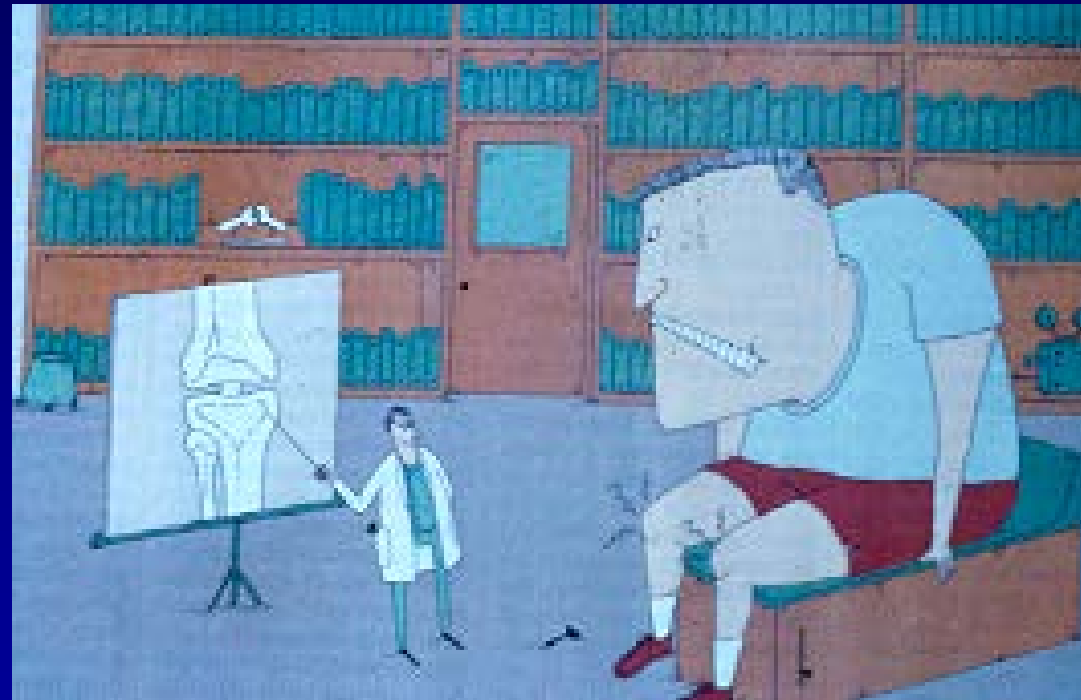


Dx and Tx of Common Knee Problems

Bertram Zarins, MD
Massachusetts General Hospital

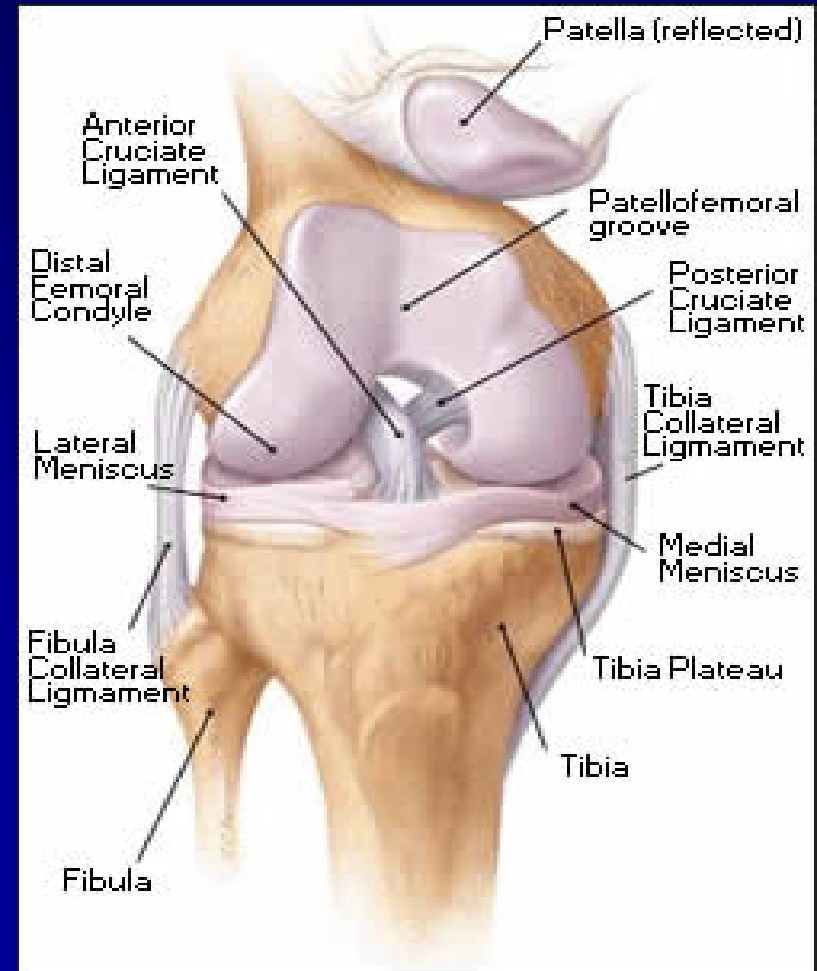
Diagnosis & Treatment of Common Knee Problems

- Anatomy
- History
- Examination
- Diagnostic tests
- Common knee problems
- Management



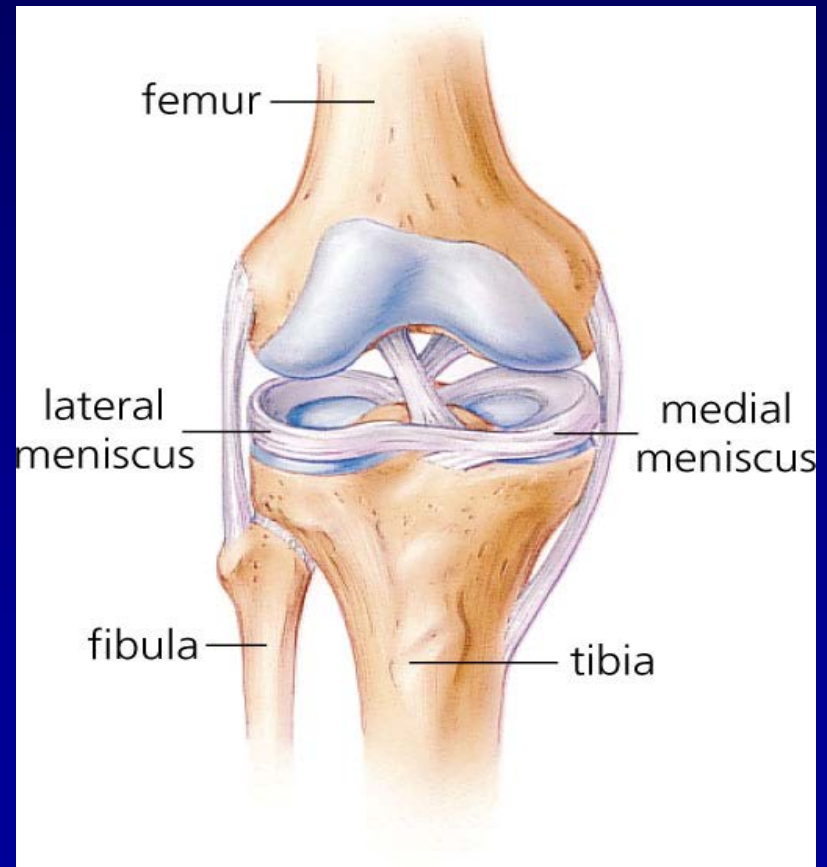
Knee Anatomy

- **Joints**
 - » Patello-Femoral
 - » Medial compartment
 - » Lateral compartment
- **Ligaments**
 - » ACL
 - » PCL
 - » MCL
 - » LCL
- **Menisci**
- **Synovium**



Knee Anatomy – Menisci

- Medial
- Lateral



Knee Symptoms

- **Meniscus**
 - » Pain
 - » Swelling
 - » Locking
 - » Popping
- **Patella**
 - » Click, grind
 - » ↓↑ Stairs
 - » Movie sign
- **ACL**
 - » Giving way
 - » Instability
- **DJD Sx**
 - » Pain, aching
 - » Stiffness

Knee - History

- Injury
 - » What, where, when, how ?
- Non - contact



Knee Examination

Knee Alignment

- Neutral
- Valgus
(knock-kneed)
- Varus
(bow-legged)



Knee Swelling



Patella

- Patella
 - » Crepitus



Knee Range of Motion



Knee Stability

Laxity vs instability



Valgus
Laxity –
30° Flex



Varus Laxity

—

30° Flex



AP Laxity - Lachman





Pivot shift





Tenderness

- **Tenderness**

- » Inferior pole patella
- » Joint line
- » Tibial tubercle



Joint Line Tenderness



Inferior Pole of Patella



Popliteal (Baker's) Cyst



Diagnostic Tests

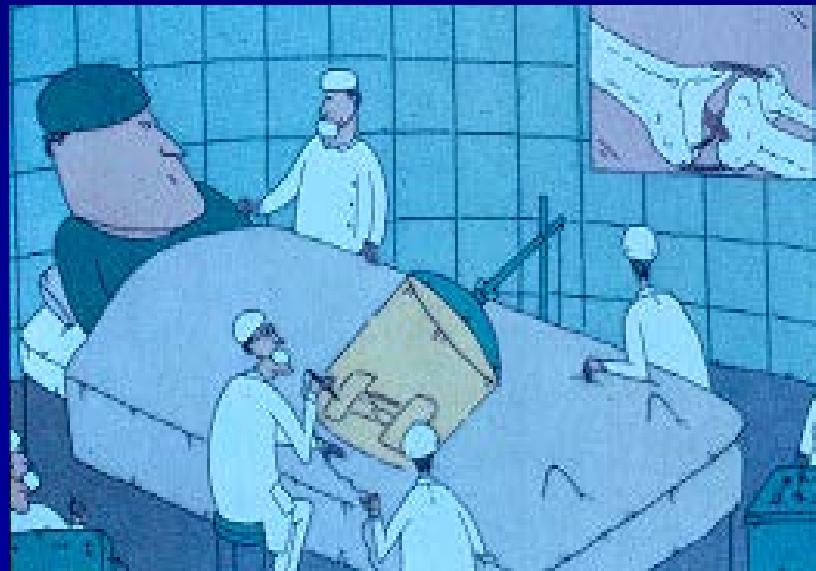
- **X- ray**
 - » AP & lateral
 - » Tunnel (AP in flexion)
 - » Tangential at 30 deg flexion
 - » Standing PA at 30 deg flexion
- **MRI**
- **CT**
- **Bone scan**
- **Aspirate fluid**
 - » Gram stain, culture
 - » Cell count
 - » Crystals

Common Knee Problems

- Anterior
 - » Chondromalacia
 - » Patella tendinitis
 - » Patella subluxation
- Medial
 - » Medial meniscus
 - » DJD
 - » MCL
- Posterior
 - » Popliteal cyst
- Lateral
 - » Lateral meniscus
 - » Fibular collateral ligament
 - » DJD
- Intra - articular
 - » Synovitis
 - » Gout, pseudo- gout
 - » DJD

Management of Knee Problems

- Conservative
 - » NSAID' s
 - » Supplements
 - » Physical therapy
- Injection
- Bracing
- Arthroscopy



Anterior Knee Pain - Patella

- Patellofemoral chondrosis (CMP)
- Patella tendinitis (jumper's knee)



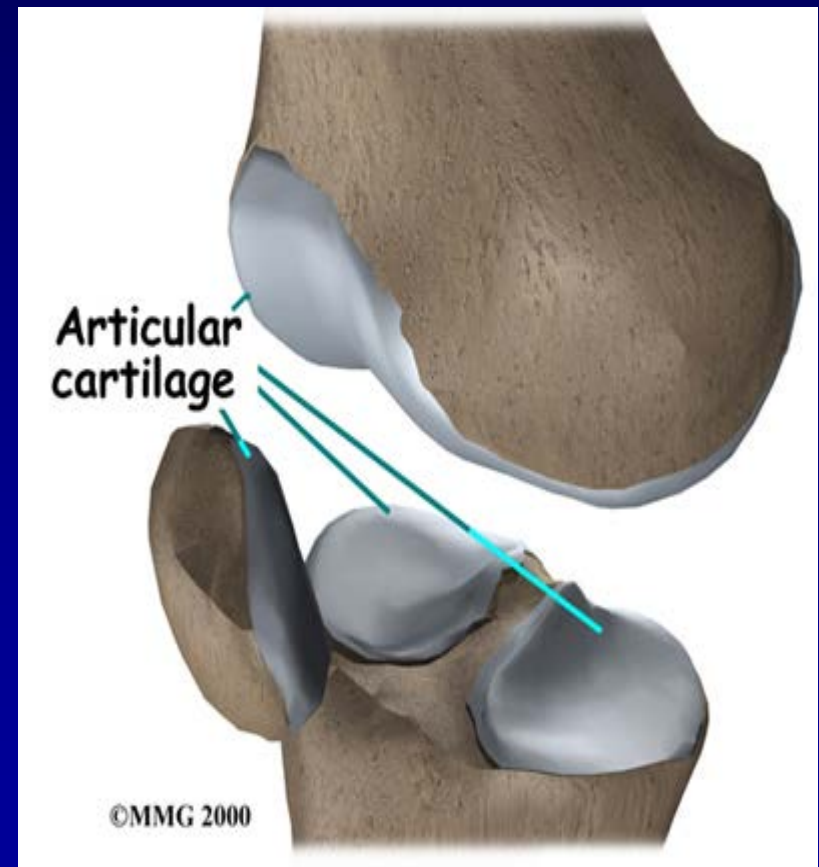
Patellofemoral Chondrosis (Chondromalacia Patella)

- Anterior knee pain
(occasionally posterior)
- Worse w/ stairs, squats,
up/down stairs, sitting
- Grind, snap
- Exam – patella crepitus



Knee – Articular Cartilage

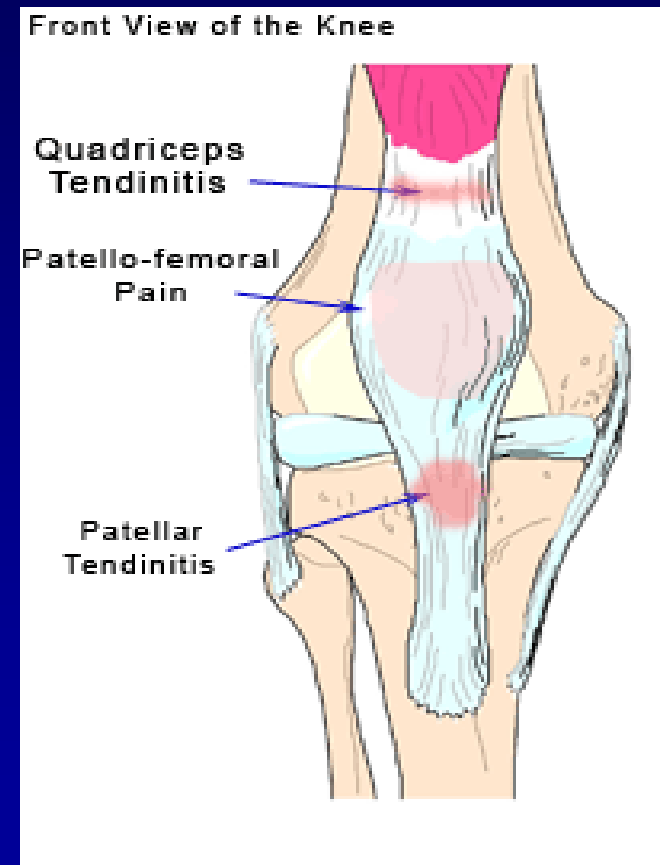
- **Coefficient of friction**
= 20% ice vs ice
- **Compressive force**
 - » Level walk 1.8 x BW
 - » Up stairs 3.5 x BW
 - » Down stairs 5x BW
 - » Jump 10 – 12 x BW



Patella Tendinitis

“Jumper’s knee”

- Anterior knee pain
- Worse w/ run, jump, stairs
- Exam – tenderness inferior pole of patella



Tx - CMP & Jumper's Knee

- Avoid
 - » Stairs
 - » High heels
 - » Deep knee bends
- No
 - » Squats
 - » Lunges
 - » Plyometrics
 - » Stairmaster



Iliotibial Band Friction Syndrome

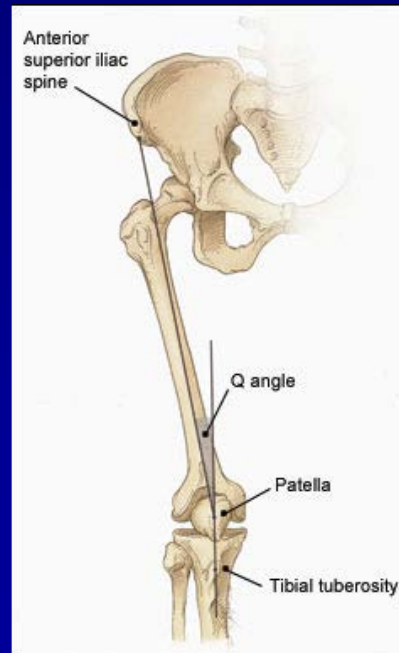
“Runner’s Knee”

- Long distance runner
- Lateral knee pain
- Tenderness lateral epicondyle
- No effusion,
- No joint line tenderness



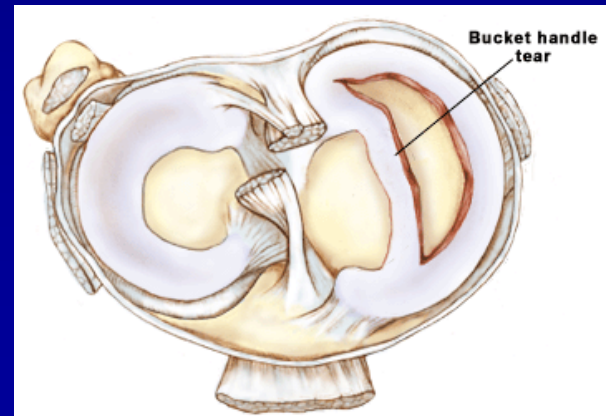
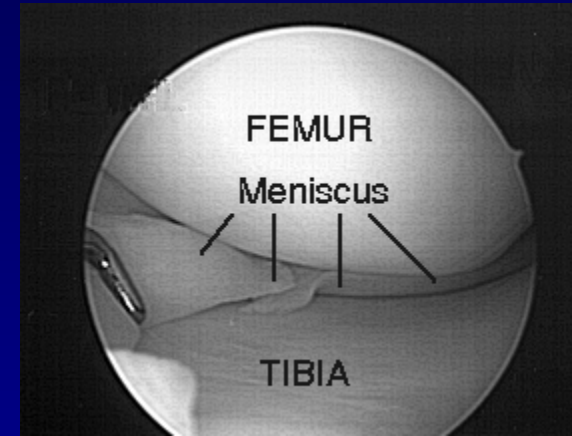
Patella Instability Dislocation & Subluxation

- Young, loose-jointed
- Apprehension w/
lateral-ward pressure
on patella
- Increased Q-angle
(more than 20
degrees)



Torn Meniscus

- Traumatic vs degenerative
- Symptoms
 - » Pain, swelling
 - » Click, pop
- Signs
 - » Effusion
 - » Pain w/ extension
 - » Pain w/ flexion
 - » Joint line tenderness



Torn Anterior Cruciate Ligament

- Non – contact injury
- Immediate swelling
- Pain, instability





Valgus Injury - MCL



Torn Medial Collateral Ligament

- Contact injury
 - » Valgus force to outside of knee (clipping)
 - » Skiing
- Exam
 - » Laxity to valgus at 30 deg



Torn Posterior Cruciate Ligament

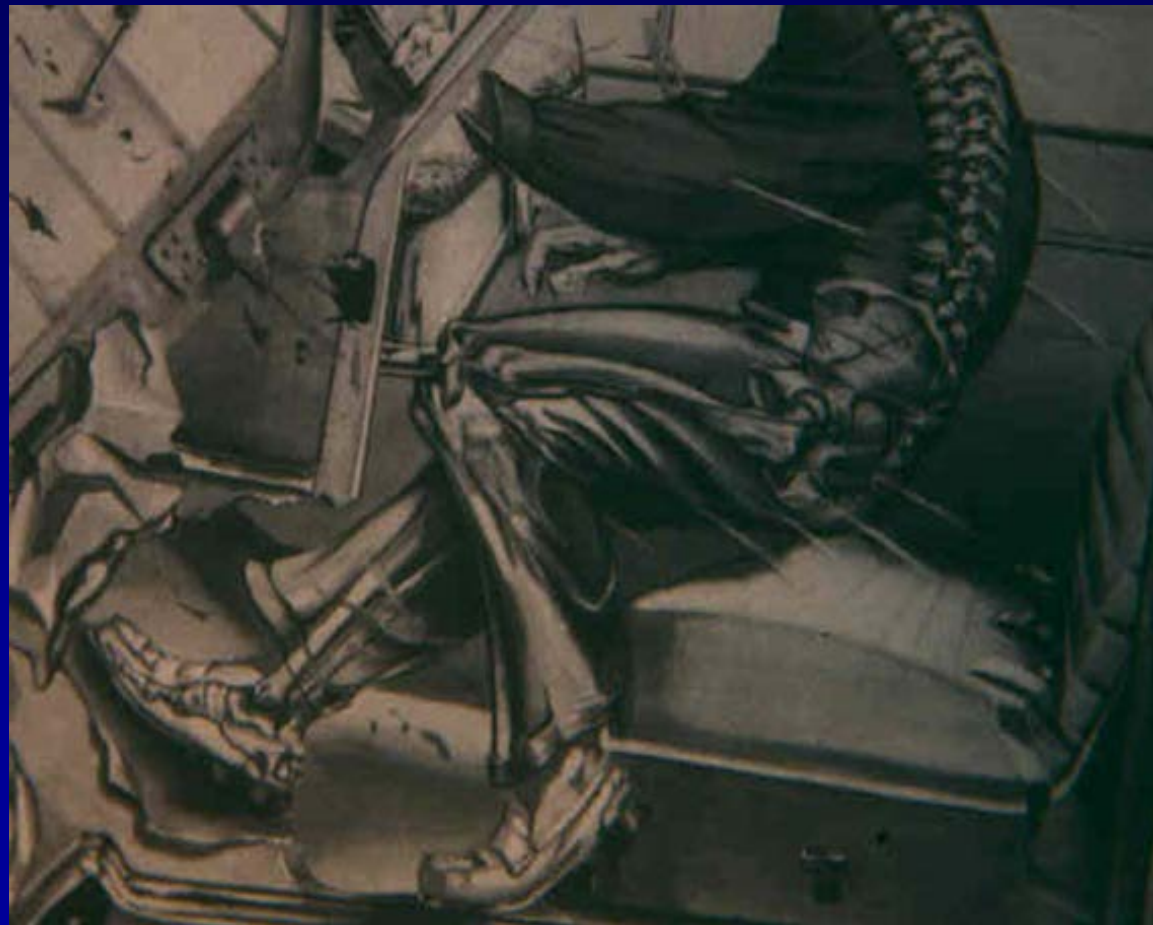
- Dashboard injury
- Fall on flexed knee
- Exam
 - » Posterior drawer
 - » Posterior sag (at 90 deg)



Fall on Flexed Knee - PCL



Dashboard Injury - PCL



Knee Effusion

- Trauma (within 2 hrs)
= torn ACL
- Atraumatic
 - » DJD
 - » Crystal synovitis
 - » Infection
 - » Synovitis (RA, etc)



Treatments

Cryotherapy

- 1st 48 hours
- 20 minutes on/
20 minutes off
- Excess cold
 - » Frostbite
 - » Reactive hyperemia when discontinued
 - » Knee - risk of peroneal nerve palsy



Heat treatment

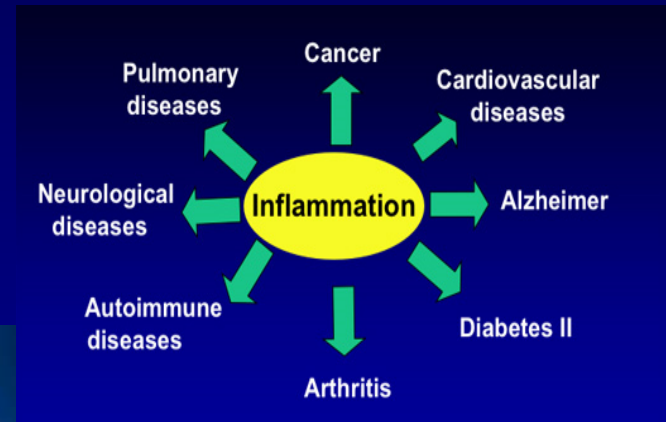
- Not for acute injuries
- OK to loosen tissues before activities
- Use before P.T.
 - » Warm up body to increase core temp
 - » Apply heat 20 min



Inflammation

Good or bad?

- **From Wikipedia**
- **Inflammation** (Latin, *inflammare*, to set on fire) is the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants. Inflammation is a protective attempt by the organism to remove the injurious stimuli as well as initiate the healing process for the tissue.



NSAIDs

- ...drugs with analgesic, antipyretic (fever-reducing) and, in higher doses, with anti-inflammatory effects (reducing inflammation).
- Not indicated in high doses in acute injuries
- Impairs proliferative phase of healing (days 0-4)
- Delays soft tissue healing
- Impairs muscle regeneration



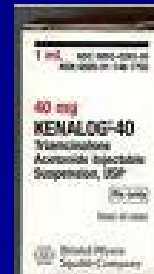
Cortisone injection

- Shuts down chondrocyte metabolism for 24 hrs
- Pain relief
- Duration variable
- Side effects of multiple injections



Soluble

(Dexamethasone)



Depot
(Kenalog)

Glucosamine and Chondroitin Sulfate

- A food (not a drug) – not controlled by FDA
- NIH funded study – proved not effective

- » Multicenter
- » Placebo - controlled
- » Double blind

New Engl J Med **354** (8): 795–808



- Meta-analysis – showed no benefit

Annals of Internal Medicine **146**:580-590, 2007



Summary

- Think anatomically
- Knee
 - » Young pts: usually PF
 - » Non-contact twist w/ swelling : ACL
 - » Degenerative meniscus tears: conservative Tx 1st

