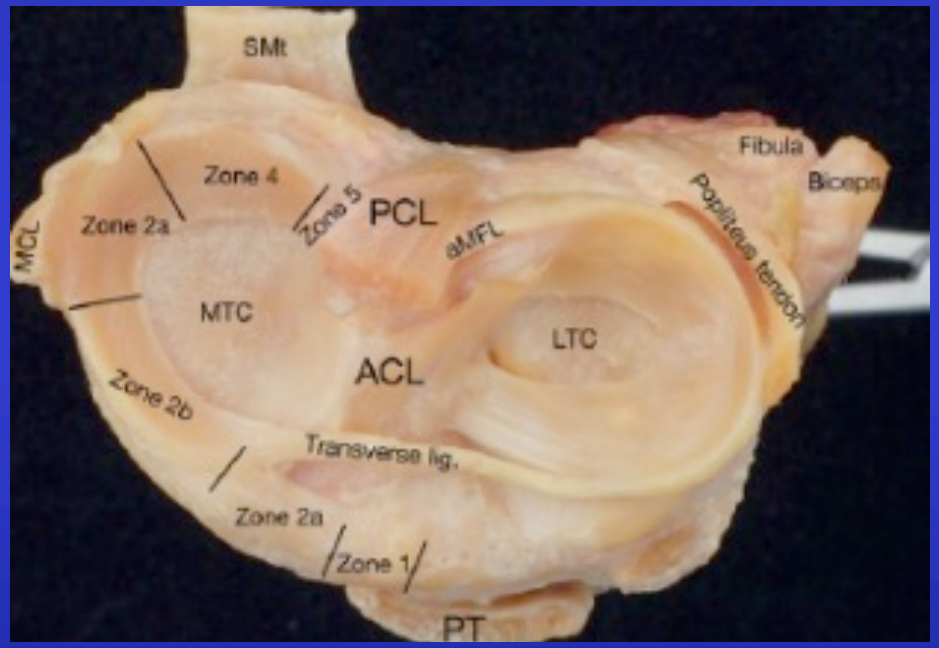
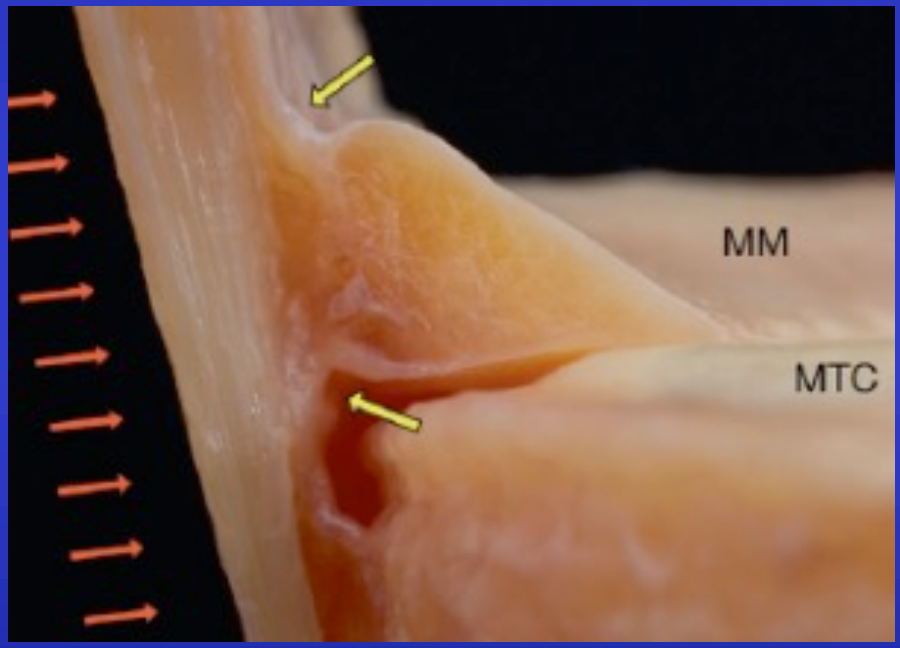
Background - Anatomy





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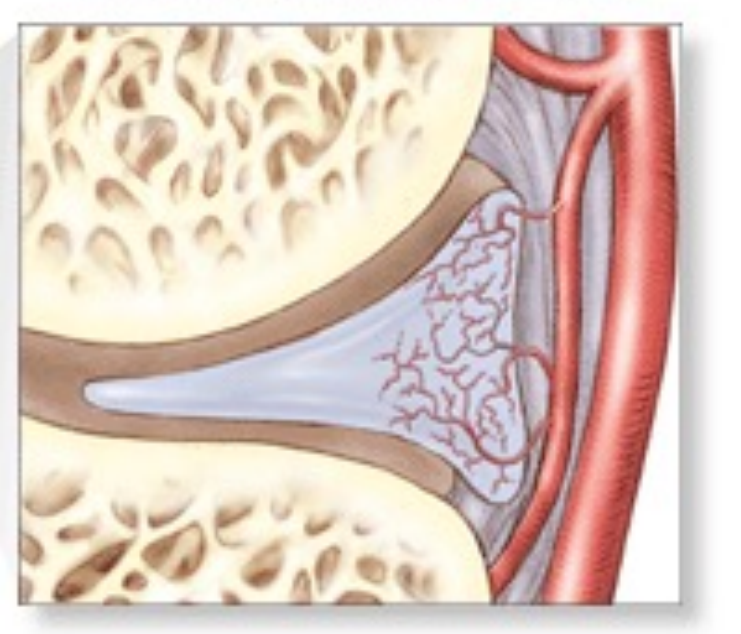
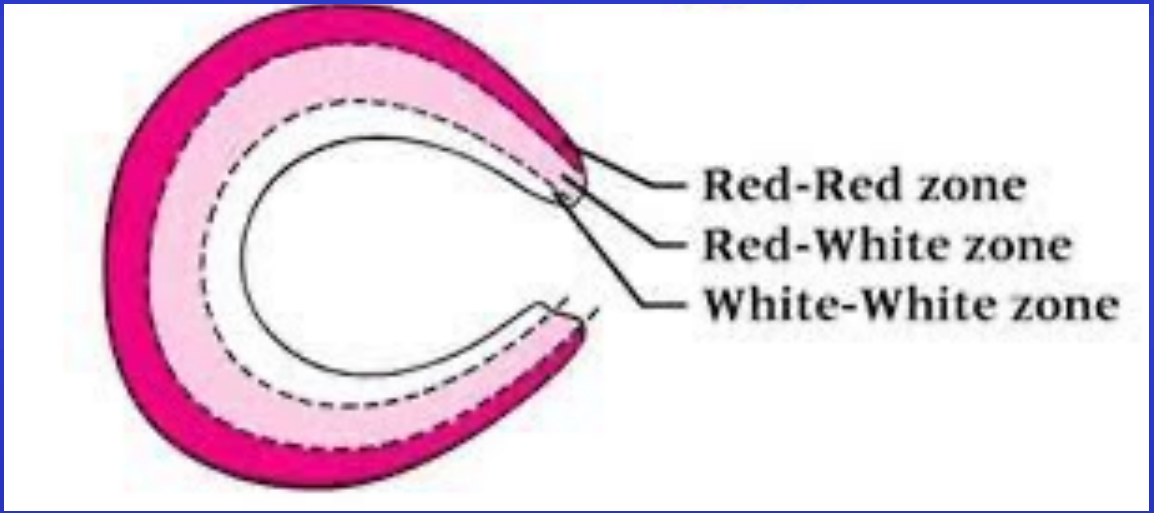
Background - Anatomy





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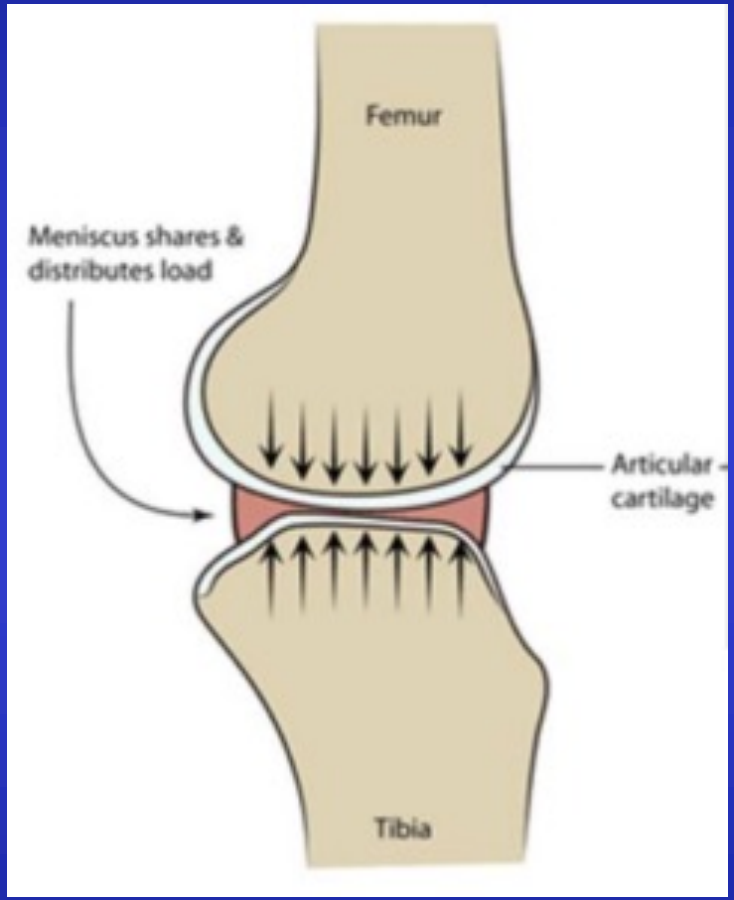
Background - Function

- Load transmission
  - 60-70% of load in extension
- Joint stability
- Lubrication and nutrition
- Proprioception



Keys to Clinical Assessment

- History
  - Acute injury?
  - Location of pain
  - Exacerbating activities? Typically squatting, twisting, uneven ground.
  - Night pain?
  - Locking?
  - Insecurity or giving way?
  - History of knee pain/osteoarthritis?

Keys to Clinical Assessment

- Examination
  - Effusion
  - Tenderness
  - McMurray's test – very non-specific

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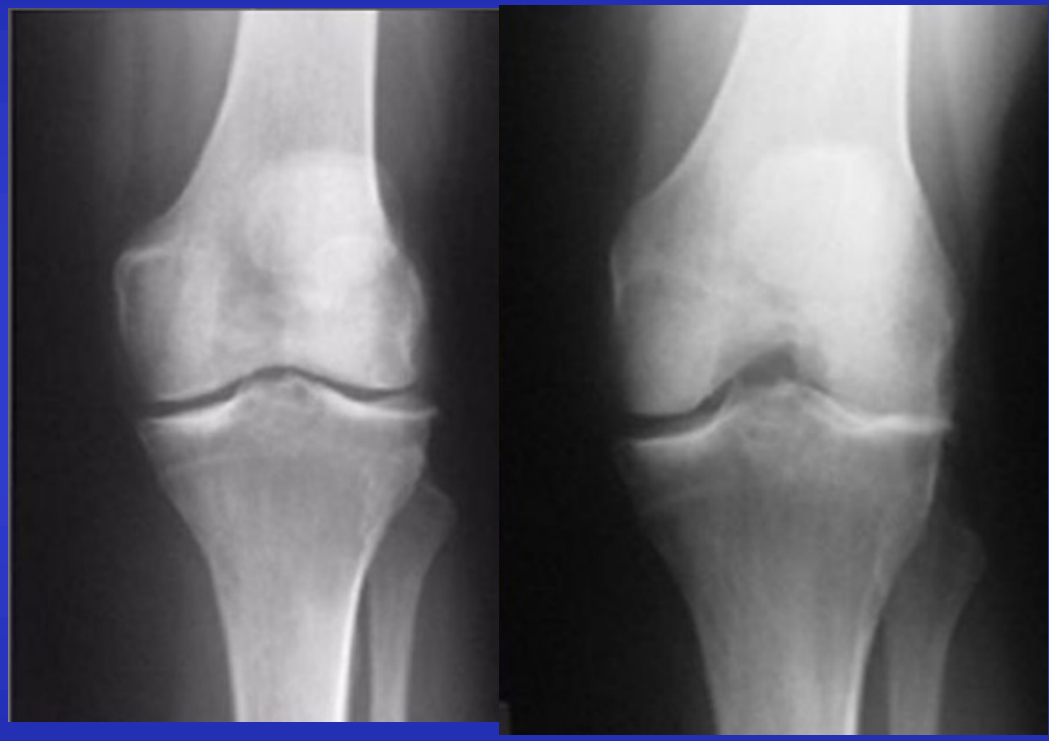
Keys to clinical assessment

- Investigations
  - Xray (always ask for **weight bearing views**: AP, lateral, Rosenberg, skyline).
  - **MRI –** Gold standard.
  - US is not useful.
    - Would recommend against ordering.



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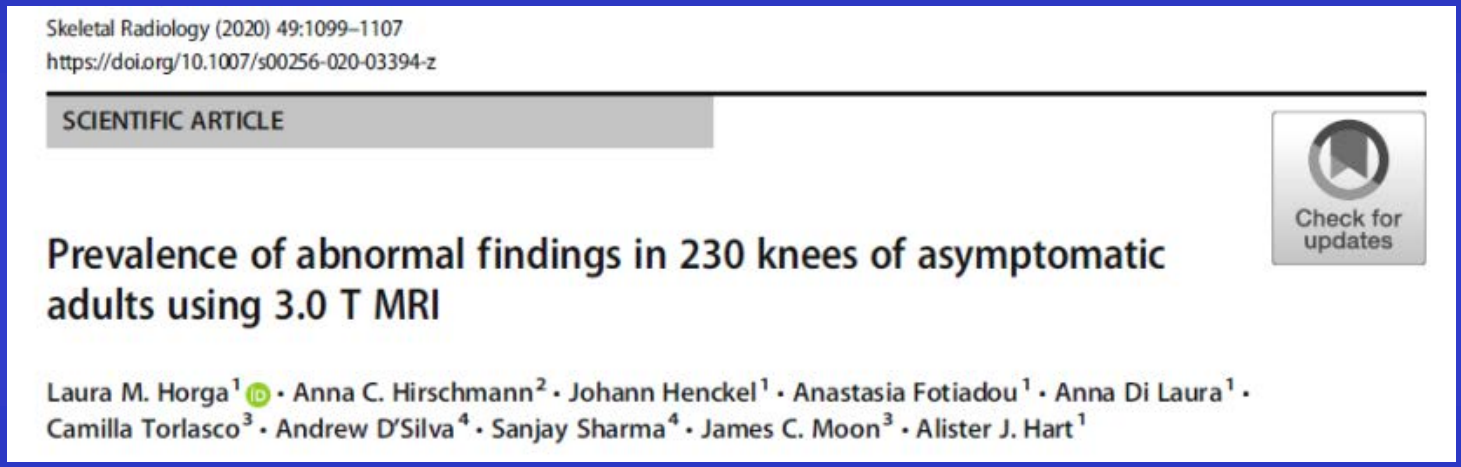
MRI – a word of warning

- Meniscus tears are very common on MRI, even in asymptomatic individuals.



Skeletal Radiology (2020) 49:1099–1107
https://doi.org/10.1007/s00256-020-03394-z

SCIENTIFIC ARTICLE

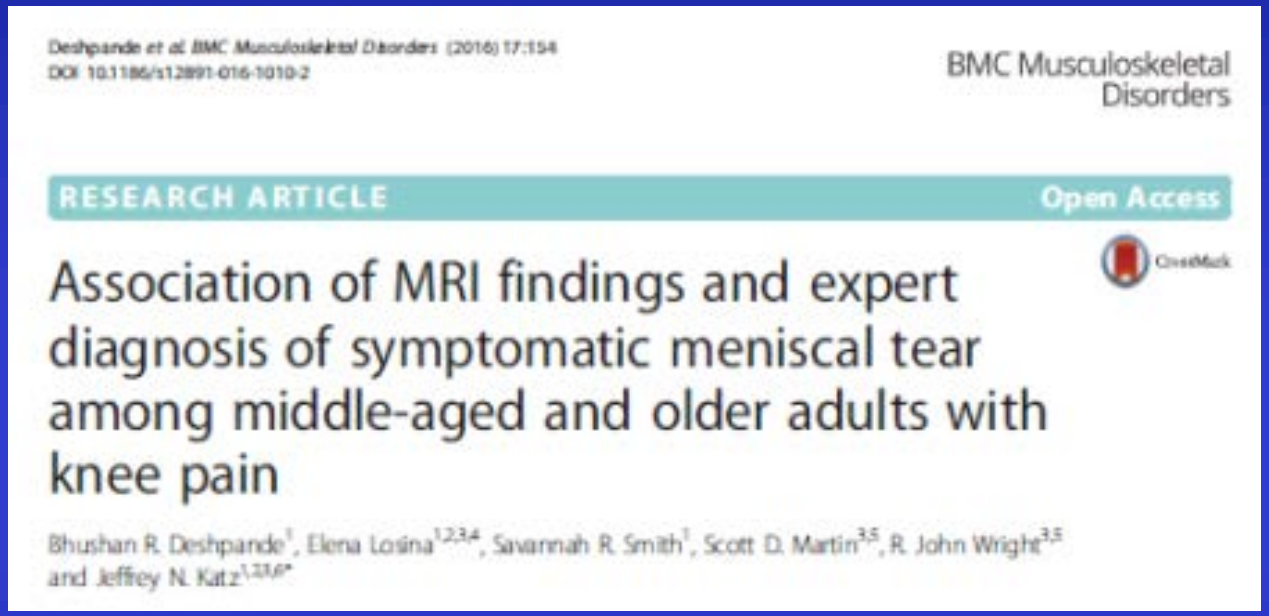
Check for updates

Prevalence of abnormal findings in 230 knees of asymptomatic adults using 3.0 T MRI

Laura M. Horga[1] · Anna C. Hirschmann[2] · Johann Henckel[1] · Anastasia Fotiadou[1] · Anna Di Laura[1] · Camilla Torlasco[3] · Andrew D'Silva[4] · Sanjay Sharma[4] · James C. Moon[3] · Alister J. Hart[1]

  - Asymptomatic adults, median age 40
  - **30% rate of meniscal tear**

MRI – a word of warning



Deshpande et al. BMC Musculoskeletal Disorders (2016) 17:154
DOI 10.1186/s12891-016-1010-2

BMC Musculoskeletal Disorders

RESEARCH ARTICLE Open Access

Association of MRI findings and expert diagnosis of symptomatic meniscal tear among middle-aged and older adults with knee pain

Bhushan R. Deshpande[1], Elena Losina[1,2,3,4], Savannah R. Smith[1], Scott D. Martin[3,5], R. John Wright[3,5] and Jeffrey N. Katz[1,3,6*]

- 84 symptomatic adults > 45 yrs.
- 87% had a meniscus tear.
- **The meniscus tear will not always be the cause of the patient's pain.**

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Common tear patterns

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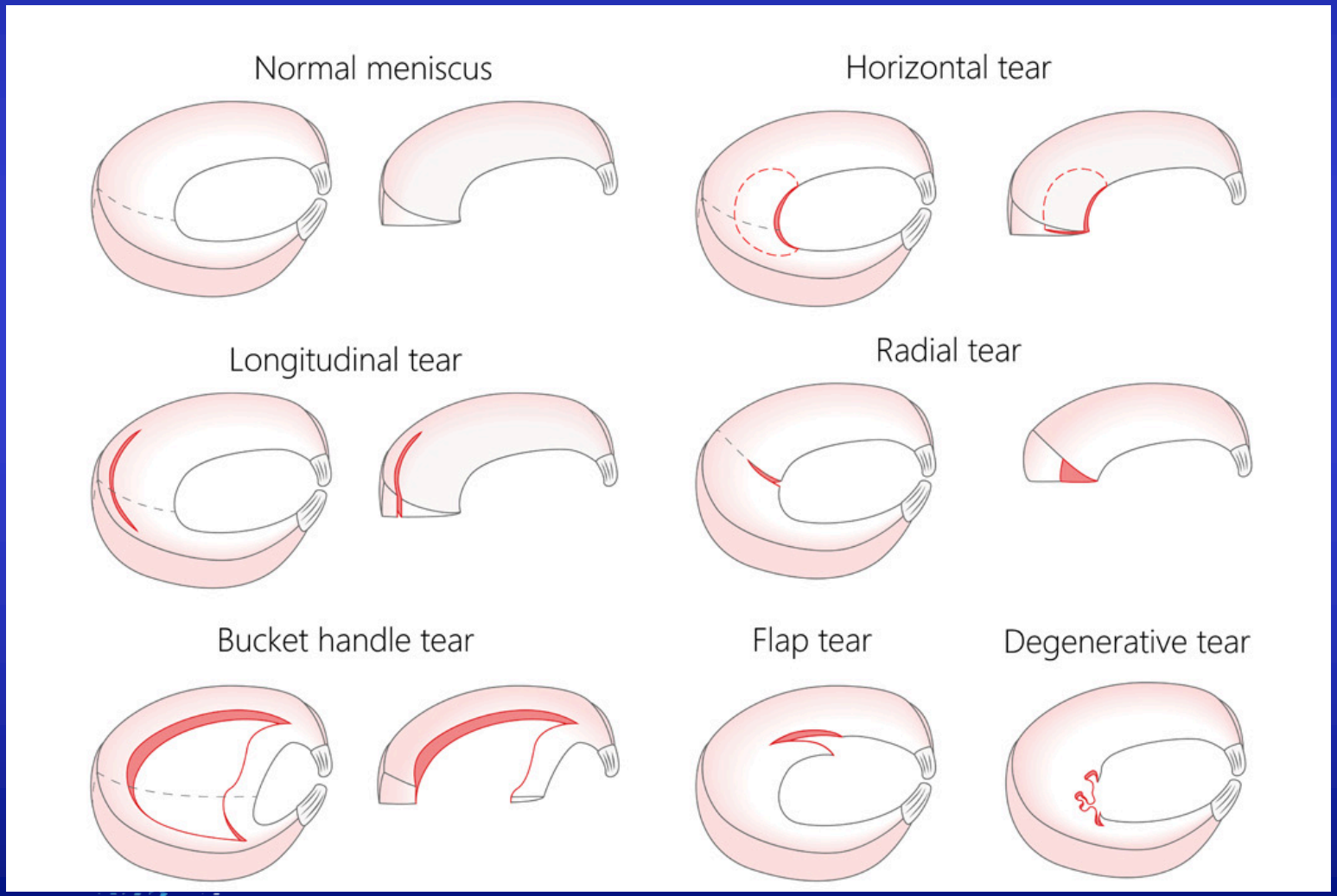
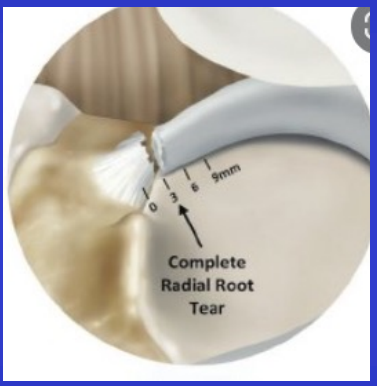
Common tear patterns





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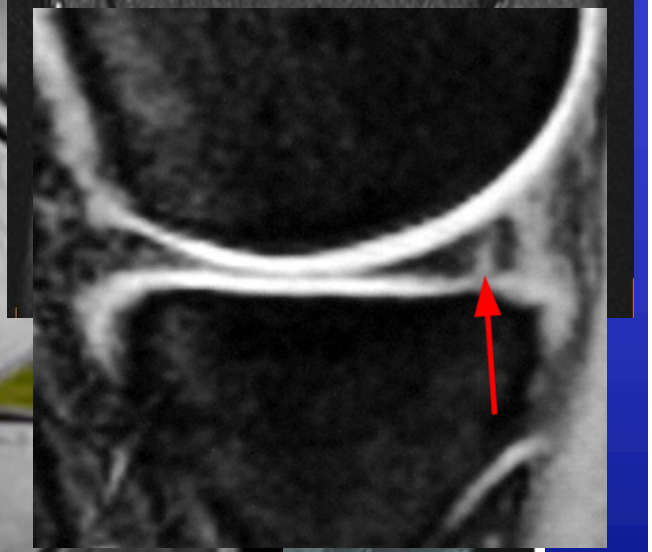
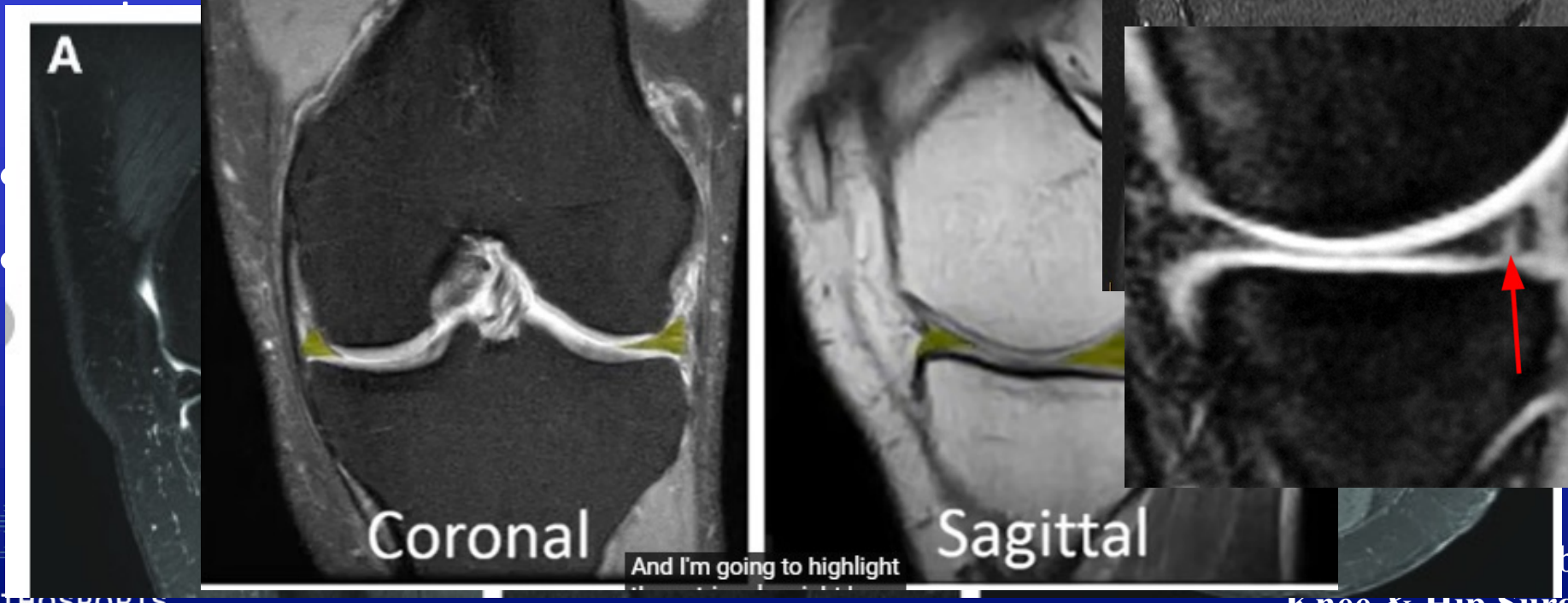
Quick tips for meniscus on MRI

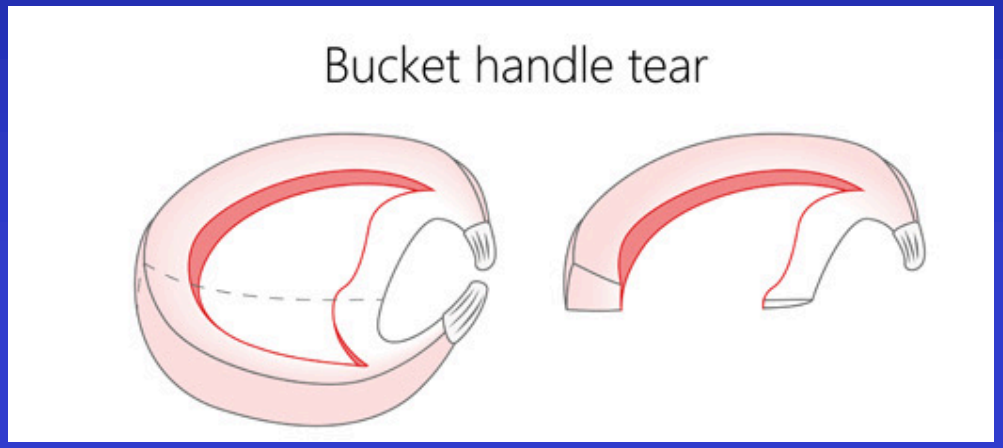
- T2 weighted images (bone dark, meniscus/ligaments black, fluid white).
- Look on all views
- Meniscus should appear triangular
- Look at meniscus volume. If reduced





Bucket Handle tear

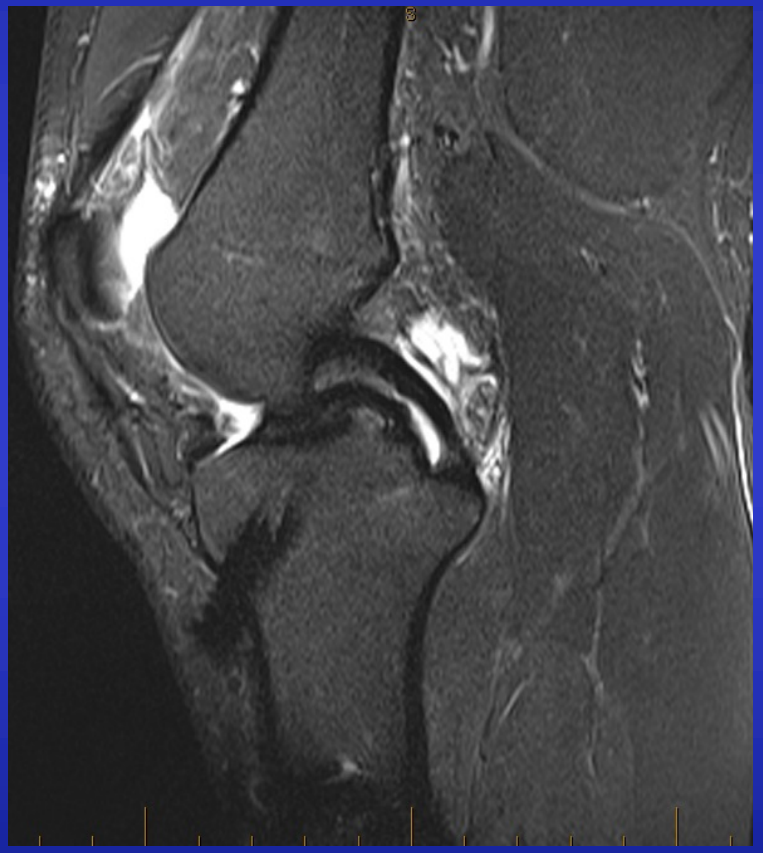
- **History**
  - Acute injury



- **Examination**
  - May have “locked knee” ie incomplete extension.

Bucket Handle tear

- **MRI findings**
  - Loss of normal triangular shape and volume. (Coronal)
  - Meniscal tissue visible in intercondylar notch. (Coronal/Sagittal)
  - “Double PCL sign” (Sagittal)



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Bucket Handle tear

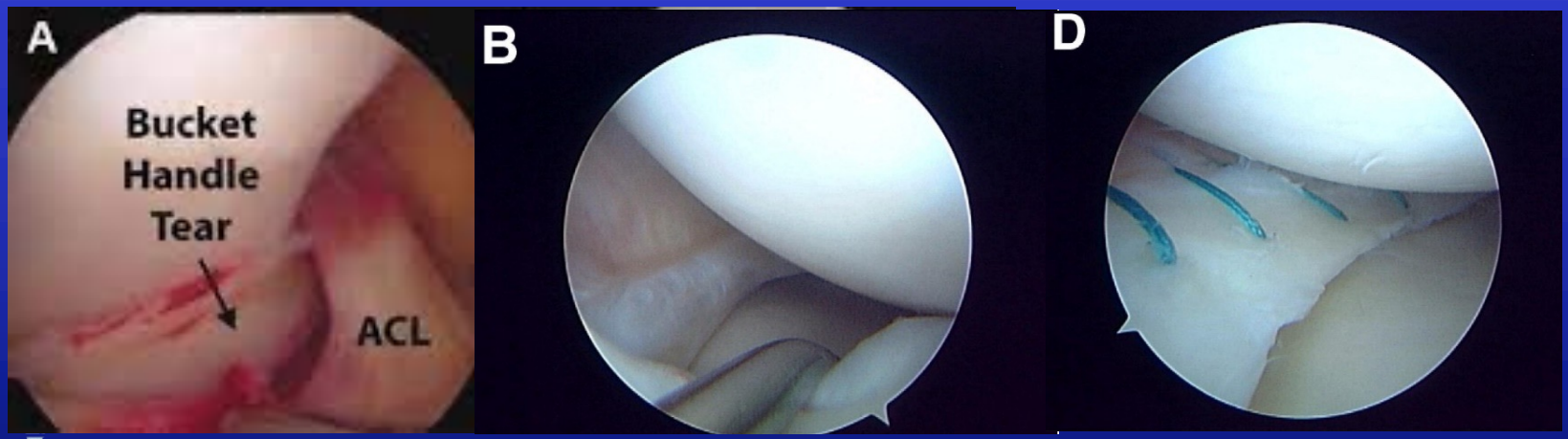
- **Natural history**
  - Displaced meniscal tissue can abrade chondral surfaces.
  - The longer it remains displaced, the less likely it is to be repairable.

- **Rehab vs Refer**
  - Relatively URGENT Ortho Referral – feel free to call!

Bucket Handle tear

- **Treatment**
  - Repair when possible
  - Otherwise remove bucket handle fragment.

- **Prognosis**
  - If meniscus removed → high risk of OA in long term.
  - Lateral worse than medial.



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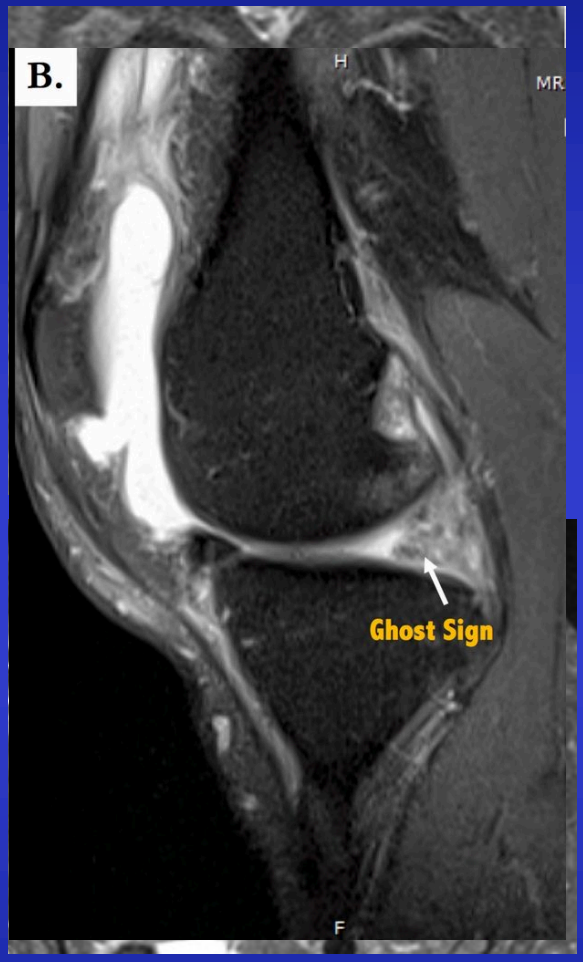
Posterior root tears

- **History**
  - Aged 50s, 60s.
  - Often an acute injury ie patient can tell you the precise moment they felt tear.
  - Initially swollen and painful ++
  - May have instability/giving way

- **Examination**
  - Swelling
  - Posteromedial tenderness

Posterior root tears

- **MRI findings**
  - Meniscus not attached to bone posteriorly (coronal, axial).
  - Meniscus may be extruded (coronal)
  - Meniscal “ghost sign” (sagittal)

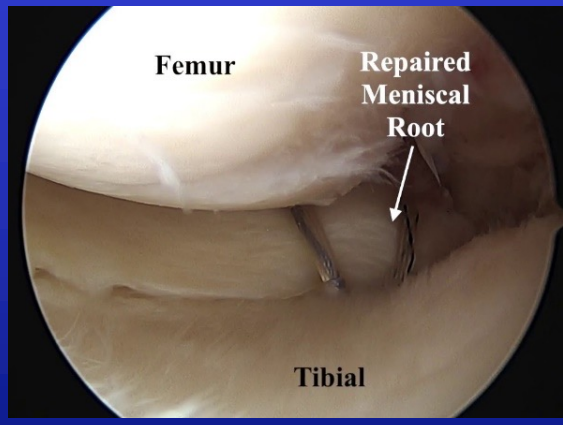


Posterior root tears

- **Natural history**
  - Root tear defunctions meniscus.
  - Bernard et al AJSM 2020 – significant reduction in progression of OA with repair.

- **Treatment**
  - Repair into intraosseous tunnel.
  - **Non weight bearing 6 weeks post-surgery.**

- **Rehab vs Refer**
  - Refer early



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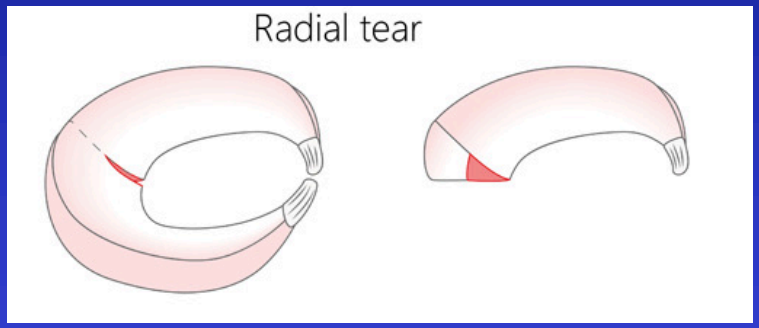
Full thickness radial tears ie Meniscal transection

- **History**
  - Often secondary to traumatic event.
  - May have mechanical symptoms.



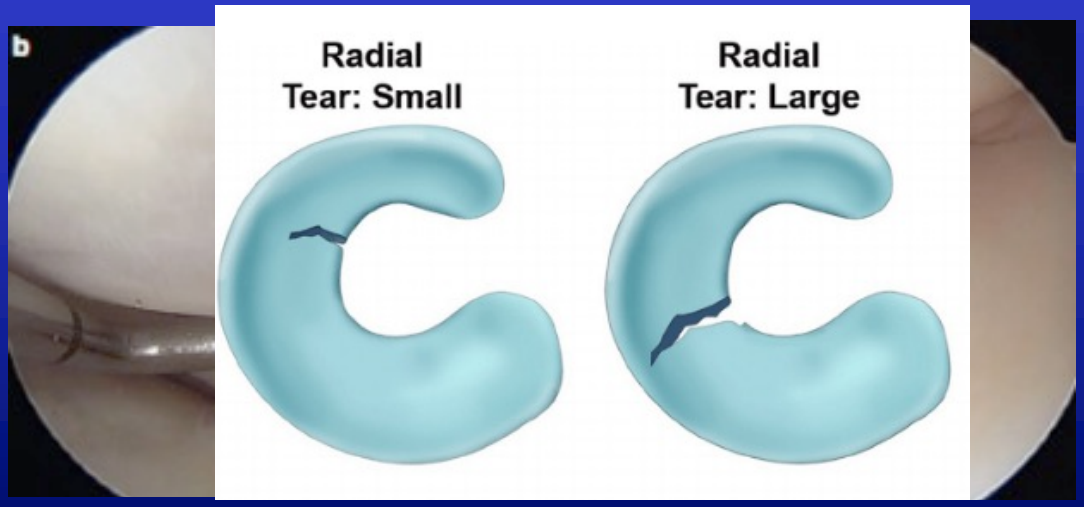
- **Examination**
  - Non-specific

- **MRI hallmarks**
  - Cleft sign
  - Ghost sign
  - Meniscal extrusion

Full thickness radial tears

- **Natural history**
  - Defunctions meniscus and therefore can increase progression to OA.

- **Rehab vs Refer**
  - **Full thickness radial tears** – refer.
    - Consider repair (although no good evidence that it is better than debridement).
  - **Partial thickness radial tears** – trial rehab.
    - If remains symptomatic consider arthroscopic debridement.



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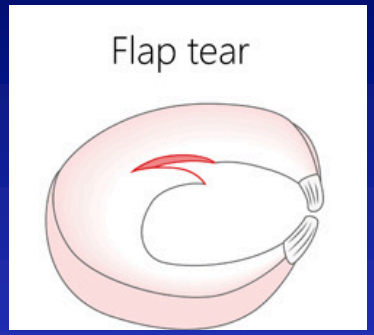
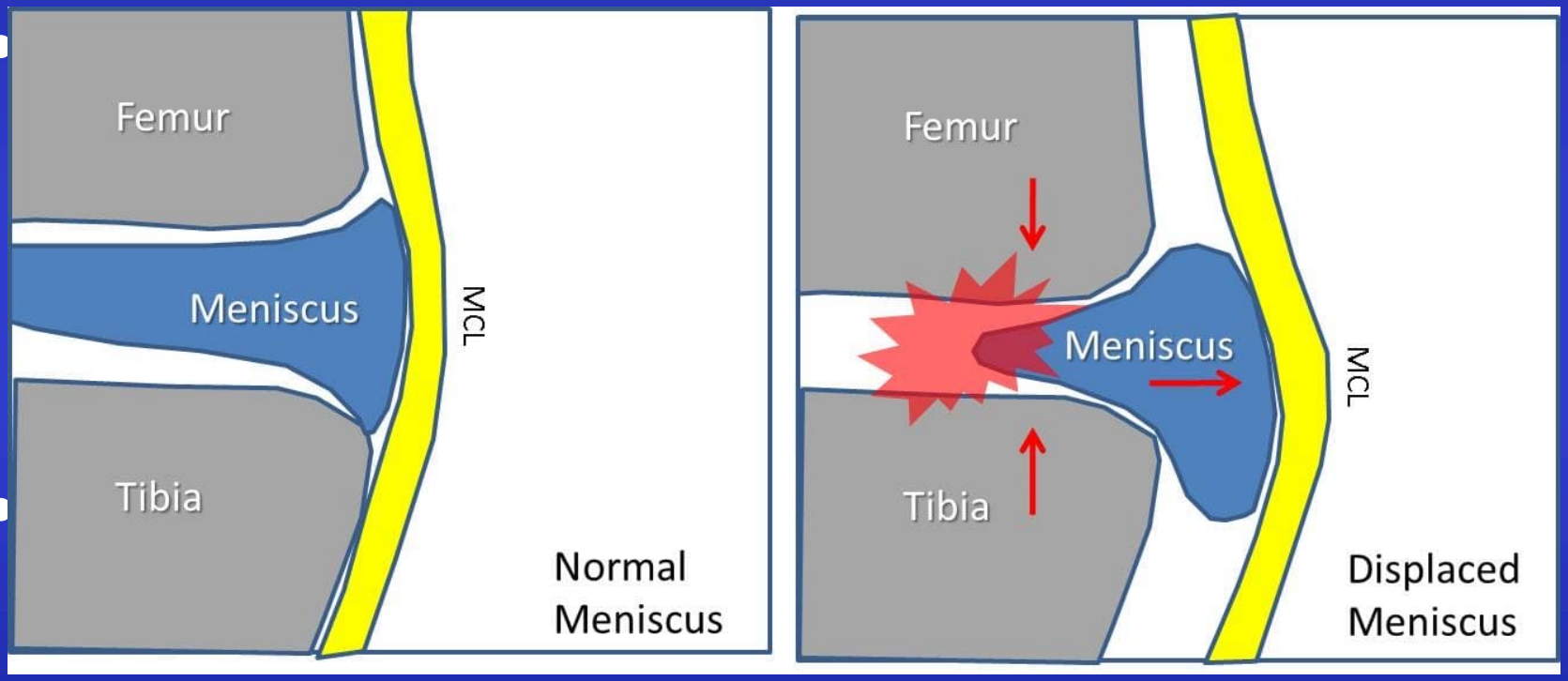
Displaced flap tears





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Displaced flap tears

- **MRI findings**
  - Meniscal tissue displaced into medial gutter.
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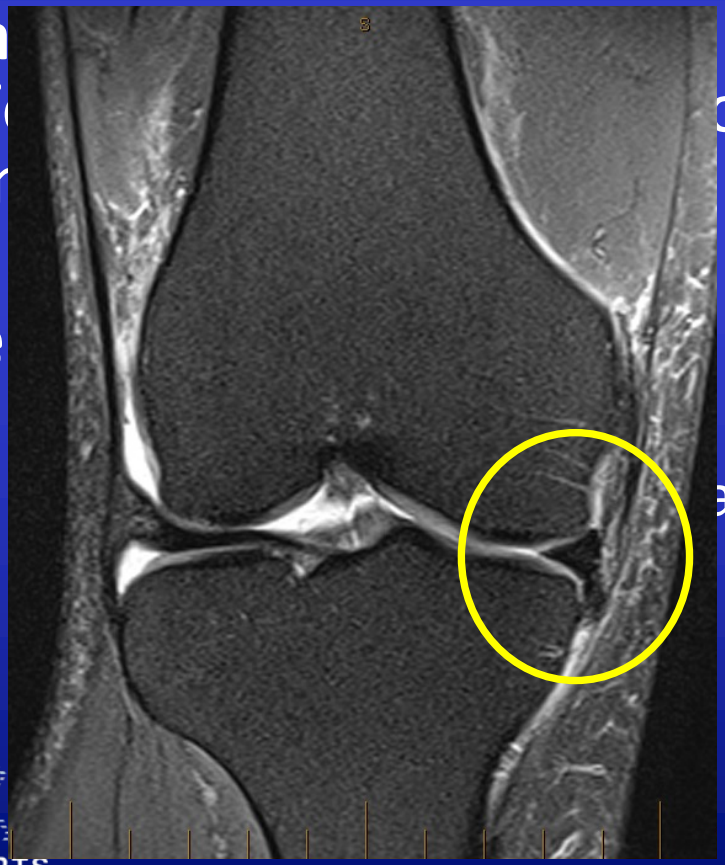

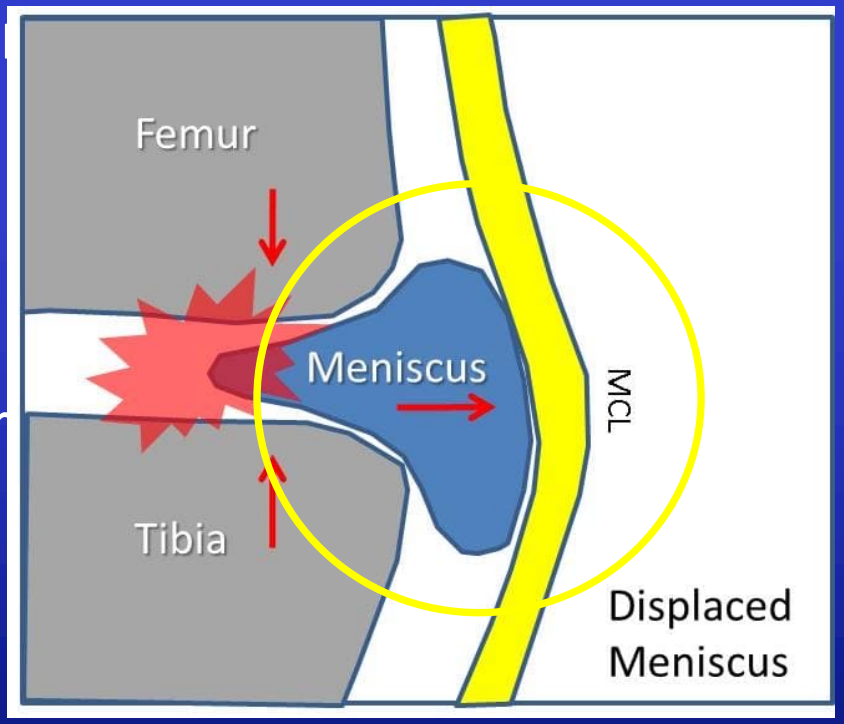

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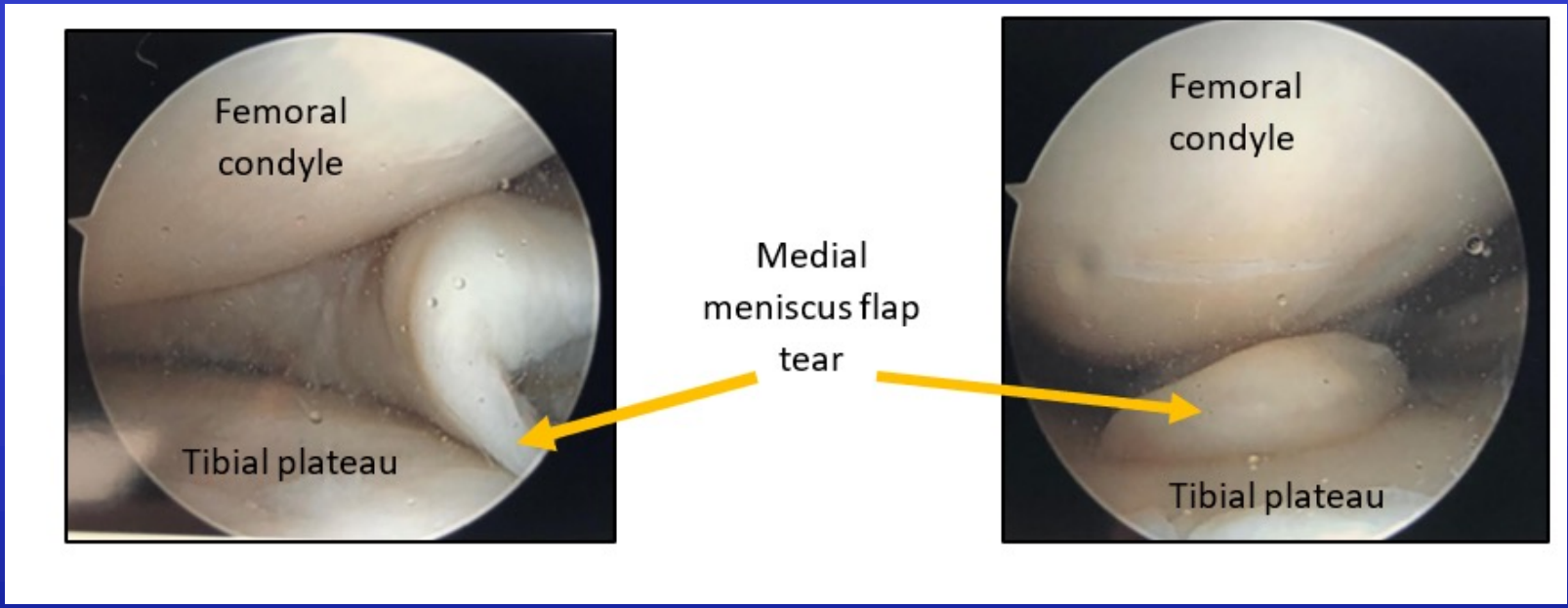
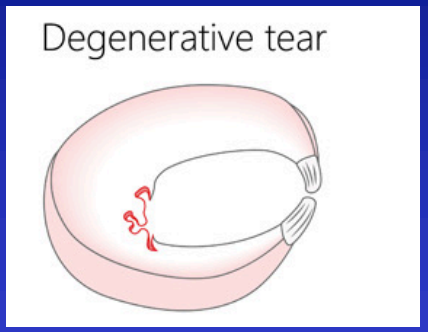
Displaced flap tears

- **Treatment**
  - Arthroscopic debridement



Complex/degenerative tears



- **History**
  - Present in up to 30% of asymptomatic people.
  - > 50s
  - Pain +/- mechanical symptoms
  - Common in arthritic knees.

- **Examination**
  - Non-specific

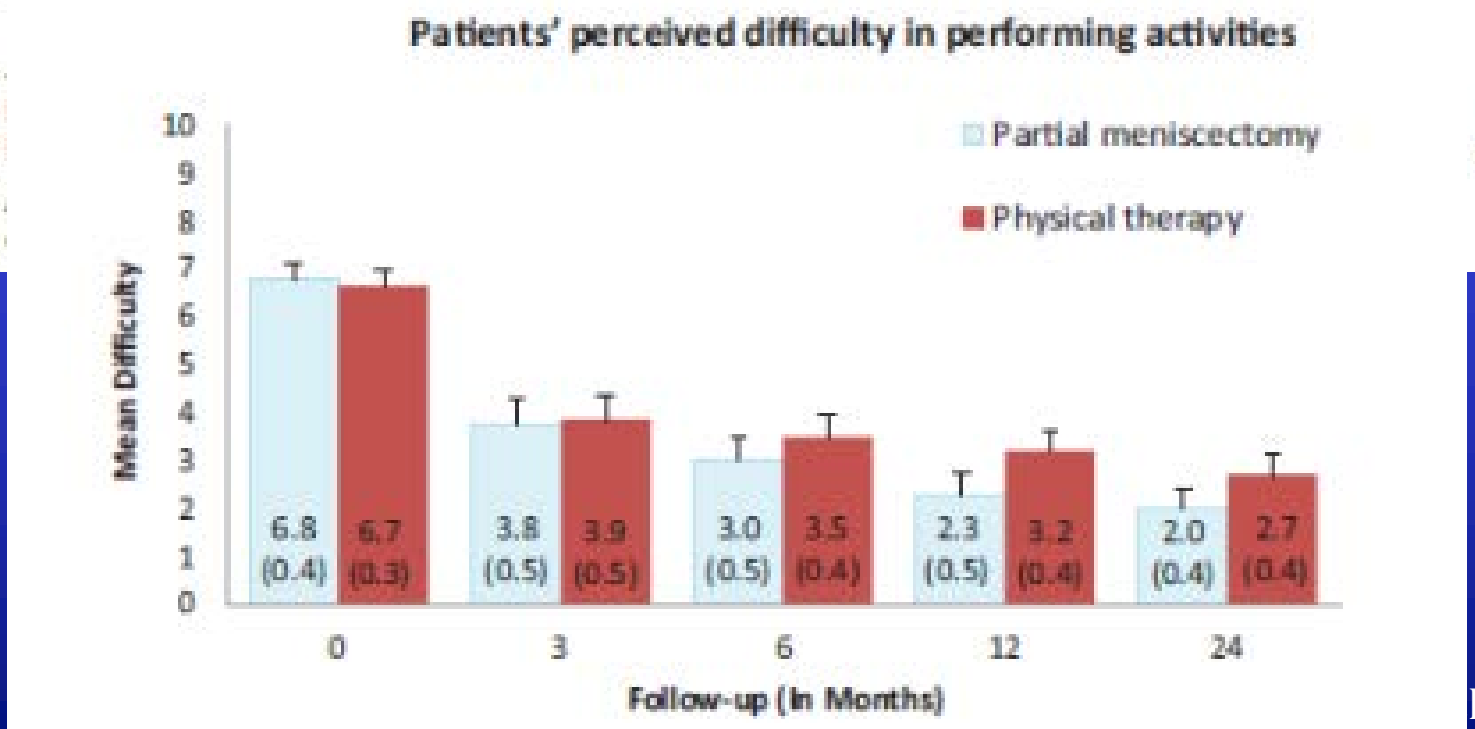
Complex/degenerative tears

- **MRI findings**
  - May have horizontal/vertical/flap components.
  - Look for associated OA
  - Weight bearing xrays may help to guide surgical treatment.
- **Natural history**
  - Fluctuating symptoms.
- **Treatment**
  - Evidence suggests surgery may not significantly alter the natural history.
  - RCTs suggest meniscectomy not significantly better than sham surgery.

Complex/degenerative tears

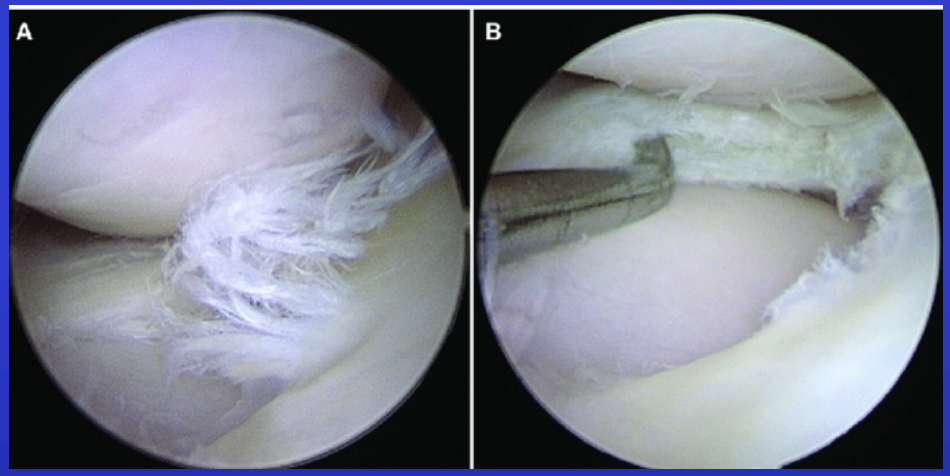
- **Functional Outcomes of Arthroscopic Partial Meniscectomy Versus Physical Therapy for Degenerative Meniscal Tears Using a Patient-Specific Score**

A Randomized Controlled Trial



Complex/degenerative tears

- **Rehab vs refer**
  - **Rehab**
  - Almost always trial non-operative measures first.
  - Referral if no improvement with rehab or persistent mechanical symptoms.



- **Treatment**
  - Physiotherapy
  - NSAIDs
  - Consider intra-articular injection
  - Arthroscopic debridement if fail non-operative or true mechanical symptoms.
  - Results variable.

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How to rehab a meniscus tear

- ESCAPE trial (Effect of physical therapy vs arthroscopic partial meniscectomy in people with degenerative meniscal tears)
- JAMA 2022

Physical therapy protocol

Time (week)	Exercises	repetitions or time
0-8	stationary bicycling for warming up and cooling down or cardiovascular training	gradual increase 7-15 min or longer
0-8	pully, strap around healthy ankle, stay and keep balance on injured side, move healthy leg forward, backward and sideward by standing in all 4 directions	3x12
0-4	calf raises on a leg press	3x12
0-8	standing hip extension in a "multi-hip" trainings device	3x12
0-4	balance on wobble board on both feet	
0-8	stair walking, walking, running, jumping according the patients ICF challenging with throwing a ball	10 min
5-8	calf raises standing on one leg	3x12
1-8	leg press, place the shinbone horizontal and the knee starting at 110°, unilateral	3x12
5-8	lunges (according the needs of the patient) with < 90° knee flexion	3x12
5-8	balance on wobble board on one foot challenging with throwing a ball	3 min
5-8	crosstrainer as cardiovascular and cooling down training	10 min or more

The exercise program for comprised 16 supervised sessions during 8 weeks

How to rehab a meniscus tear

- STARR (Study of traumatic meniscus tears: Arthroscopic resection vs rehabilitation)
- BJSM 2022 https://bjsm.bmj.com/content/56/15/870

Phase	Goal	Activities
I	Reduce knee effusion	Explanation and education about meniscal injury; advice for daily activities and to stay in 'pain free range of motion'
		Exercises (partial weight bearing) within 'pain free range of motion', e.g. walking, cross-training, cycling
IIa	Optimize range of motion	Transfers: sit and to stand Cycling Optional: stair walking (patient dependent)
		Homework: Extension and flexion -Straighten and bend the knee Practicing simple daily activities -Squat, step up, pelvic bridge
IIb	Optimize coordination and muscle function	To maintain / improve gait -Active dynamic gait To improve muscle function of the quadriceps To train proprioception
		Homework: Pursue full (passive) extension Practicing simple daily activities -Squat, step up, pelvic bridge
III	Stimulate activities in daily living and return to sport	Dependent on patients preferences / background / work situation: daily life or sport specific exercises
		Daily life-specific exercises : Walking and turning Kneeling, squatting, lifting Practicing complex, multiple transfers Practicing complex daily activities (e.g. turn + reach)
		Sport-specific exercises : Extended gait training (goal: increase of intensity), e.g. dribbling – skippings Jumping
		Homework: Practicing complex, multiple transfers Practicing complex daily activities (e.g. turn + reach)

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Summary - Indications for early referral on the MRI report

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CONCLUSION: MRI RIGHT knee demonstrating-

1. Degenerative cleavage tear posterior horn and body medial meniscus, with small displaced undersurface flap fragment protruding into the inferior meniscо-tibial recess at body level, mild adjacent synovitis and mild fragmentation at the inner edge of the posterior horn-root junction, with small slightly displaced flap fragment.

2. Mild superficial chondral wear mid to posterior weight-bearing aspect medial femoral condyle toward the notch.
3. NO subchondral bone stress-fracture-AVN.
4. Mild patello-femoral joint chondral wear medially.
5. Small effusion and small Baker's cyst.

Comment:

Comment:

1.
2.
3.
4. Tricompartmental OA most advanced in the medial femorotibial compartment where there is up to grade 3-early grade 4 involvement.

Comment:

1. Mildly supraphysiologic joint fluid with synovitis.
2. Complex medial meniscal tear including a full thickness radial tear at the junction of its posterior horn and posterior root ligament with static dysfunction.
3. Subchondral insufficiency fracture at the medial femoral condyle with articular collapse on the background of high grade medial femorotibial compartment OA.

Summary

Refer

- **Bucket-handle tears – RING ME!**
- Posterior root tears
- Full thickness radial tears
- All paediatric patients
- Displaced flap tears
- Degenerative tears that fail to improve with 3 months non-operative treatment
- Associated ligament injuries
- Associated subchondral insufficiency fractures (Non-weight bear)

Rehabilitate

- Degenerative / complex tears
- Partial radial tears without mechanical symptoms

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