



# John Hardy

BSc, MB BS, MD, FRCS(Ed),  
FRCS(Eng), FRCS(Orth)



# Anterior Knee Pain

Assessment, Aetiology and  
Treatments



Knee Surgeon

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Everything you need to know about **knee surgery** (to the anterior cruciate ligament) including why and how it is done, the risks and your choices, ...  
[www.nhs.uk/conditions/repairtotendon](#) - Cached

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[Knee surgeons and specialists in Harley Street, London](#)  
Information on private **knee surgeons** and specialists in Harley Street, London, provided by Private Healthcare UK.  
[www.harleystreetguide.co.uk/doctors/knee-surgeons/](#) - Cached - Similar

[Knee replacement - Wikipedia, the free encyclopedia](#)  
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### Mr Hardy is a Consultant Specialist in Orthopaedic and Trauma Surgery.

Mr Hardy has 27 years of experience as a doctor, surgeon and in particular knee surgery and hand surgery. He trained in London and Leicester and now consults at the BUPA Cromwell Hospital, London, the Chelsea Outpatient Centre in the Kings Road, London and at the Sport and Orthopaedic Clinic in Bristol.

Mr Hardy believes that patients often need more time than they think for an assessment. In 2010 he increased all of his outpatient appointment slots to 30 minutes. If you think you need additional time please would you ask for the last appointment of the day especially if you are coming for a second opinion.

When making an appointment telephone Sally: 0044 (0)117 3171793.

Please bring with you the following:

Correspondence

Medications

Investigations

It is always useful to bring with you a copy of your GP referral letter and any other correspondence concerning your medical history.



### Educational Website

Mr Hardy has a growing practice in providing a [second opinion](#) for patients with persistent knee pain before and after failed knee operations. As a knee doctor Mr Hardy understands the unique mechanical properties of the knee. Many musculoskeletal (especially knee) conditions when ignored or neglected get worse with time.

### Advice Sheets

Last year Mr Hardy undertook 4331 patient consultations and performed 275 operative procedures. Mr Hardy provided more patient information Advice Sheets last year for his patients which are now available in these web pages. Some of his patients have put their video on YouTube...

### Education

Anterior Knee Pain is becoming much easier to treat with the advances in understanding and the better equipment available. Read about the experience of just one of Mr Hardy's patients who works for the French Insurance Company AXA. He now has a [pain-free kneecap](#).



John was invited to appear on [Dr Phil Hammond's Saturday Surgery](#) "The only place where you can book a regular appointment with a GP on a Saturday!" 26th Feb 2011.

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[www.orthopaedicsandtrauma.com/](http://www.orthopaedicsandtrauma.com/) - Cached

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## The Internet Brace and Support Store for Patients to use with their GMC Registered Doctors

Patients are often confused by the jargon used to describe injury, its prevention and treatment. Part of your valued role as a doctor is to translate this jargon into effective therapy that encourages compliance after injury or arthritis. As a doctor, this site helps you to help patients choose correctly when they are buying a knee brace for knee injury, wrist brace for wrist injury, or ankle brace for ankle injury over the internet. Your help reduces the cost to the patient, the knee brace supplier, and the environment.



## www.OrthopaedicsAndTrauma.com

OrthopaedicsAndTrauma.com is, first and foremost, an educational website with product placement at its heart. Patients benefit from your informed expert advice on the braces and supports most appropriate for their condition; they also benefit from the cost savings only you can deliver. For example, our range of Procure Wrist Supports and Donjoy Shoulder Slings are a less expensive, higher quality alternative than many found on the high street today.

# Anterior Knee Pain

- Quick Assessment
  - No crepitus
  - Crepitus no pain
  - Crepitus pain

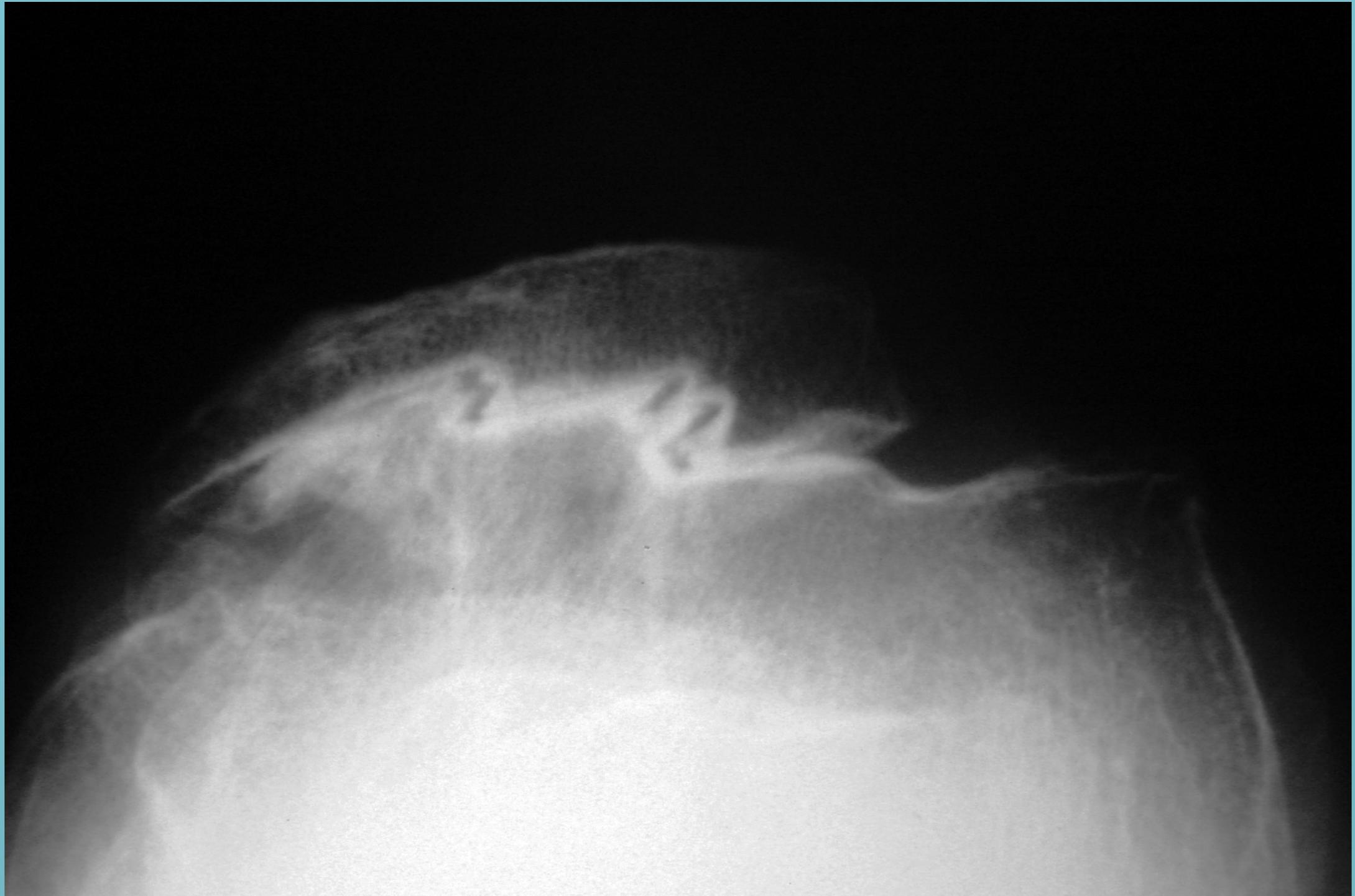


# Anterior Knee Pain

- Quick Assessment
  - No crepitus
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  - Crepitus pain



# ECG Patella



# Avon PFJ



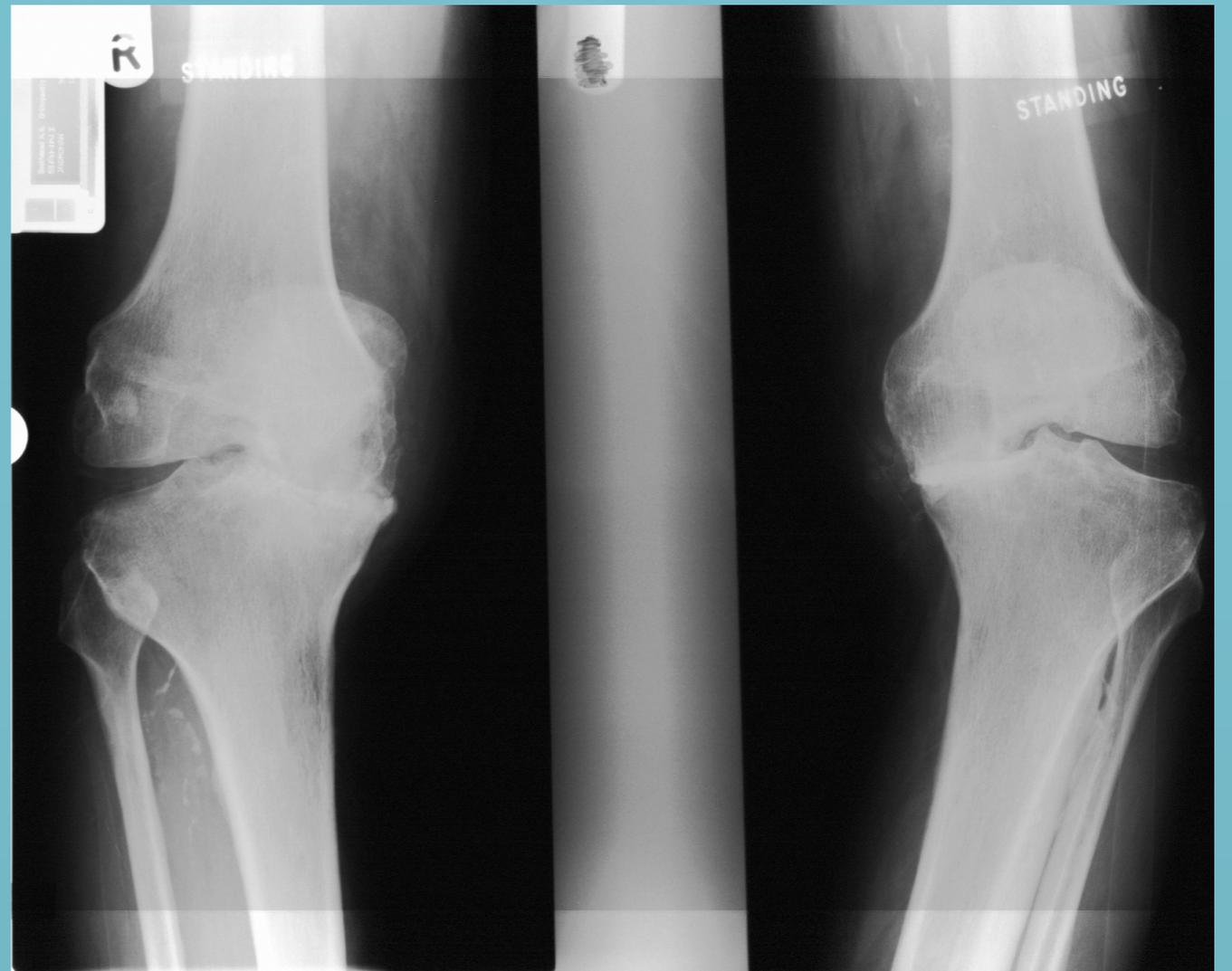


# Natural History of Degenerate Change in the Knee

Aetiology  
of  
Osteoarthritis of the Knee

# Aims

- Relate biomechanics to the aetiology of osteoarthritis of the knee

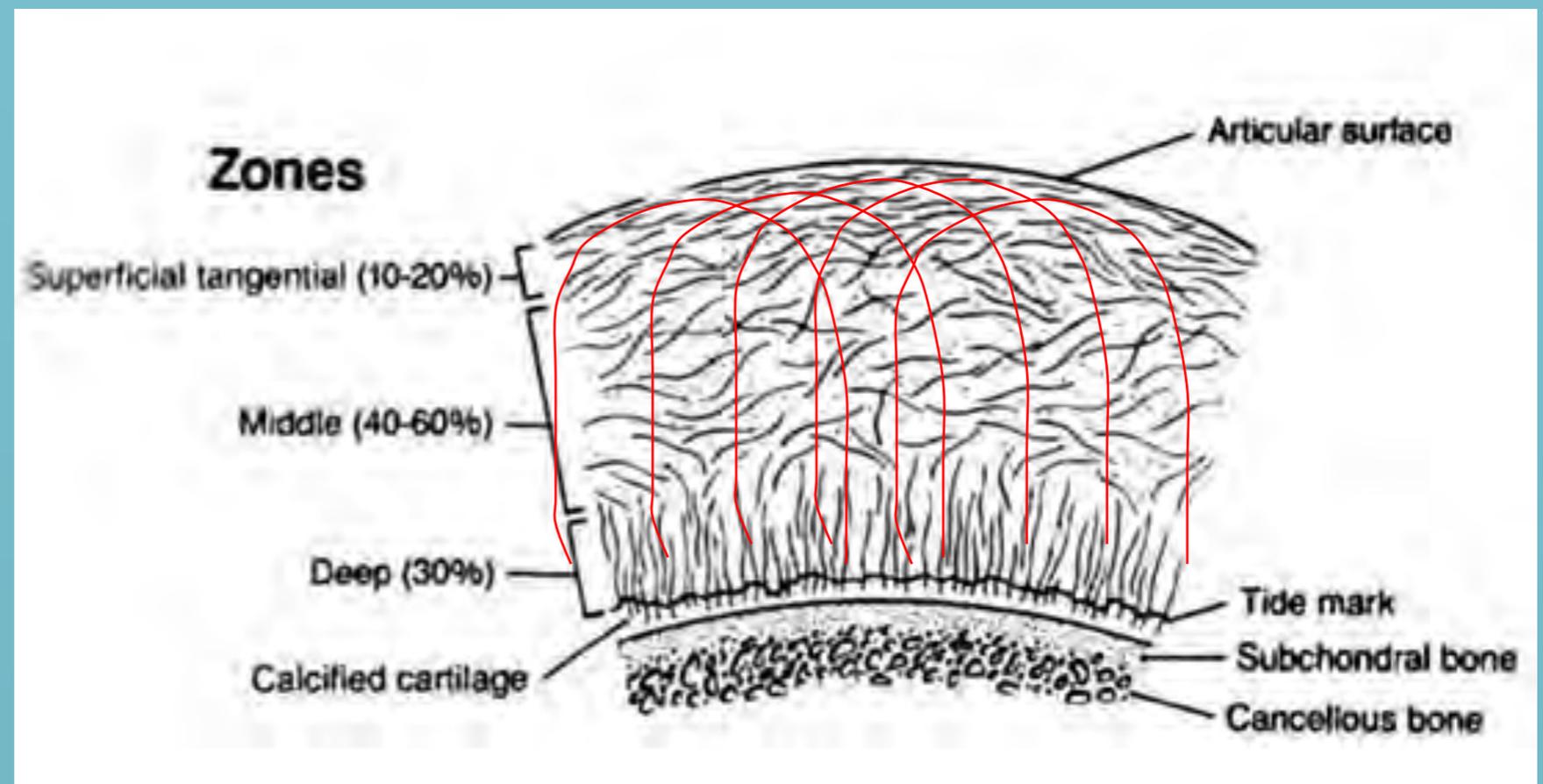


# Objectives

- Knowledge and Understanding:
  - The principles of the aetiology of failure of cartilage
  - Prevention of Osteoarthritis

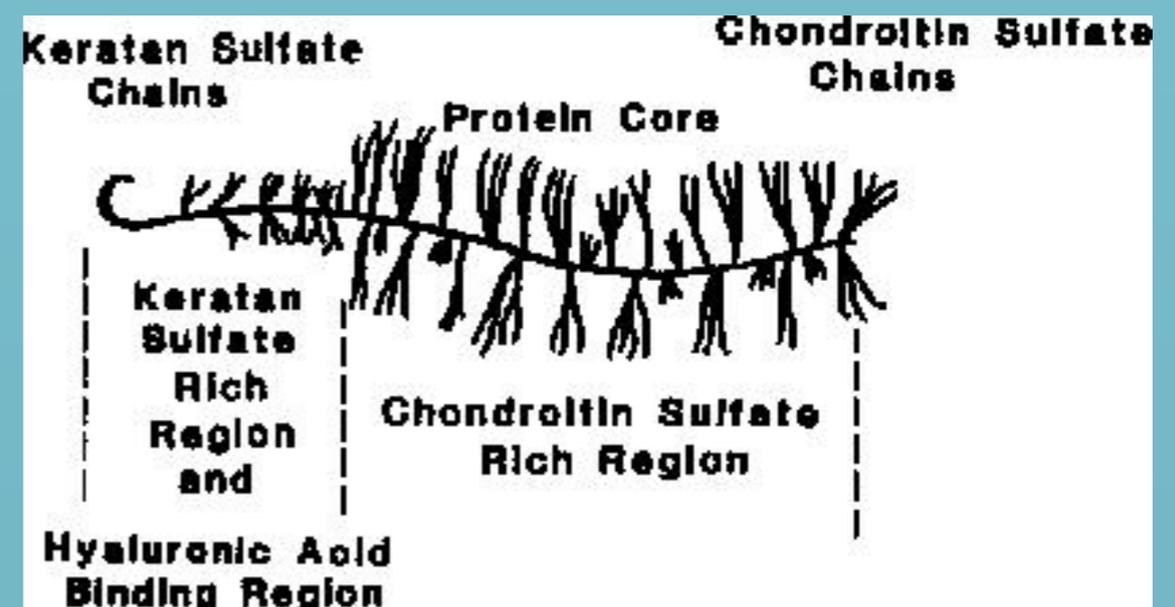
# Histology of Hyaline Cartilage

- There are three zones of hyaline cartilage that cover the articulating surfaces of the knee joint
- The direction of collagen fibres in each zone is determined by the collagen hoops (seen in red) that resist the stresses of walking



# Histology of Hyaline Cartilage

- Glycosamineoglycans are attached to these collagen hoops. They attract the water molecules (hydrophilic). This sponge like quality gives hyaline cartilage its viscoelastic properties to resist impact and wear
- Glycosaminoglycans (GAG's) include:
  - Chondroitin-4-sulphate (decreases with age)
  - Chondroitin-6-sulphate (increases with age)
  - Keratan sulphate (increases with age)

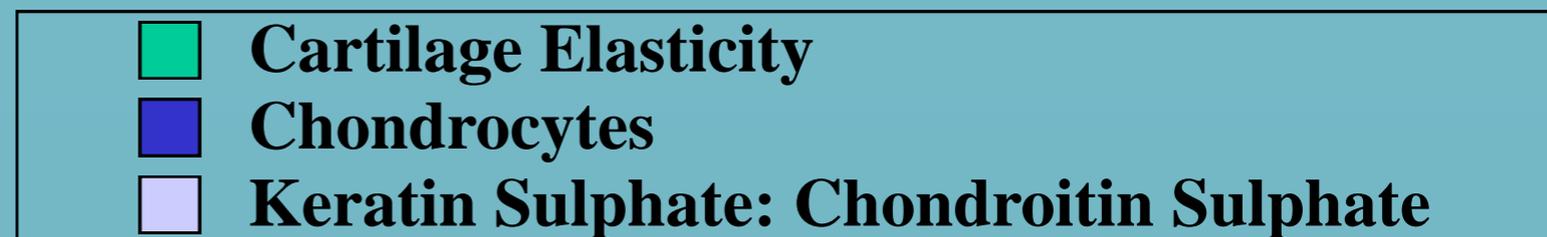
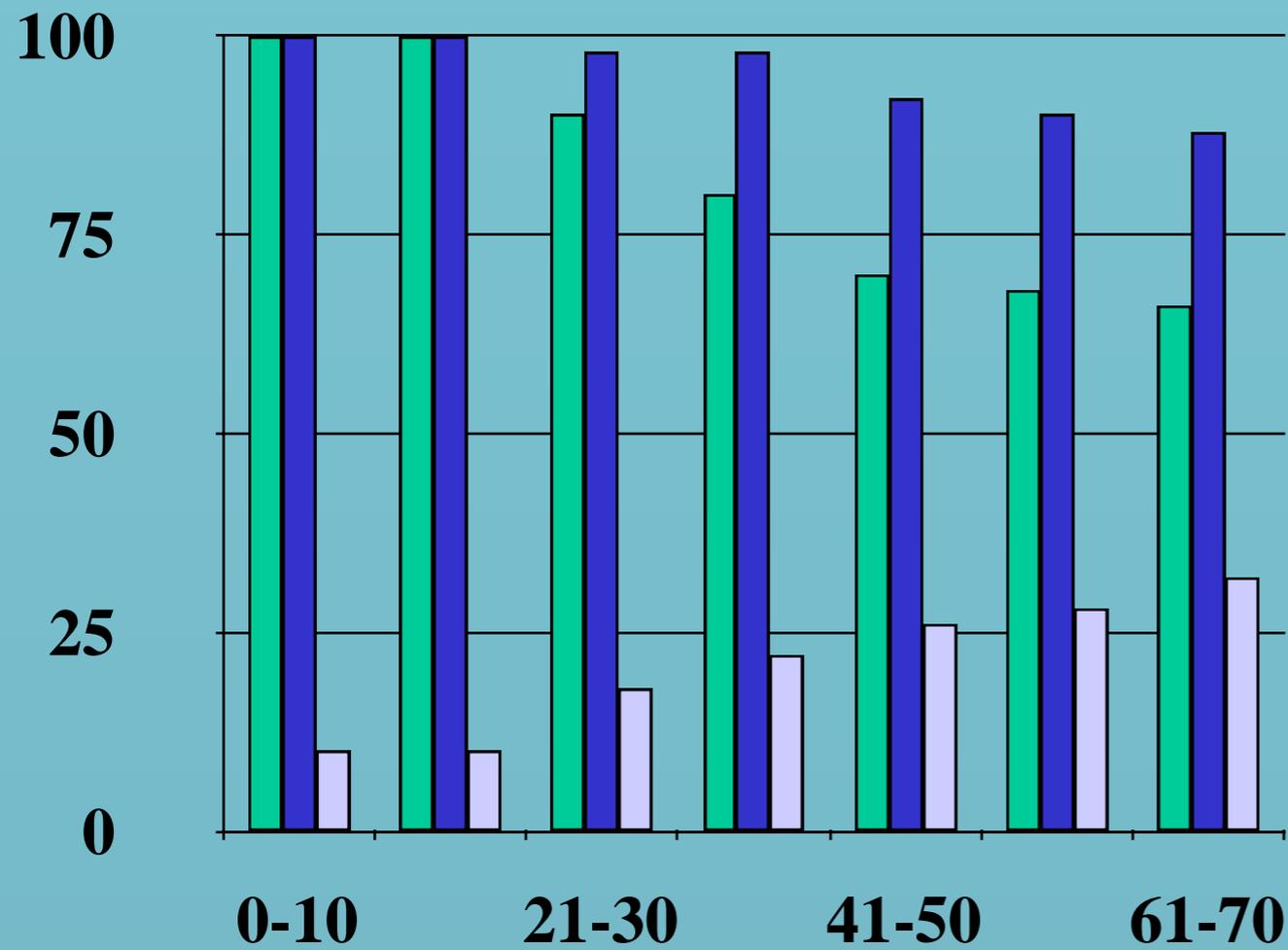


# Hyaline Cartilage

- Normal hyaline cartilage is smooth
- 6 week medial meniscal tear
- Normal hyaline cartilage



# Age Related Changes in Hyaline Cartilage



# Pathology of Hyaline Cartilage

- Calcification
  - Much of hyaline cartilage of the body ultimately calcifies with aging
  - When calcification occurs, chondrocytes die & matrix disintegrates
  - The superficial zones do not calcify, except in pathologic states such as gout or pseudogout

Calcium in the meniscii in gout stiffens them and makes them more prone to tears



# Incidence

- Symptomatic knee osteoarthritis
  - 30% Female 70 yrs
  - 20% Male 70 yrs

# Pathology of the Meniscus

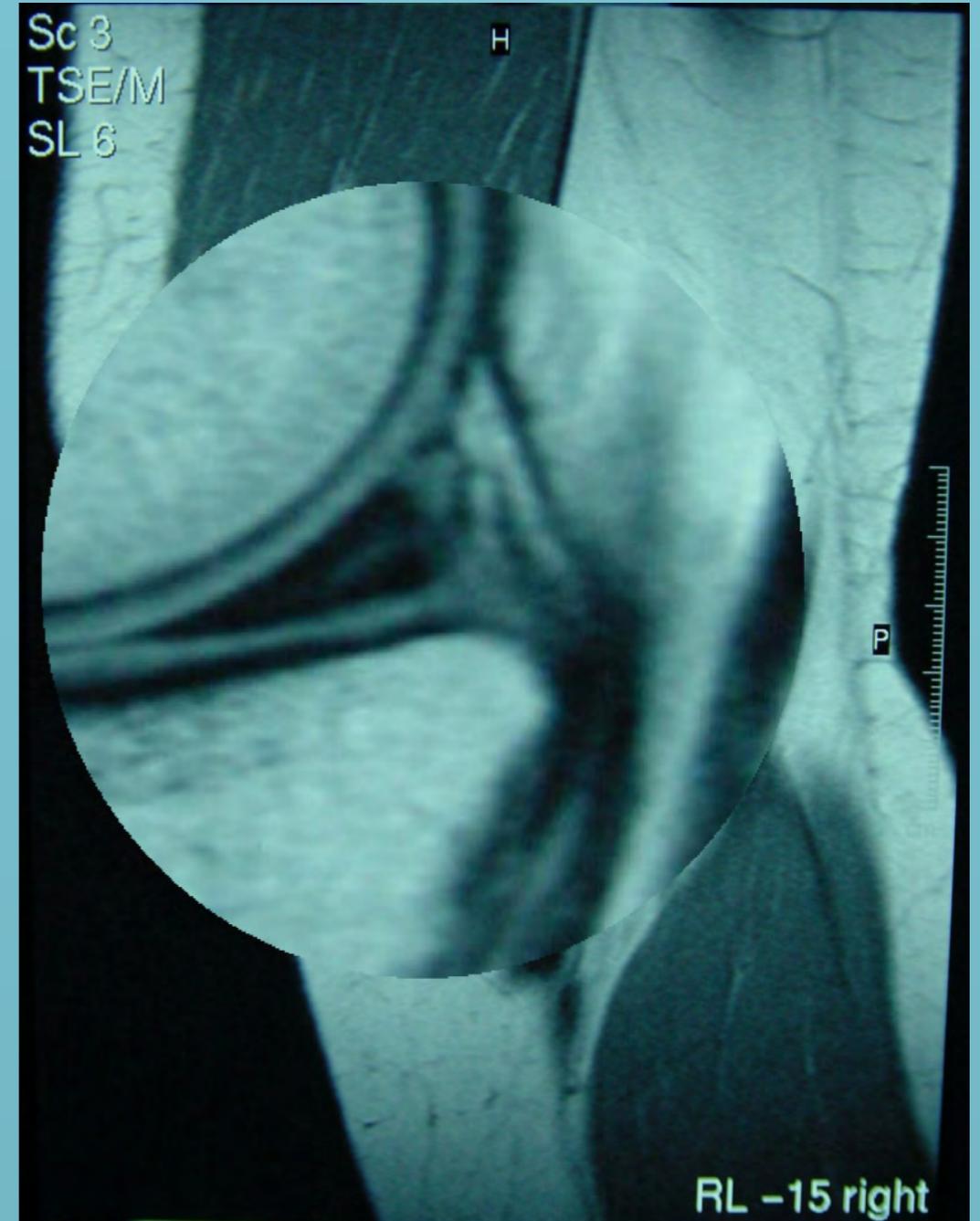
- After aged 20 years a degenerate signal appears in the core of the meniscus



De Smet AA, Norris MA, Yandow DR, Quintana FA, Graf BK, Keene JS.  
AJR Am J Roentgenol. 1993 Jul; 161(1):101-7.

# Pathology of the Meniscus

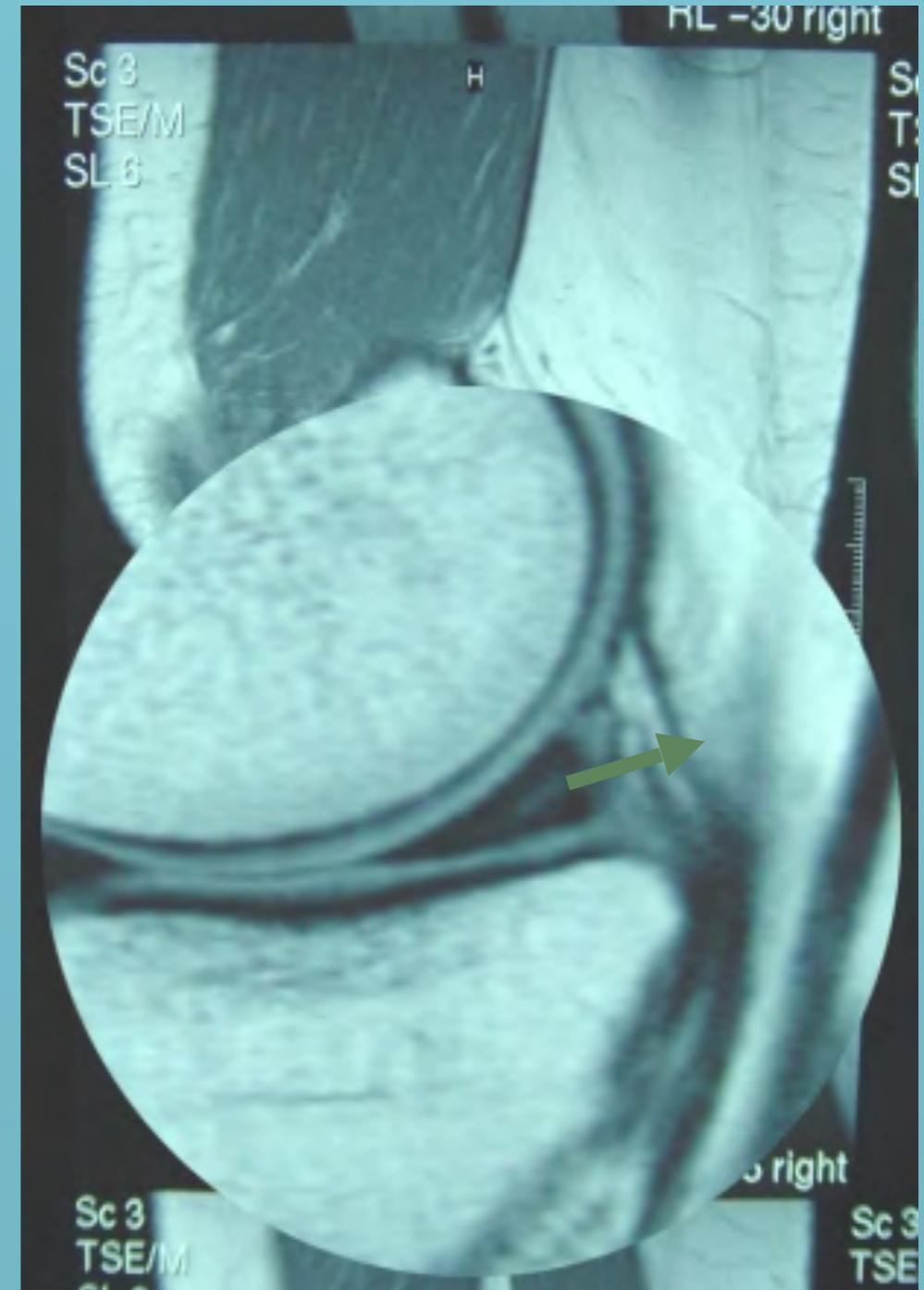
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De Smet AA, Norris MA, Yandow DR, Quintana FA, Graf BK, Keene JS.  
AJR Am J Roentgenol. 1993 Jul; 161(1):101-7.

# Cyclic Load Chondral Injury

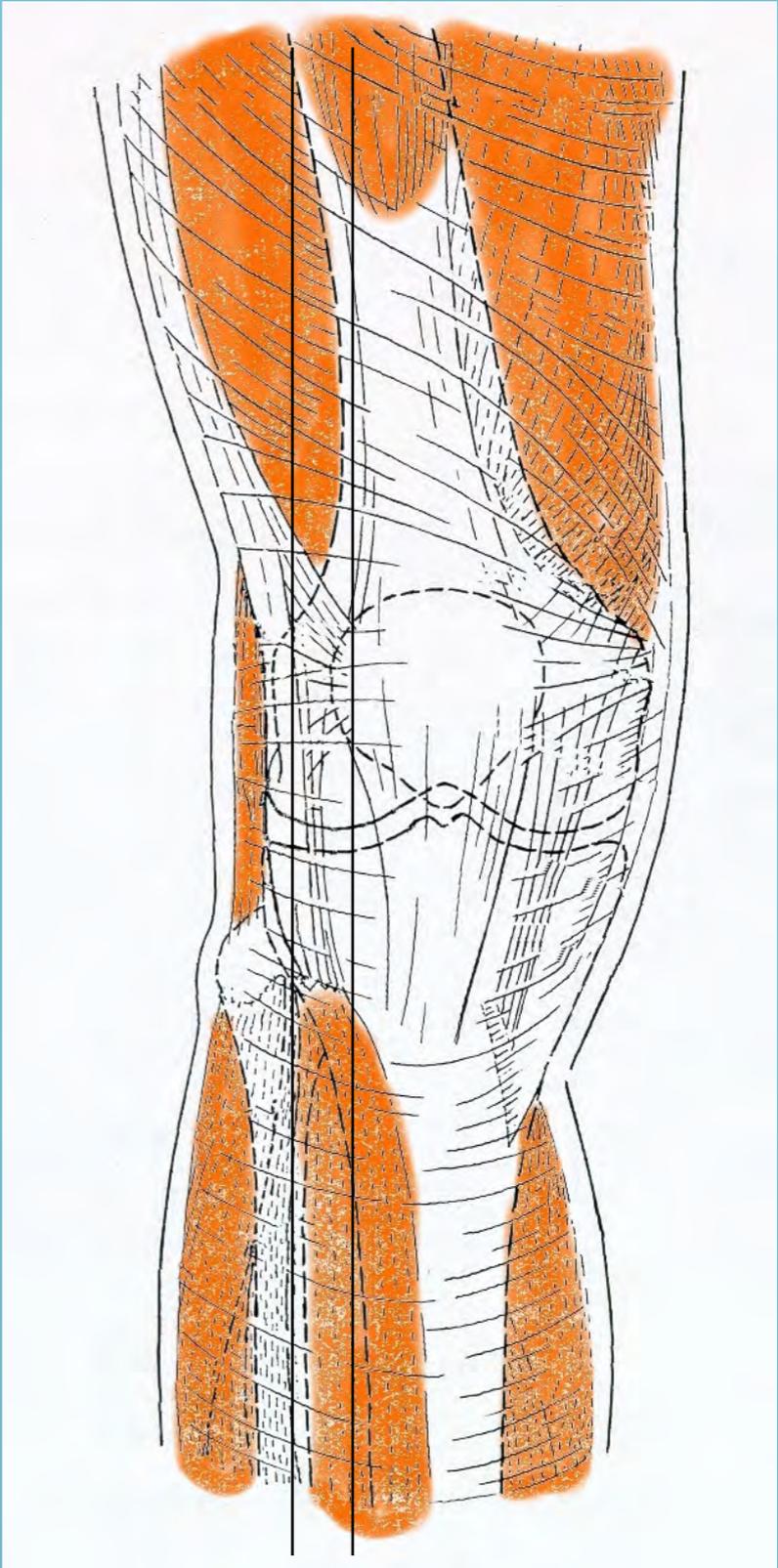
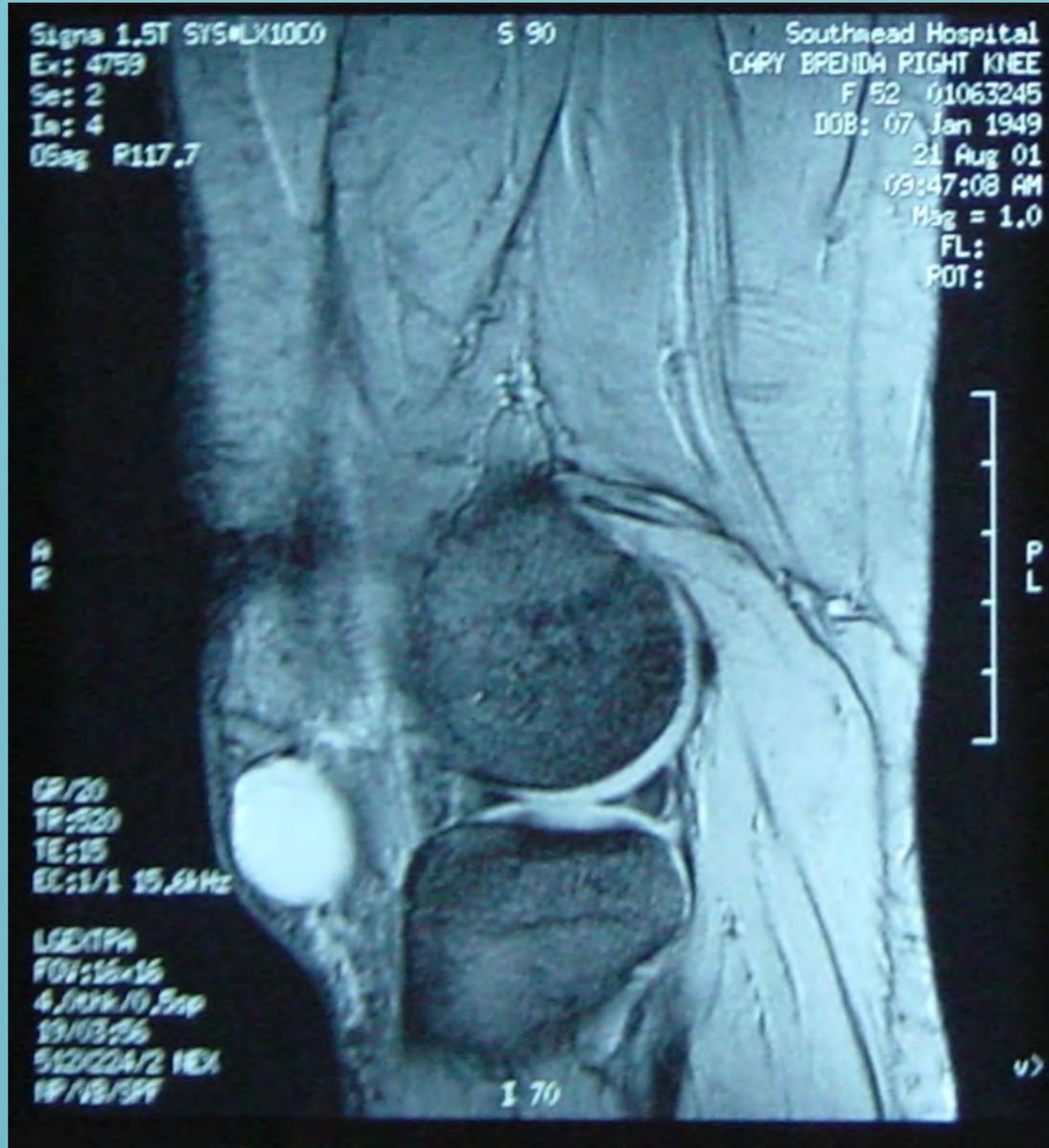
- A stable horizontal tear results in a meniscal cyst
- Degenerate change rare



# Horizontal Meniscal Tear

- A stable horizontal tear results in a meniscal cyst
- Degenerate change rare
- The upper and lower flaps act like a bellows to blow up the cyst

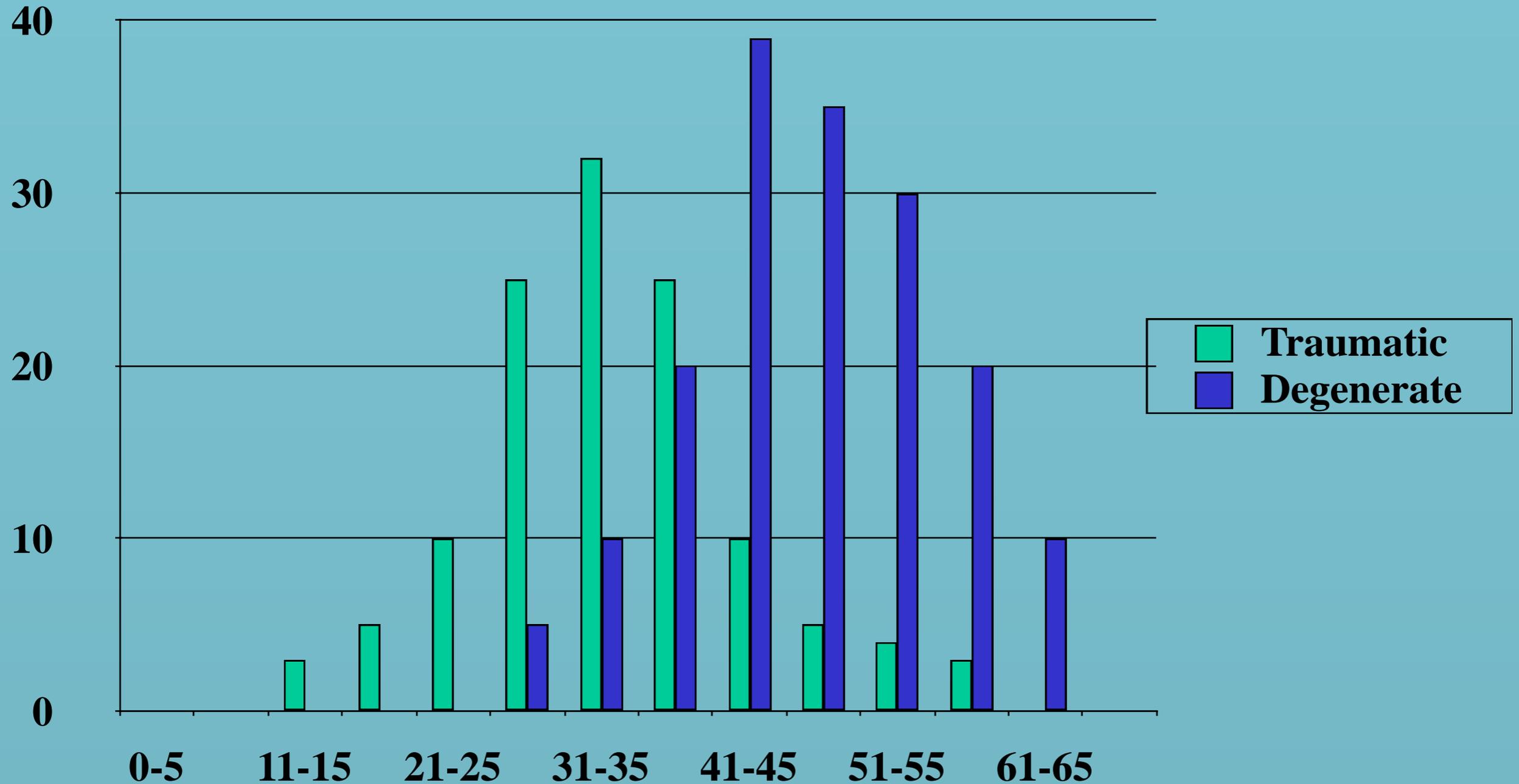




# Age Related Injury

- 2 types of meniscal injury
  - Traumatic
    - Mean 33 years, sports injuries, good history of injury
  - Degenerate
    - Mean 43 years, no identifiable cause, poor history of injury
- Male:Female 4:1
- 66.6% medial 33.3% lateral

# Percentage Meniscus Tears with Age



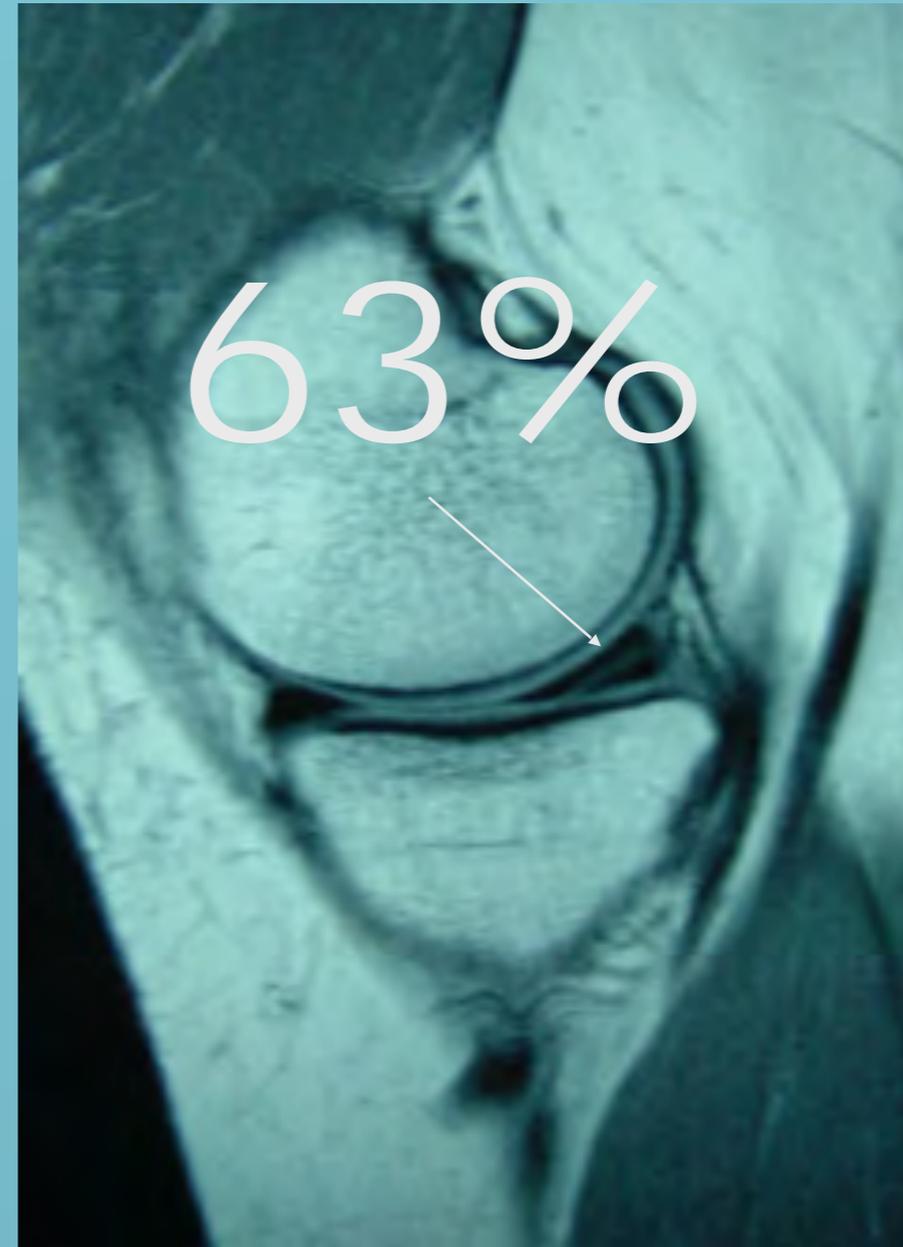
Drosos GI, Pozo JL.  
Knee. 2004 Apr; 11(2):143-9.

# Asymptomatic Meniscus Tear?

- 100 patients with symptomatic tears
- 63% asymptomatic tears of meniscus in contralateral knee

Zanetti M, Pfirrmann CW, Schmid MR, Romero J, Seifert B, Hodler J. Patients with suspected meniscal tears: prevalence of abnormalities seen on MRI of 100 symptomatic and 100 contralateral asymptomatic knees. *AJR Am J Roentgenol.* 2003 Sep; 181(3):635-41.

# Asymptomatic Meniscus Tear?



Zanetti M, Pfirrmann CW, Schmid MR, Romero J, Seifert B, Hodler J. Patients with suspected meniscal tears: prevalence of abnormalities seen on MRI of 100 symptomatic and 100 contralateral asymptomatic knees. AJR Am J Roentgenol. 2003 Sep;181(3):635-41.

# Asymptomatic Meniscus Tear?

- Asymptomatic tears have a stable morphology

Zanetti M, Pfirrmann CW, Schmid MR, Romero J, Seifert B, Hodler J. Patients with suspected meniscal tears: prevalence of abnormalities seen on MRI of 100 symptomatic and 100 contralateral asymptomatic knees. *AJR Am J Roentgenol.* 2003 Sep; 181(3):635-41.

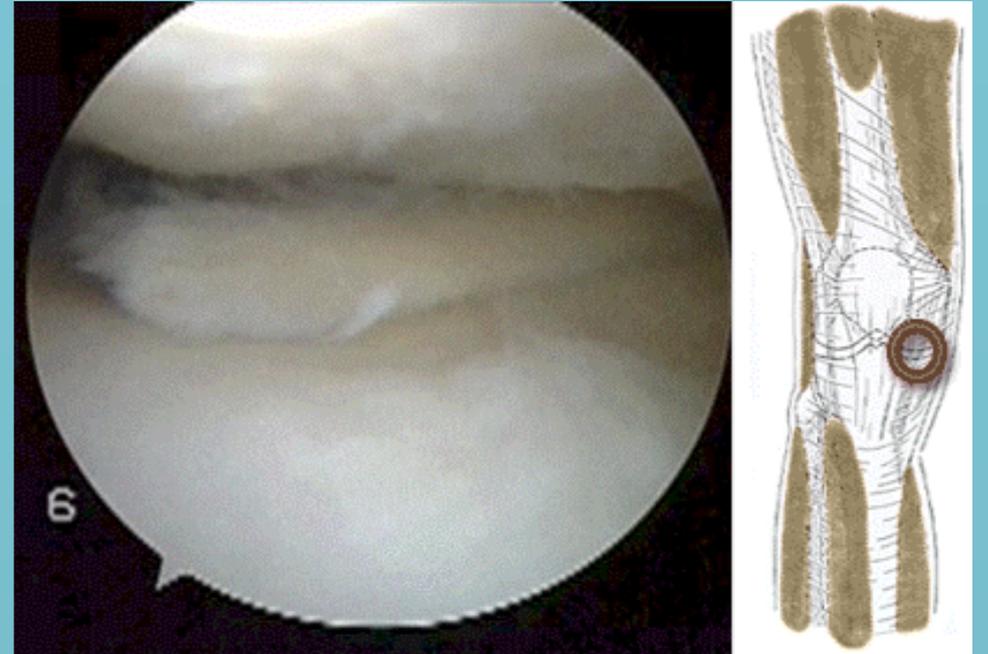
# Symptomatic Meniscus Tear?

- Symptomatic tears have a characteristic morphology
- Symptomatic tears appear unstable and prolapse into the joint causing pain, locking, giving way and swelling.

Zanetti M, Pfirrmann CW, Schmid MR, Romero J, Seifert B, Hodler J. Patients with suspected meniscal tears: prevalence of abnormalities seen on MRI of 100 symptomatic and 100 contralateral asymptomatic knees. *AJR Am J Roentgenol.* 2003 Sep; 181(3):635-41.

# Symptomatic Meniscus Tear

- How does an unstable tear cause osteoarthritis?



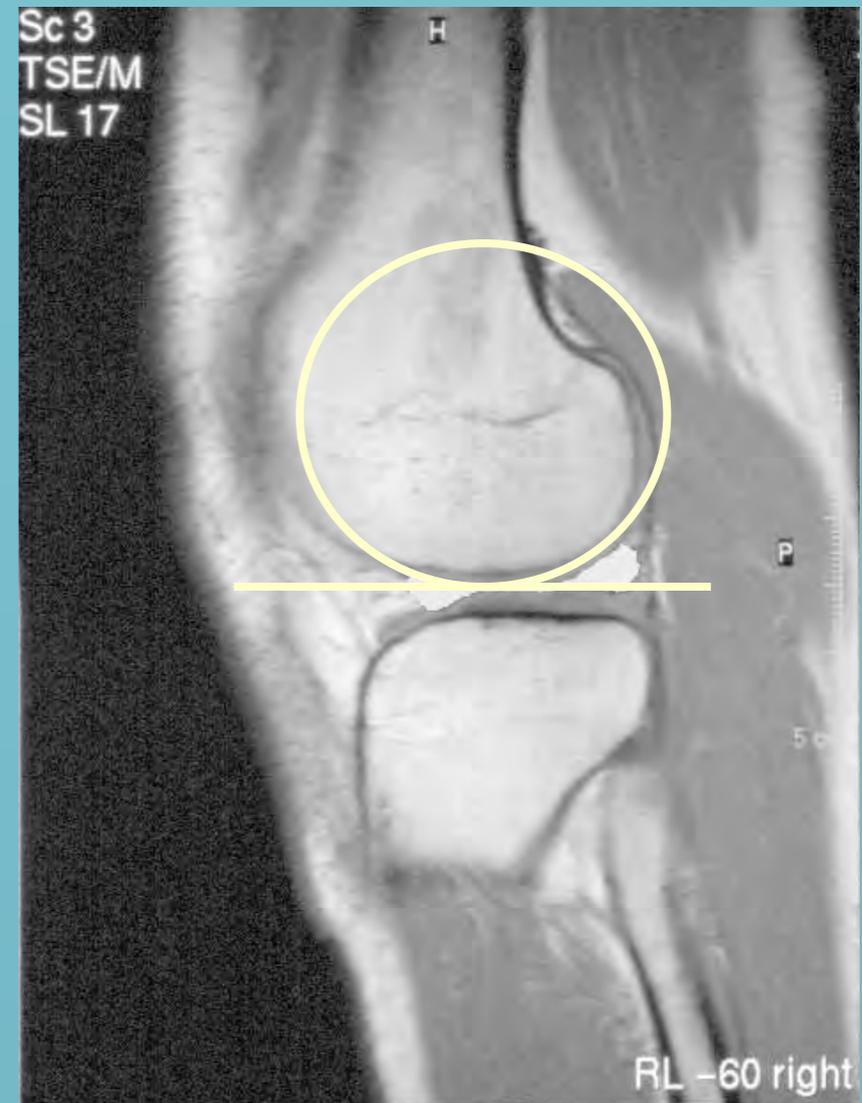
# Anatomy

- Femoral condyles are round
- Tibial condyles are flat



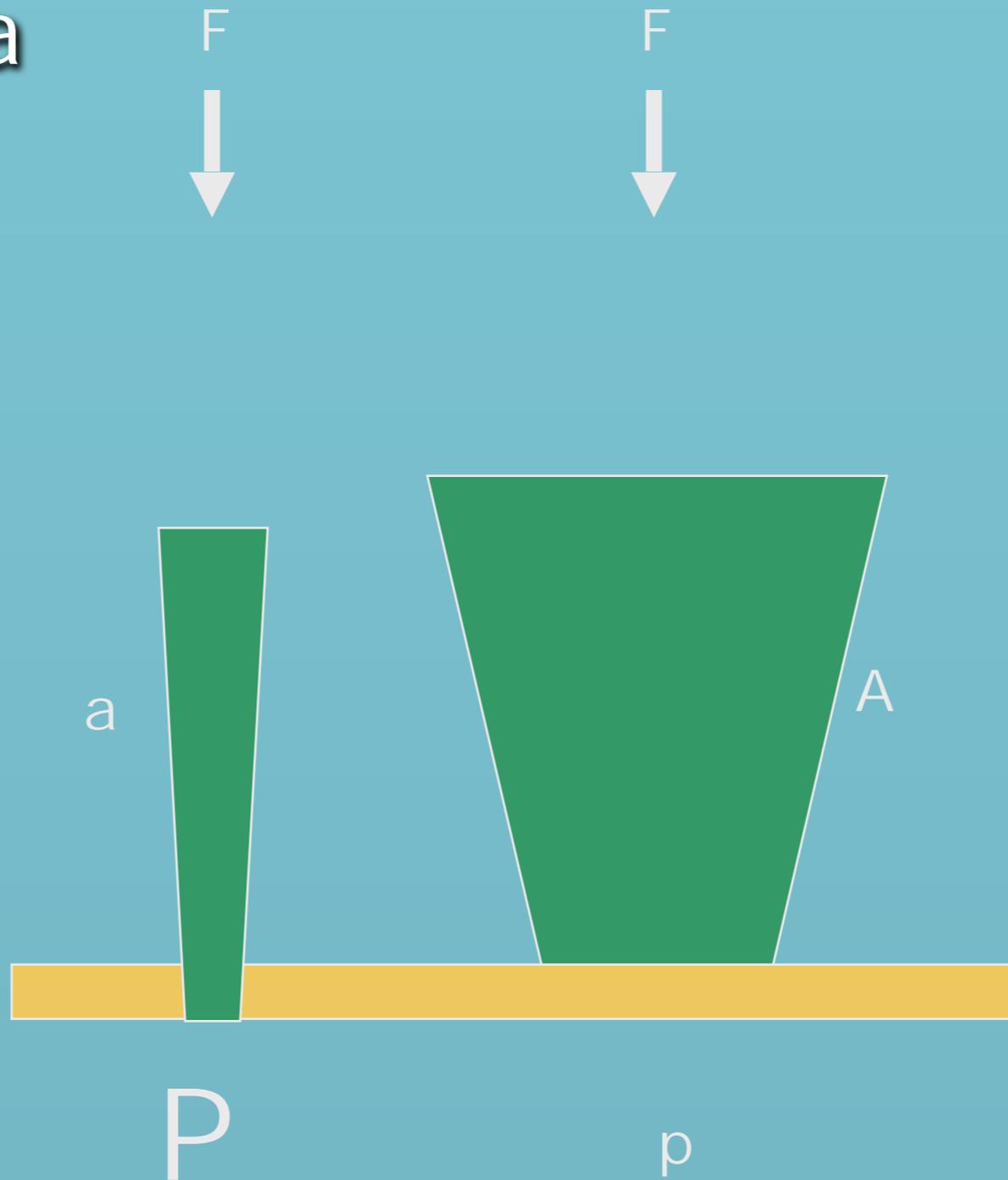
# Mathematics

- Newton's geometry
- Tangent – A line that contacts an arc or circle at a single point



# Physics

- Pressure = Force/Area



# Biomechanics

- The meniscus is a load sharing device

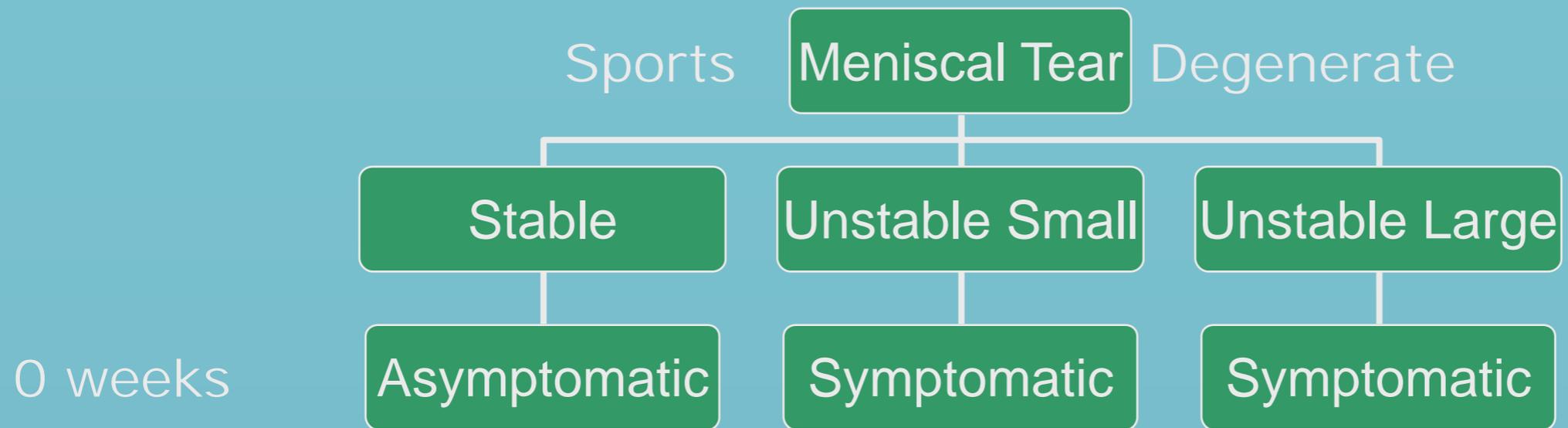


# Time Line: Natural History of OA Knee



0 weeks

# Time Line: Natural History of OA Knee

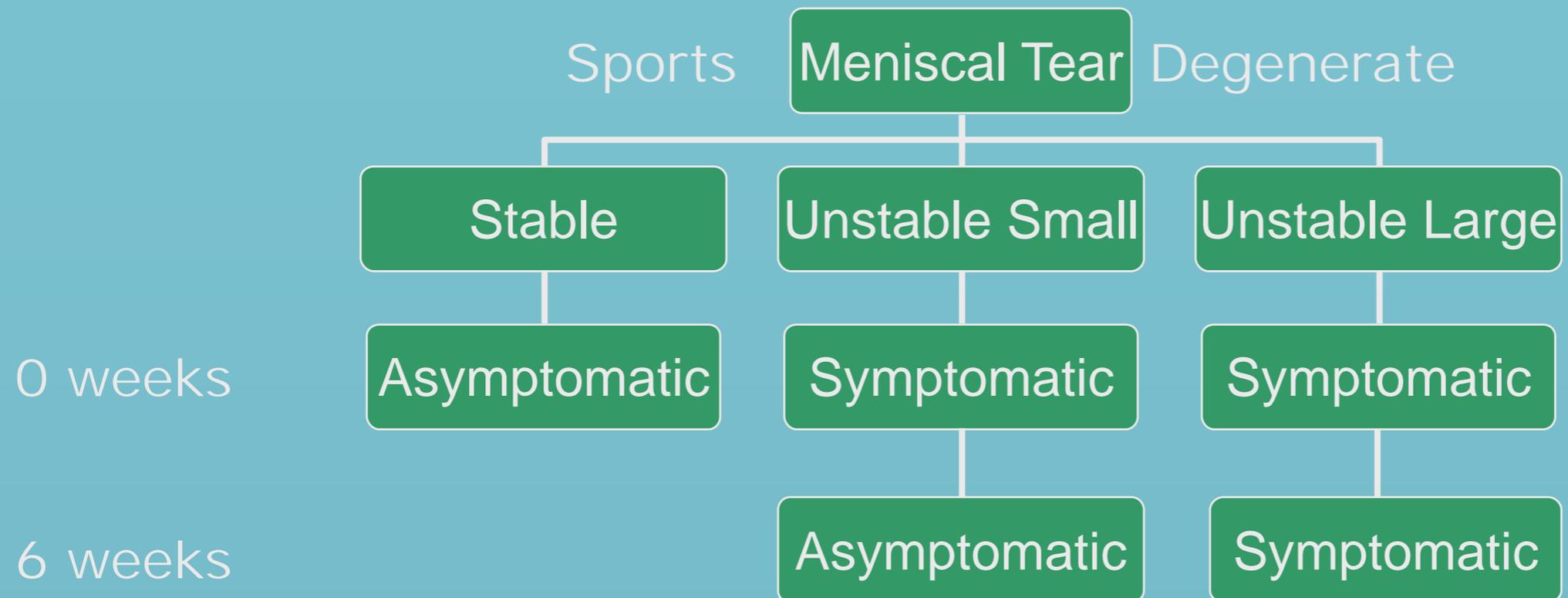


# Unstable Small

- Asymptomatic unstable small: ? resolution within 6 weeks



# Time Line: Natural History of OA Knee



# Large Symptomatic Meniscal Tears

- Treated unstable large symptomatic tears 6-12 weeks
  - No chondral injury
  - Become asymptomatic with treatment only

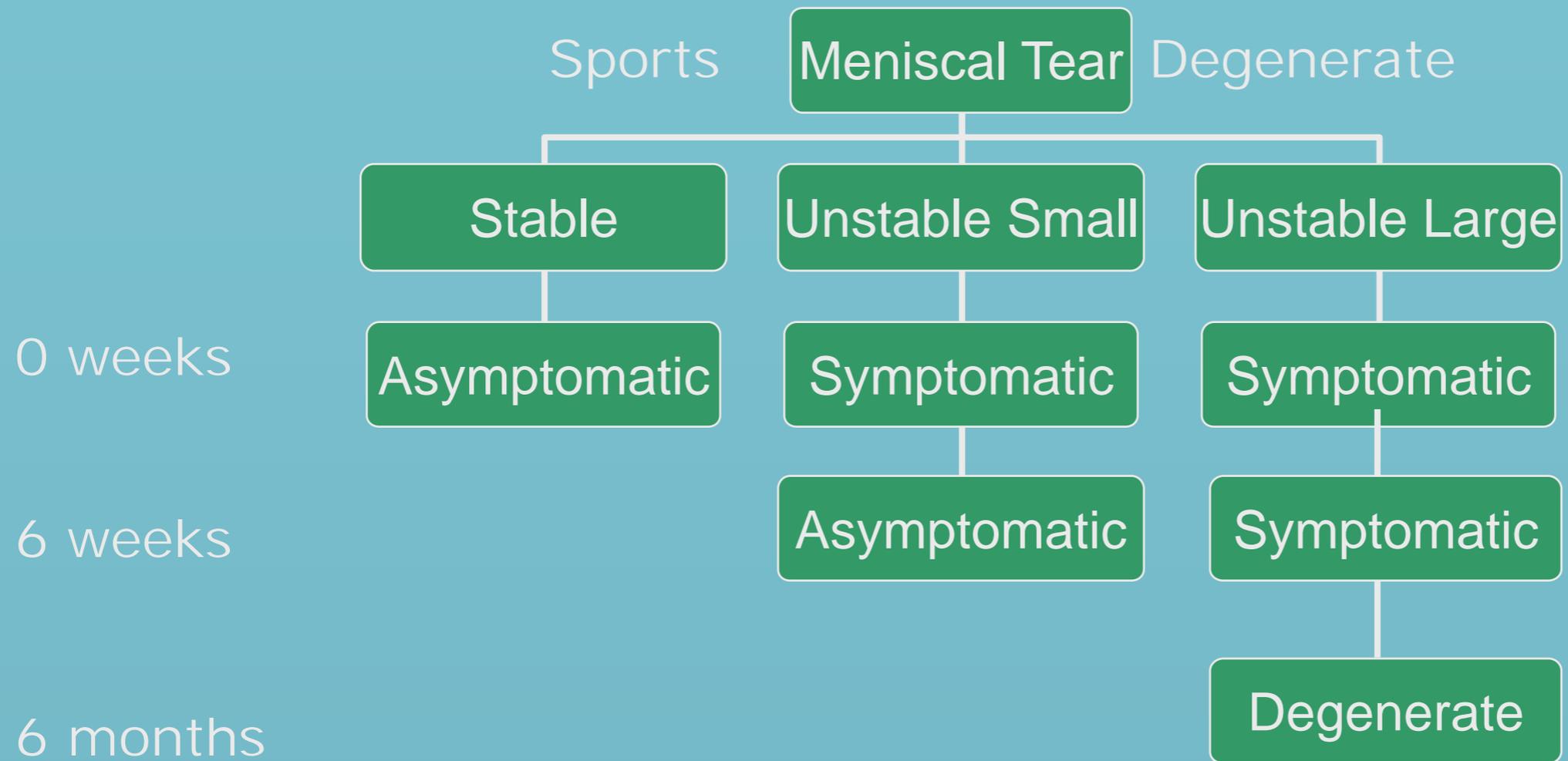


# Large Symptomatic Meniscal Tears

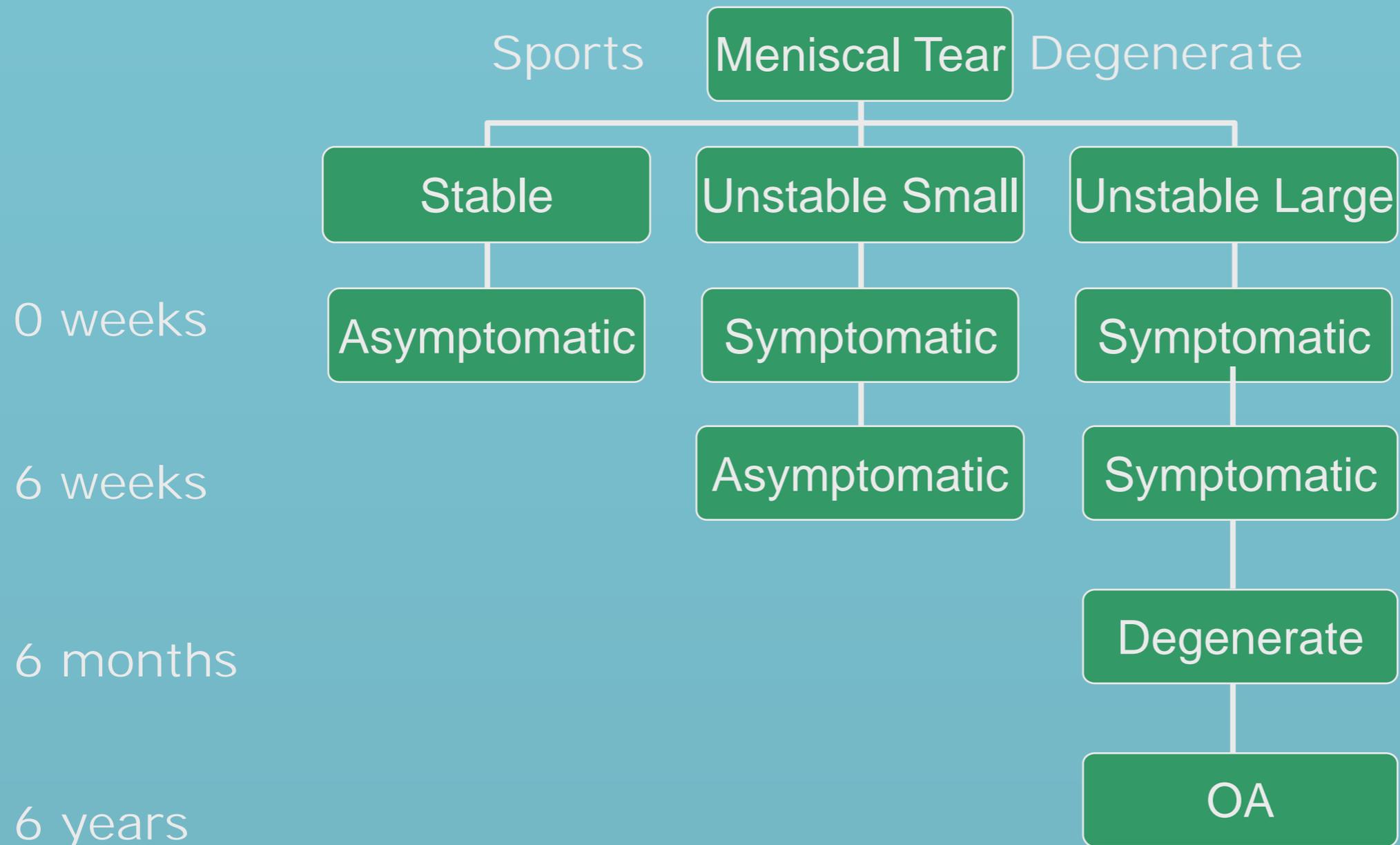
- Treat unstable large symptomatic tears 6-12 weeks
  - No chondral injury
  - Become asymptomatic with treatment only
  - Meniscal repair for large peripheral tears



# Time Line: Natural History of OA Knee

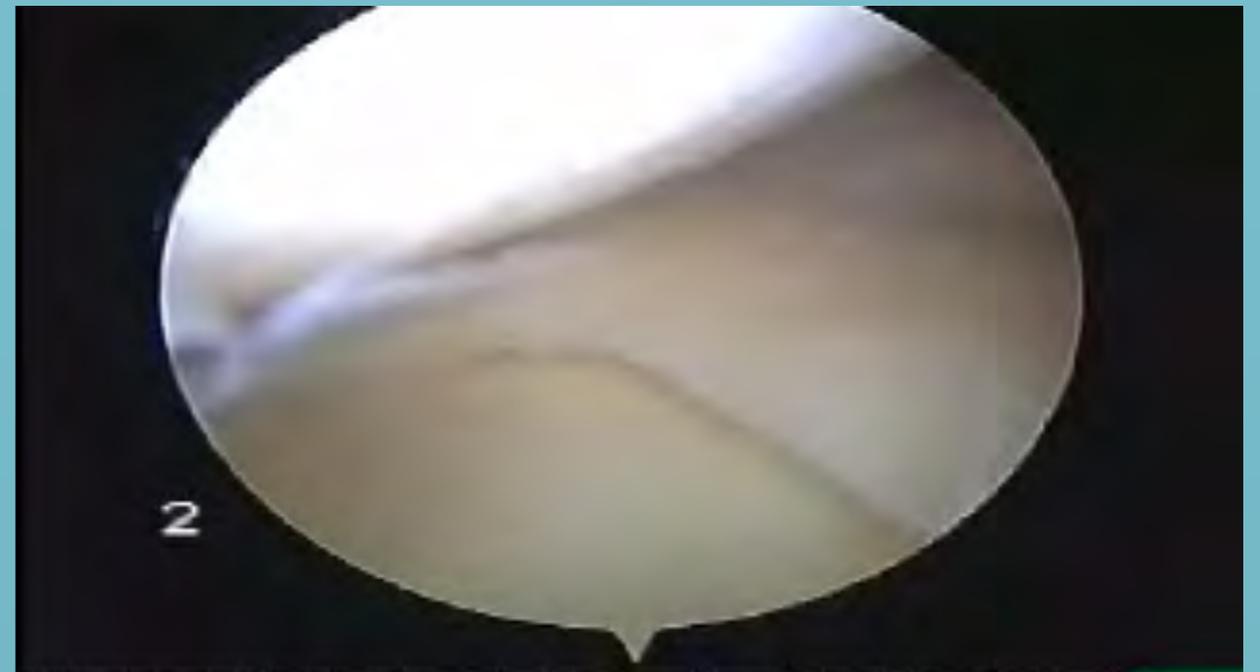


# Time Line: Natural History of OA Knee

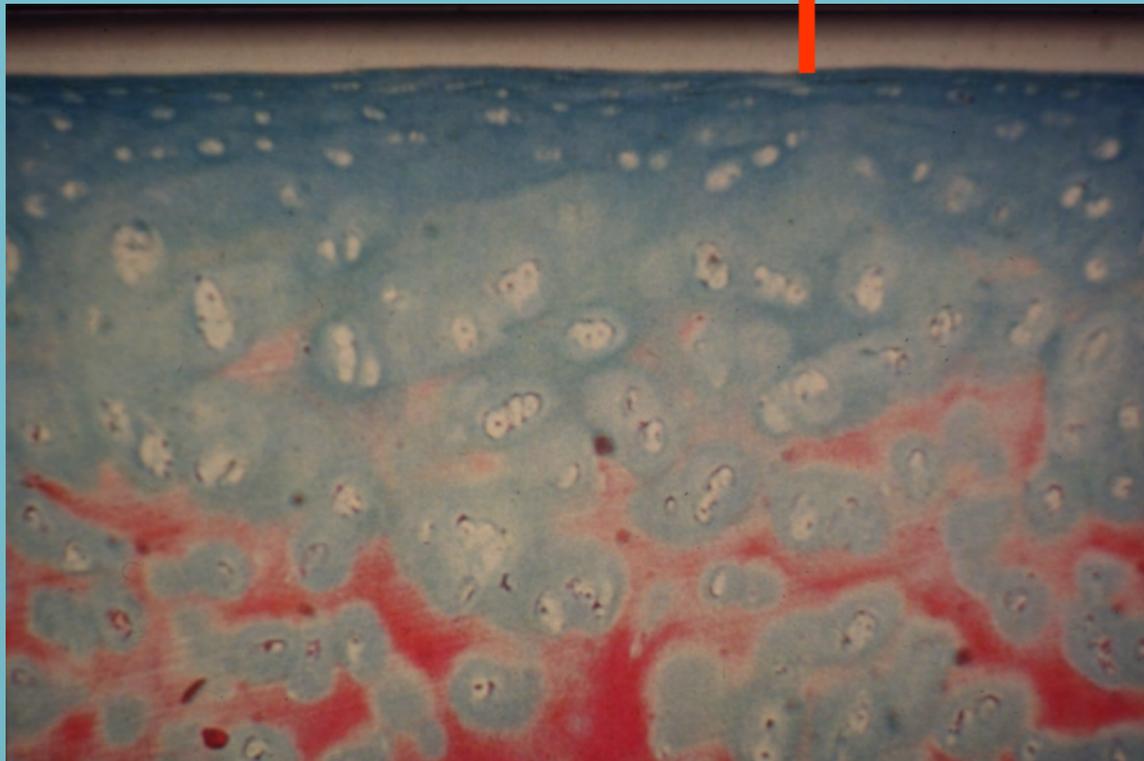
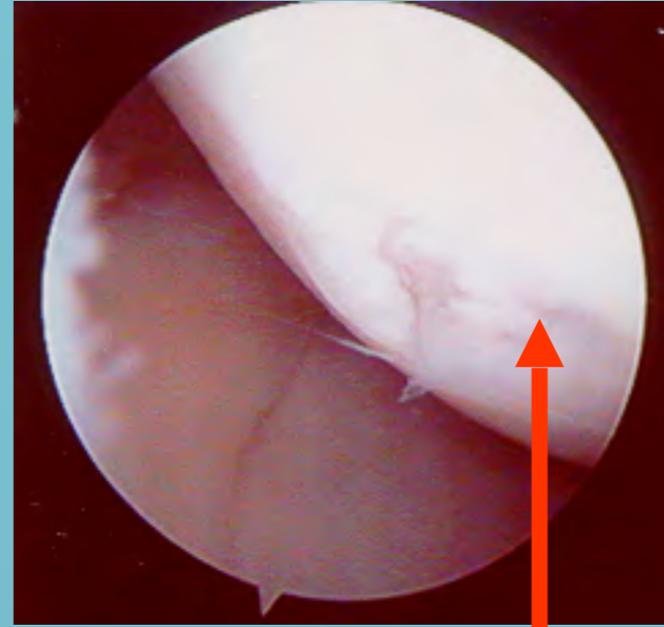
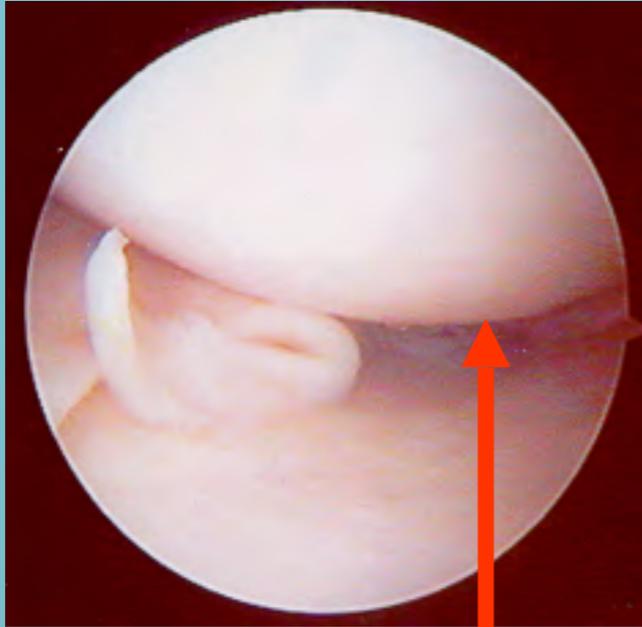


# Large Symptomatic Meniscal Tears

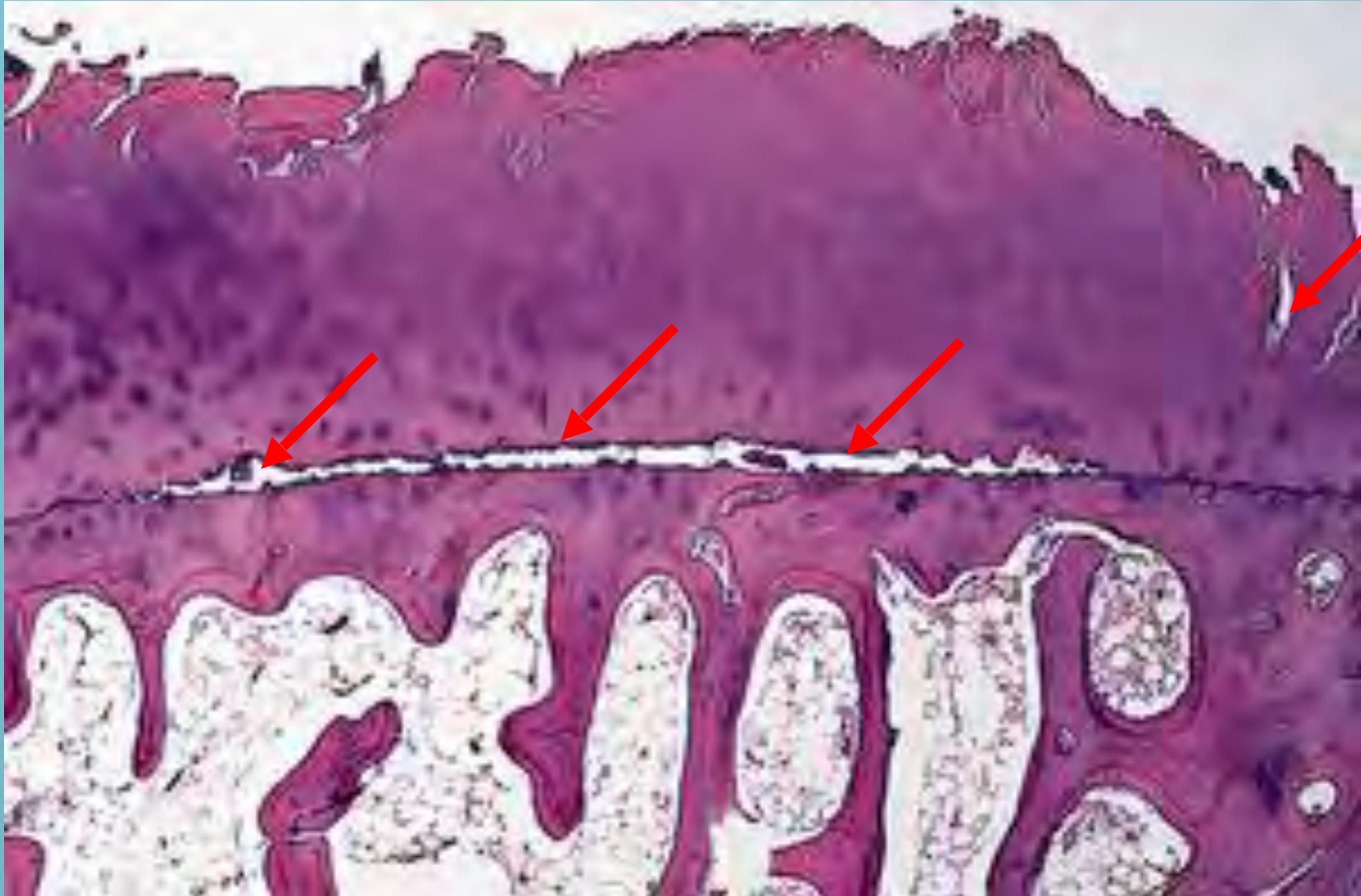
- 6 months of cyclic loading
- Age related changes in the articular cartilage facilitates this process.....



# Osteoarthritis



Hyaline Cartilage under abnormal loading conditions result in chondral flaps being lifted



# Aetiology of Osteoarthritis

- Meniscectomy (OR 4.0; 1.0-16.4)
- Previous injury (OR 3.4; 1.7-6.7)
- Obesity (OR 3.3; 1.6-6.9)
- Family History (OR 2.7; 1.3-5.5)
- Heberden's nodes (OR 2.0; 1.1-3.6)

# Aetiology of Osteoarthritis

Arthritis Type      Total (223)

RA      26

OA      197

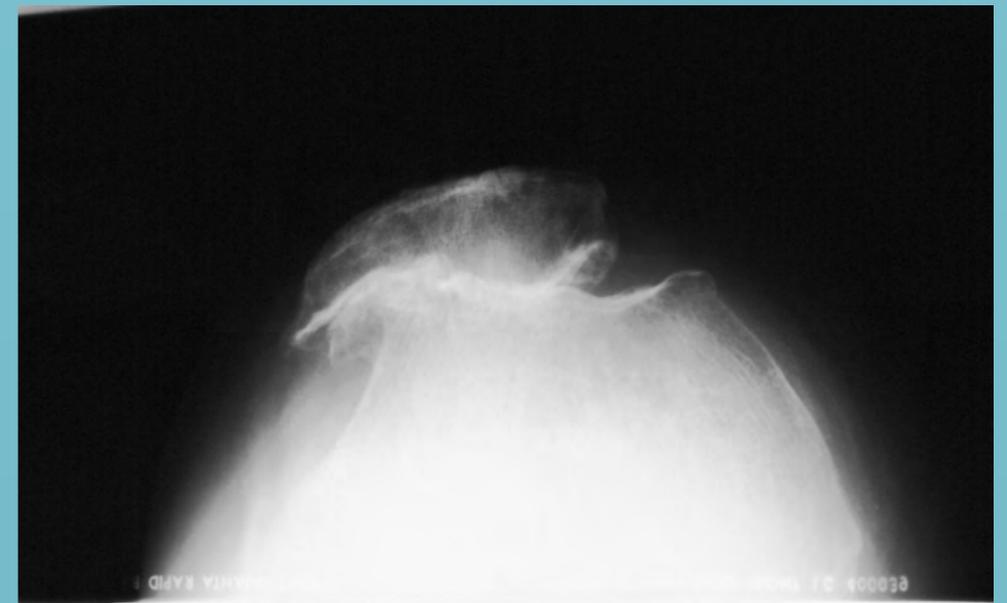
JCA      -



Lesley Roper Audit AOC 1998

# Patellofemoral joint

- Symptomatic isolated patellofemoral arthritis
  - 8% Female >55yrs
  - 2% Male >55yrs

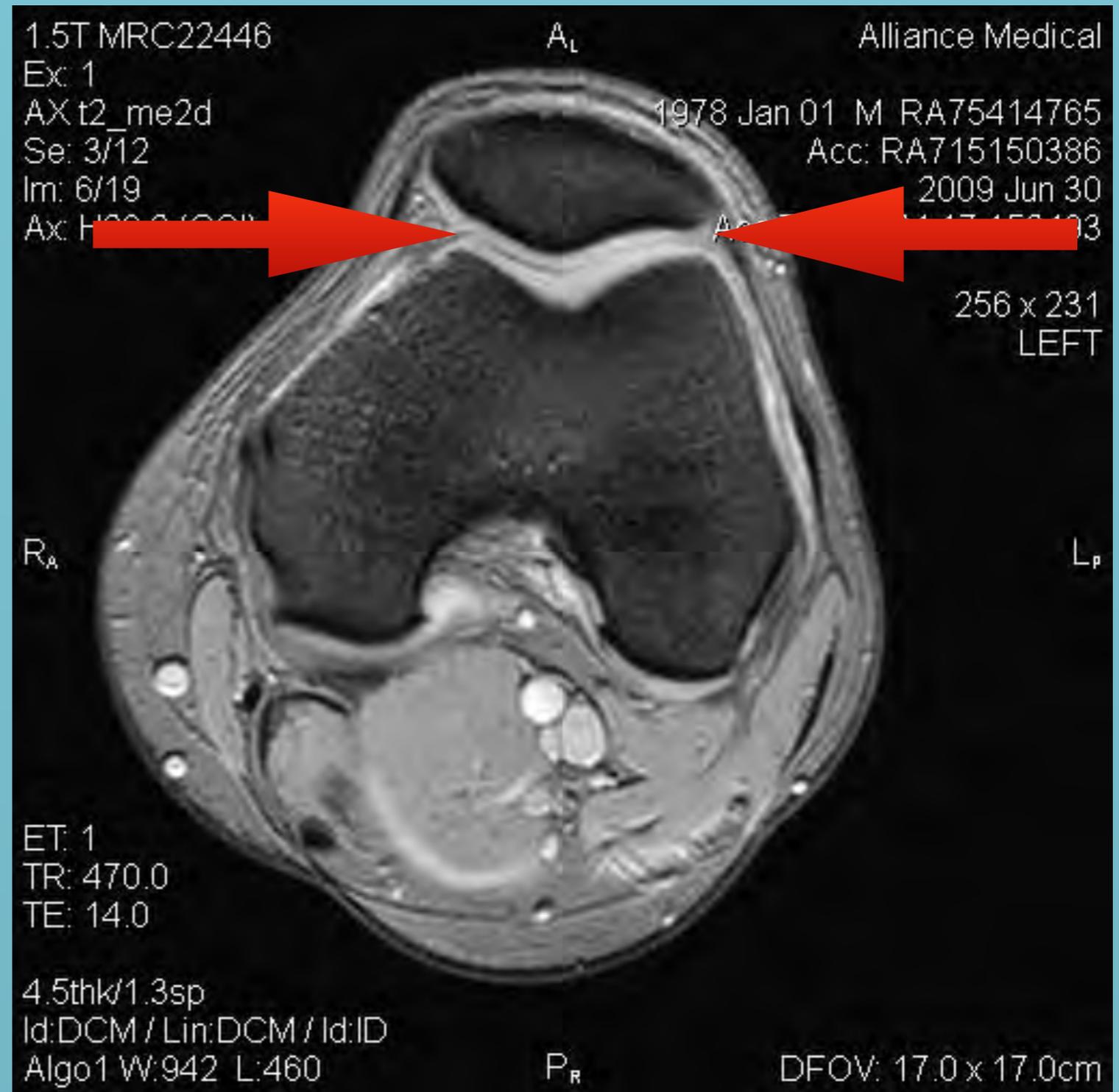


# Age

Age Range	Total (223)
20-25	8
56-65	42
66-75	97
76-85	70
85+	6

# Patellofemoral OA

- 4 plicae are the meniscus of the patellofemoral joint



# Patellofemoral OA

- Treat the chondral lesion only
- Pain persists!



# Patellofemoral OA

- The sliding distance determines which surface wears



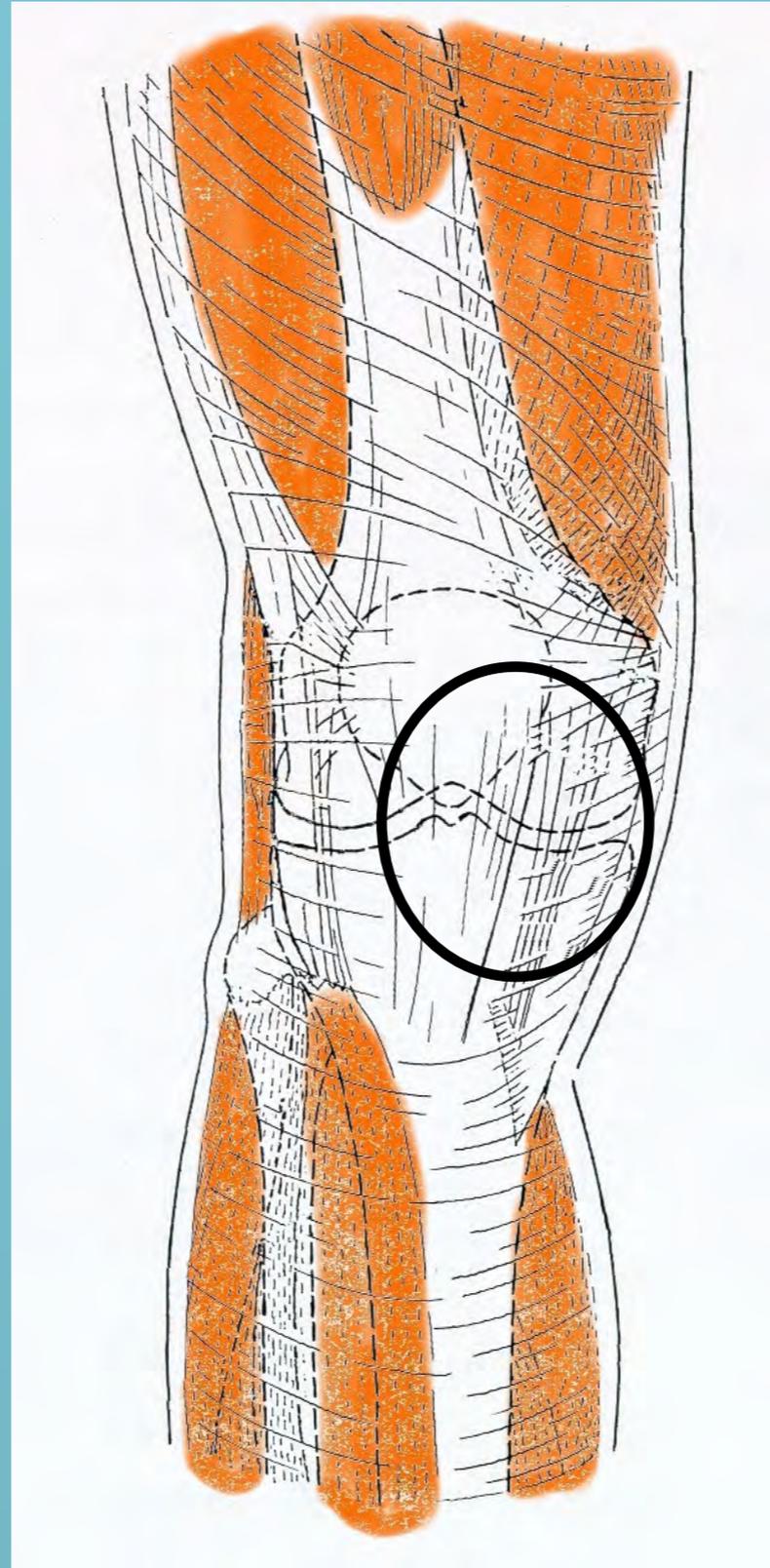
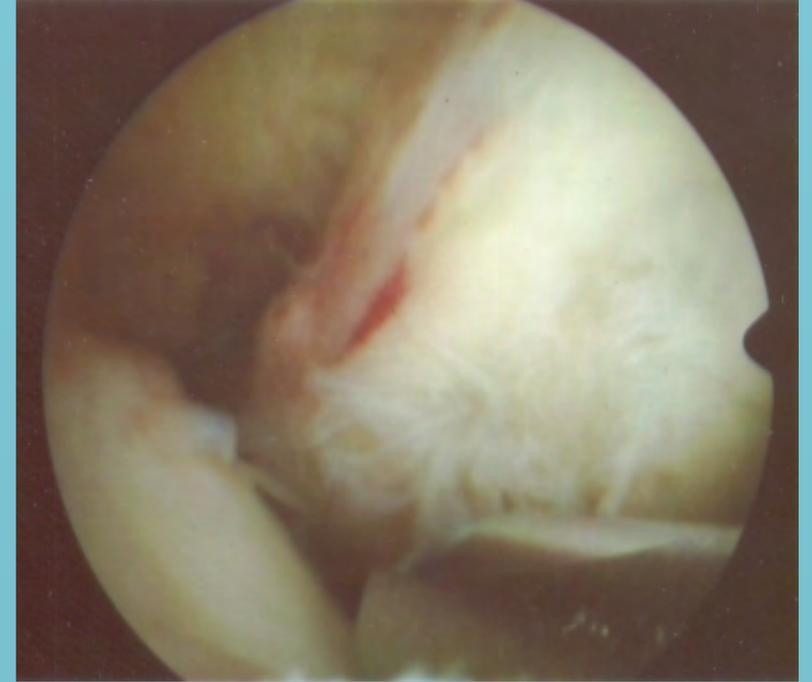
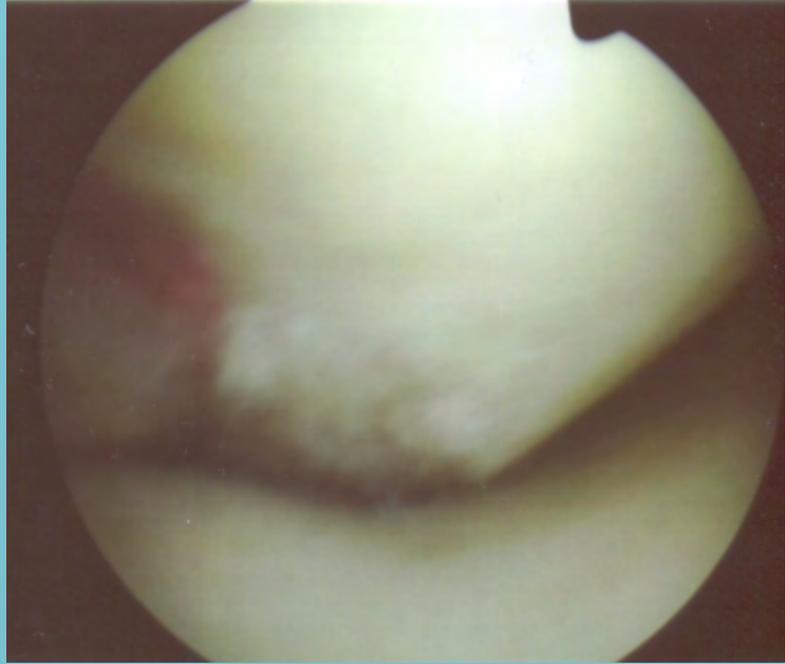
# Patellofemoral OA

- Treat the chondral lesion and
- Remove the scarred plica



# Summary

- Knowledge and Understanding:
  - The principles of the aetiology of failure of cartilage
  - Prevention of Osteoarthritis
- A scarred plica can cause OA just as a meniscal tear can cause OA



# Anterior Knee Pain

- Quick Assessment
  - No crepitus: Refer Physio for McConnell taping
  - Crepitus no pain: reassure
  - Crepitus pain: Refer



# Anterior Knee Pain

- No Crepitus
  - Refer Physiotherapy
  - McConnell taping
  - Identify LLD, CORE Stab, MUSCLE AND LIG
  - P-F Braces
  - Review 6/52

# Thank You

“Kiss me,  
Hardy”

“Get  
knotted!”

