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Osteoarthritis

Seetha Monrad M.D.

Fall 2009



Case 1

77 year old man

- Bilateral knee pain
- Began insidiously ten years ago
- Pain worsens as the day goes on and with activity
- Denies any other systemic symptoms.



Case 2

59 year old woman

- Notes that her knuckles are changing shape over the past several years
- Difficulty opening jars, typing for prolonged periods of time on the computer because of pain

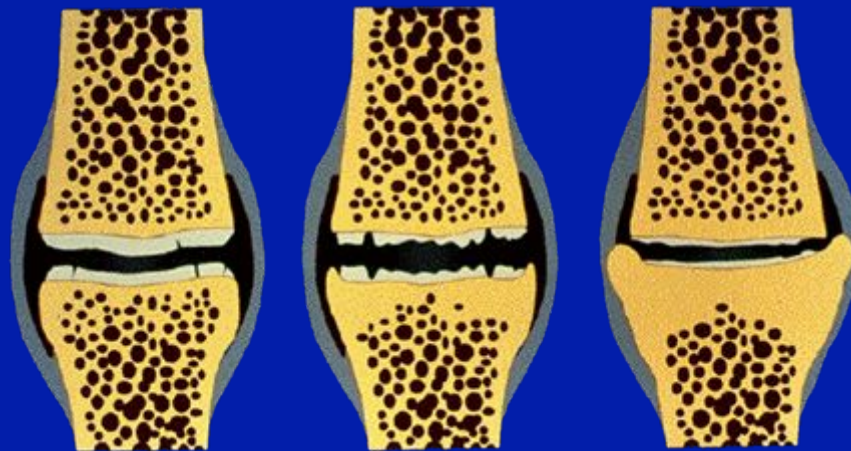


Osteoarthritis

Disease characterized by

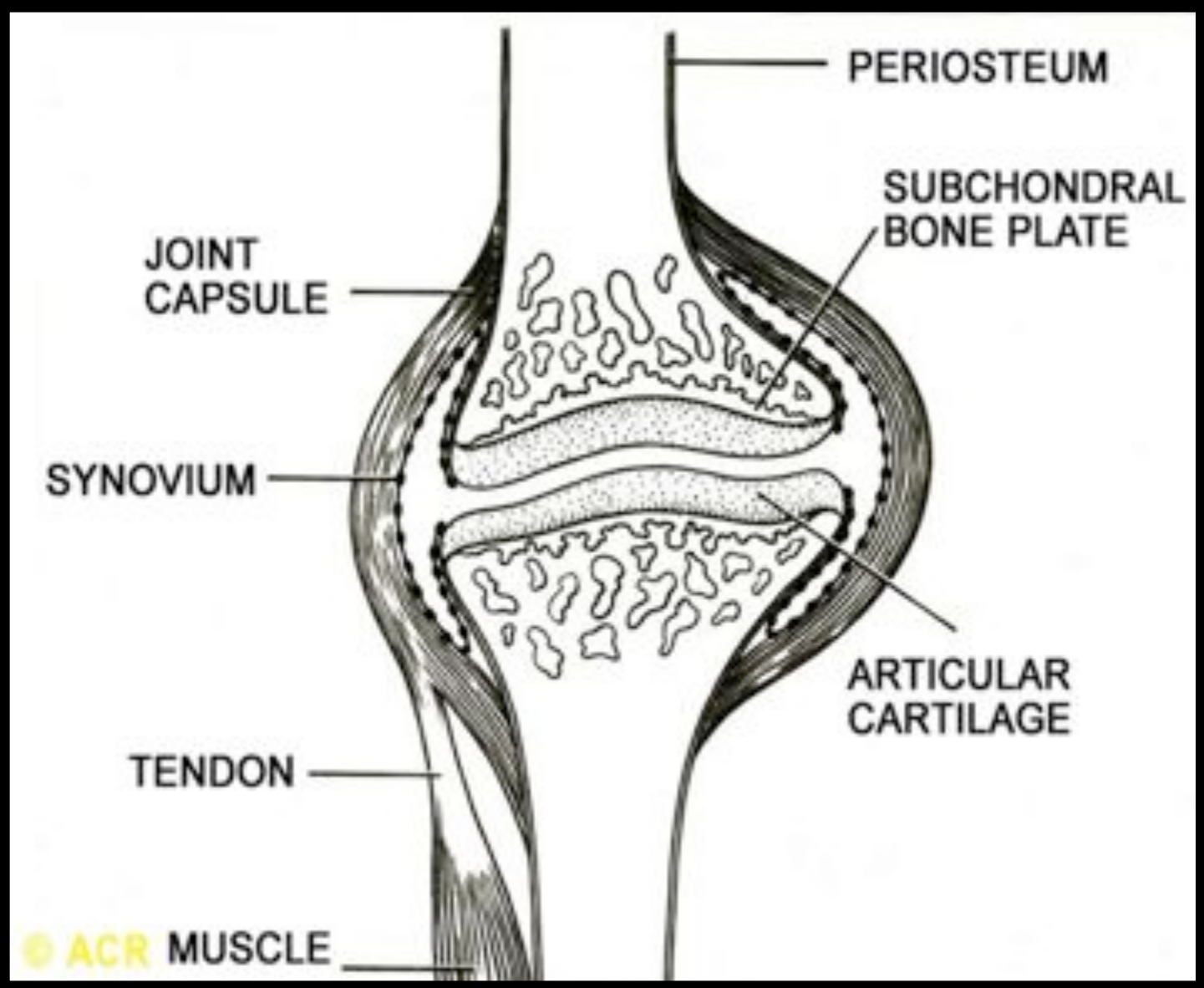
- Loss of articular cartilage
- Increased bone formation
- Mild synovitis

Results in joint pain and dysfunction



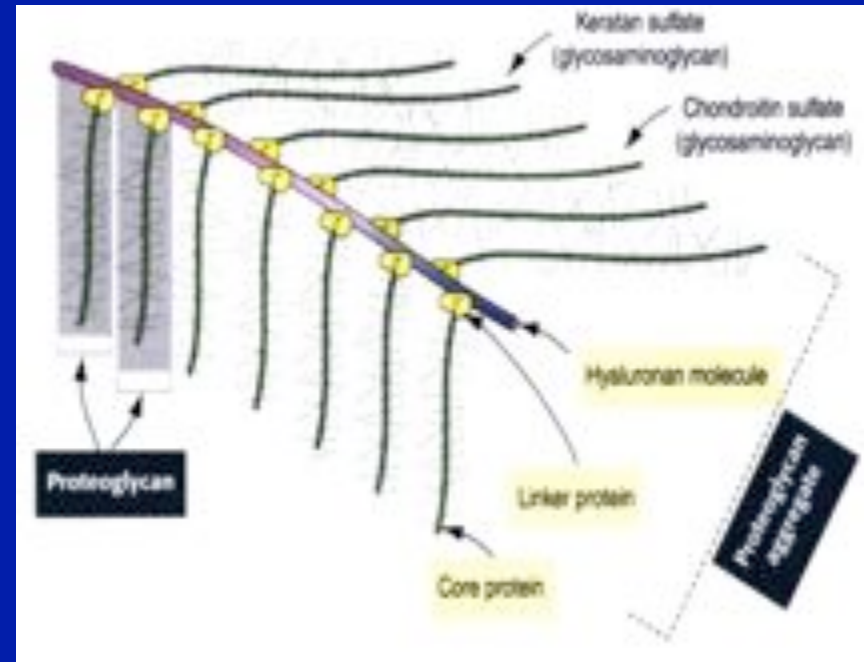
Impact of Osteoarthritis

- Disables 10% of persons >60
 - 2nd only to ischemic heart disease as cause of work disability in men > 50
- Economic impact >\$60 billion (U.S.)



Normal Cartilage

- Extracellular matrix
 - Collagens (mainly II)
 - Hyaluronan
 - Proteoglycans (mainly aggrecan)
- Chondrocytes
 - Synthesize matrix
 - Generate degradative enzymes
- Avascular



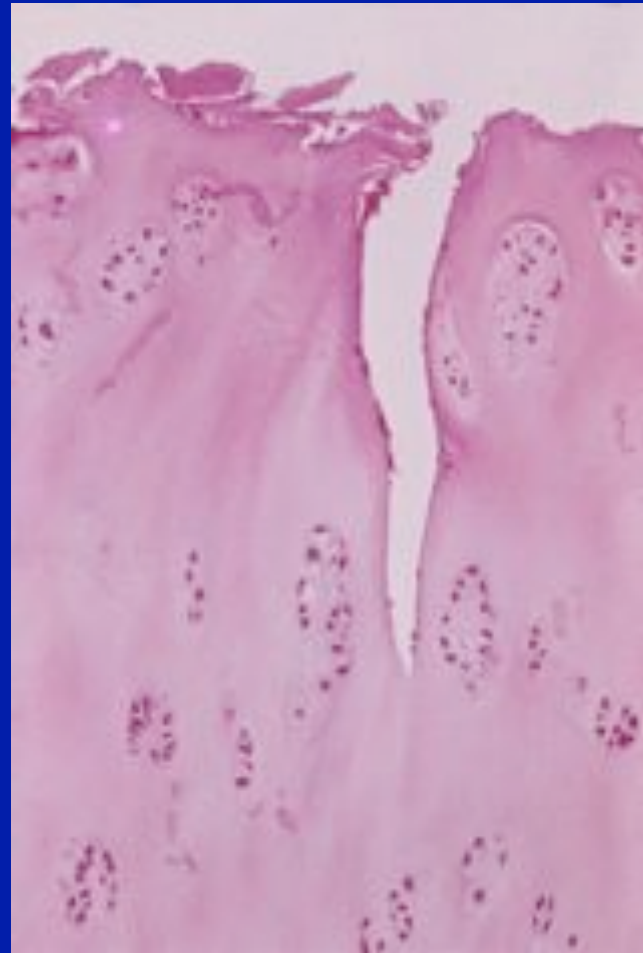
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For further review, see M1MS lecture on cartilage

Cartilage in Osteoarthritis

Altered chondrocyte phenotype

- Perpetuated by surrounding synoviocytes, osteoblasts
- Imbalance between matrix synthesis/ degradation
- Alteration in matrix composition



Early Stages of Disease



Late Stages of Disease



Inflammation in OA?

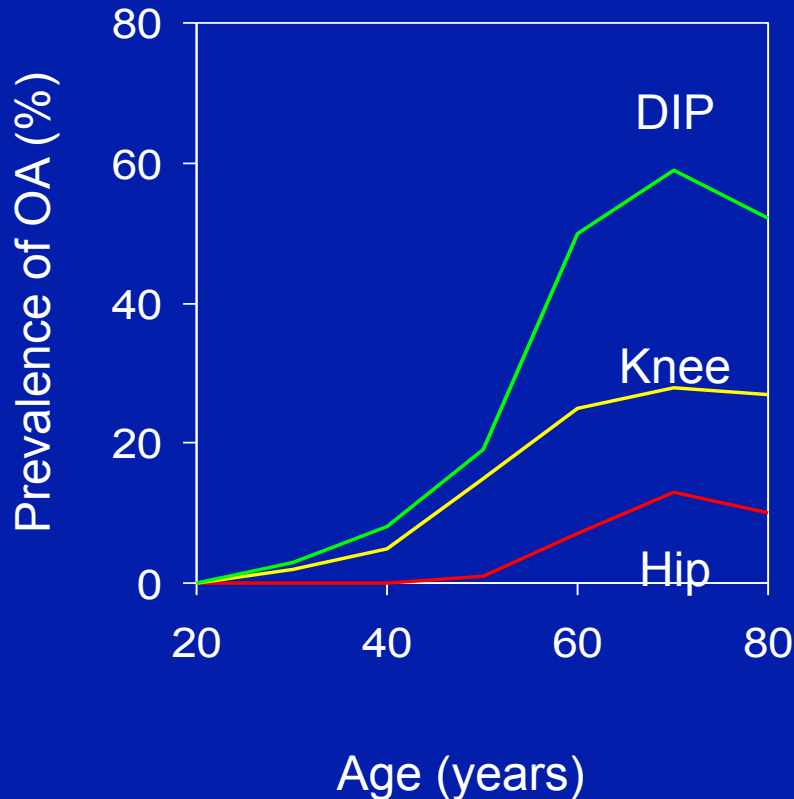
- Classically, OA has been considered a non-inflammatory, degenerative disorder
- There is increasing evidence that inflammation may be playing some role
 - Histologically: evidence of inflammation, elevated inflammatory cytokines
 - Radiographically: evidence of synovial thickening
 - Clinically:
 - Local response to injectable steroids
 - Clinical subset: inflammatory osteoarthritis
- Source of inflammation unclear
 - Crystals?

Risk factors for OA

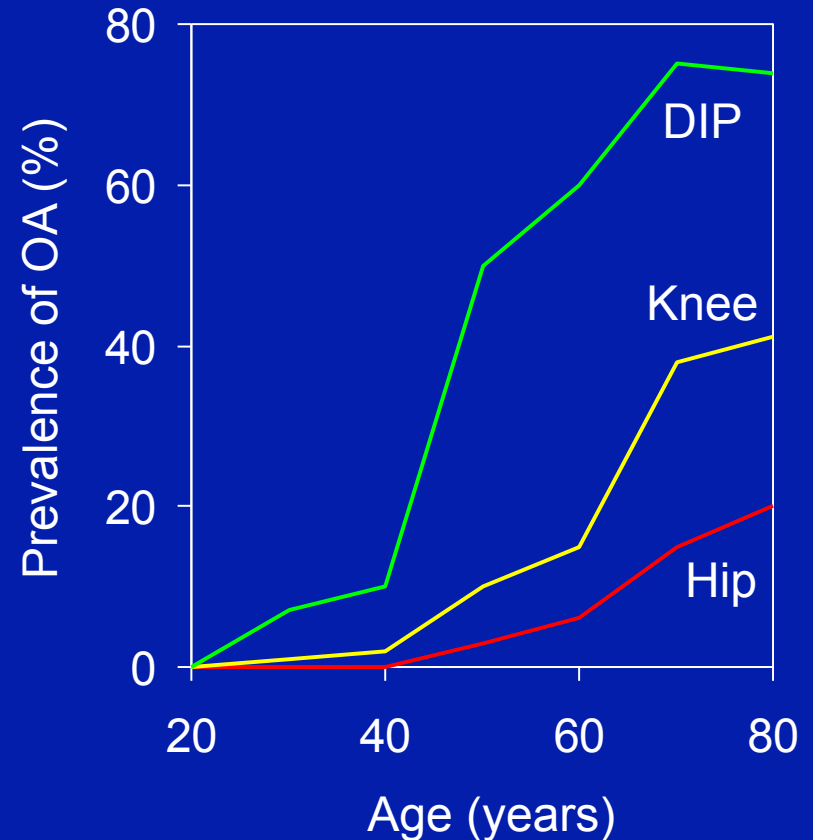
- Age (75% of persons >70)

Age-Related Prevalence of OA: Changes on X-Ray

Men



Women

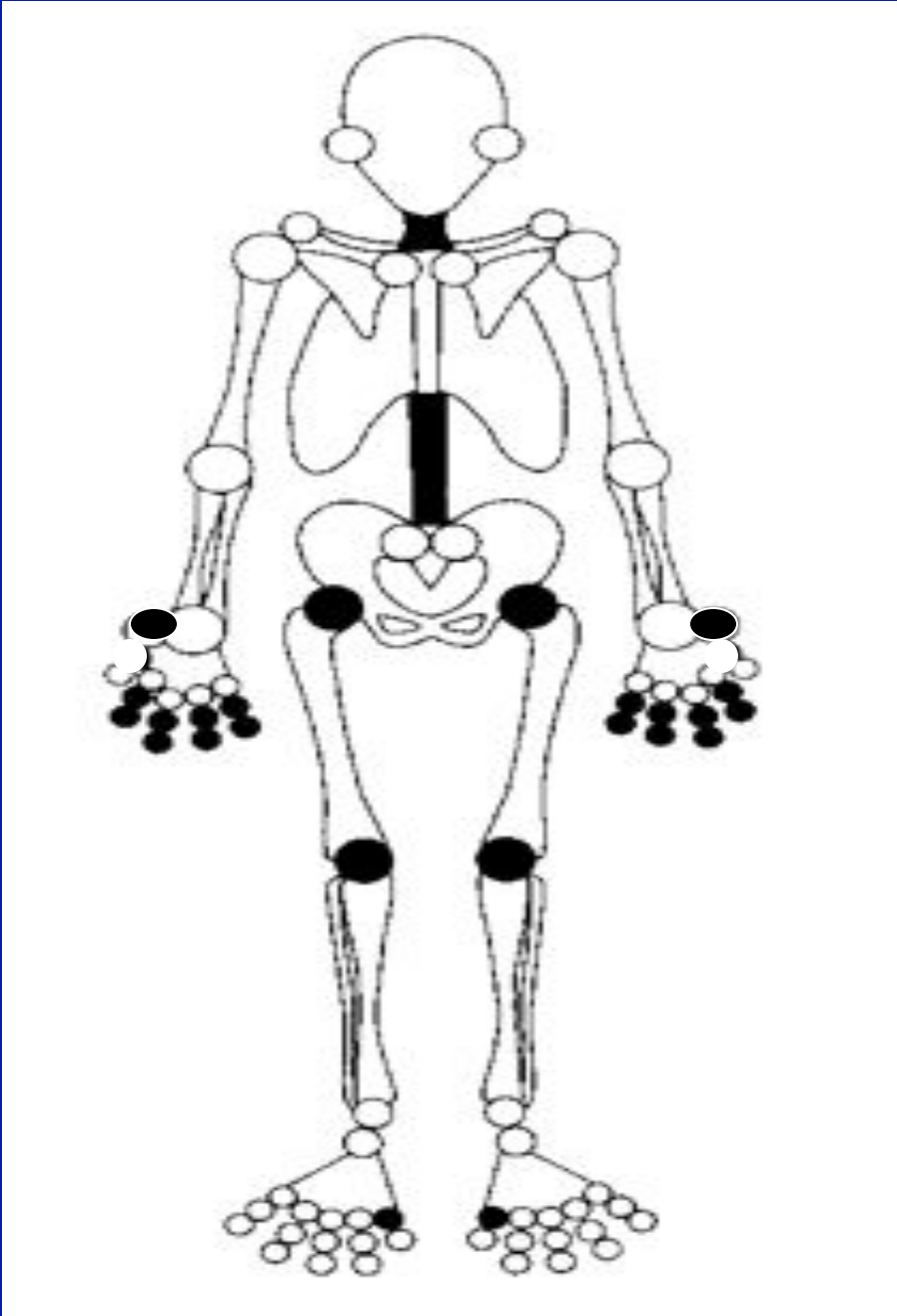


Risk factors for OA

- Age (75% of persons >70)
- Genetics (~50%)
- Biomechanical factors
- Trauma
- Obesity
- Female sex
- Neuromuscular dysfunction
- Metabolic disorders

Clinical features of OA

- Symptoms
 - Pain worse with use
 - Pain as day progresses
 - Minimal morning stiffness (<30 minutes) and after inactivity (gelling)
 - When severe, can have rest and nocturnal pain
- Signs
 - Pain with movement
 - Bony enlargement
 - Restricted movement
 - Crepitation
 - Joint instability
 - Joint deformity



OA: Laboratory Tests

- No specific tests
- No associated laboratory abnormalities; eg, sedimentation rate
- Investigational: Cartilage degradation products in serum and joint fluid

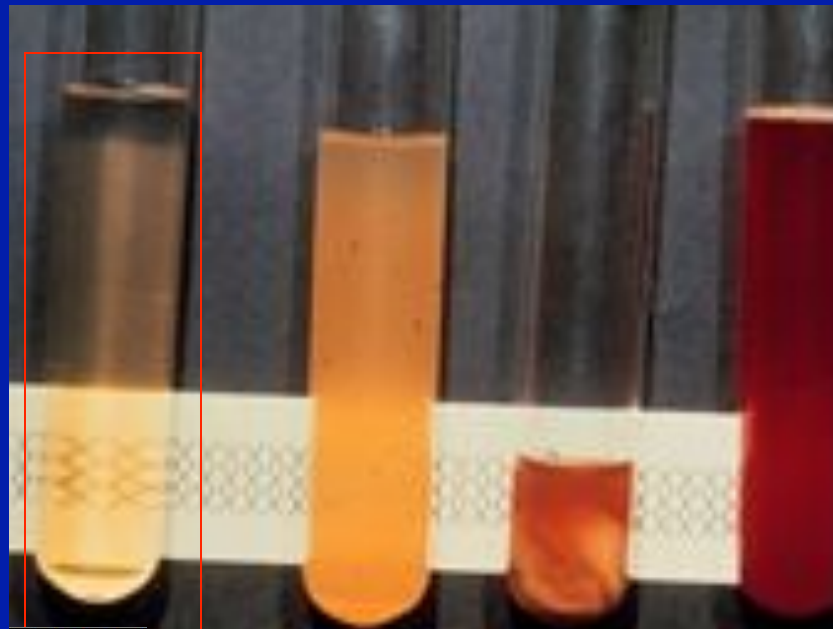
OA: Joint fluid analysis

TABLE 2C-2. CLASSES OF SYNOVIAL FLUID.

	CLASS I (NONINFLAMMATORY)	CLASS II (INFLAMMATORY)	CLASS III (SEPTIC)	CLASS IV (HEMORRHAGIC)
Color	Clear/yellow	Yellow/white	Yellow/white	Red
Clarity	Transparent	Translucent/opaque	Opaque	Opaque
Viscosity	High	Variable	Low	NA
Mucin clot	Firm	Variable	Friable	NA
WBC count	<2,000	2,000–100,000	>100,000	NA
Differential	<25% PMNs	>50% PMNs	>95% PMNs	NA
Culture	Negative	Negative	Positive	Variable

Abbreviations: PMN, polymorphonuclear leukocyte; NA, not applicable.

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OA: Xrays

- Joint space narrowing
- Marginal osteophytes
- Subchondral cysts
- Bony sclerosis
- Malalignment



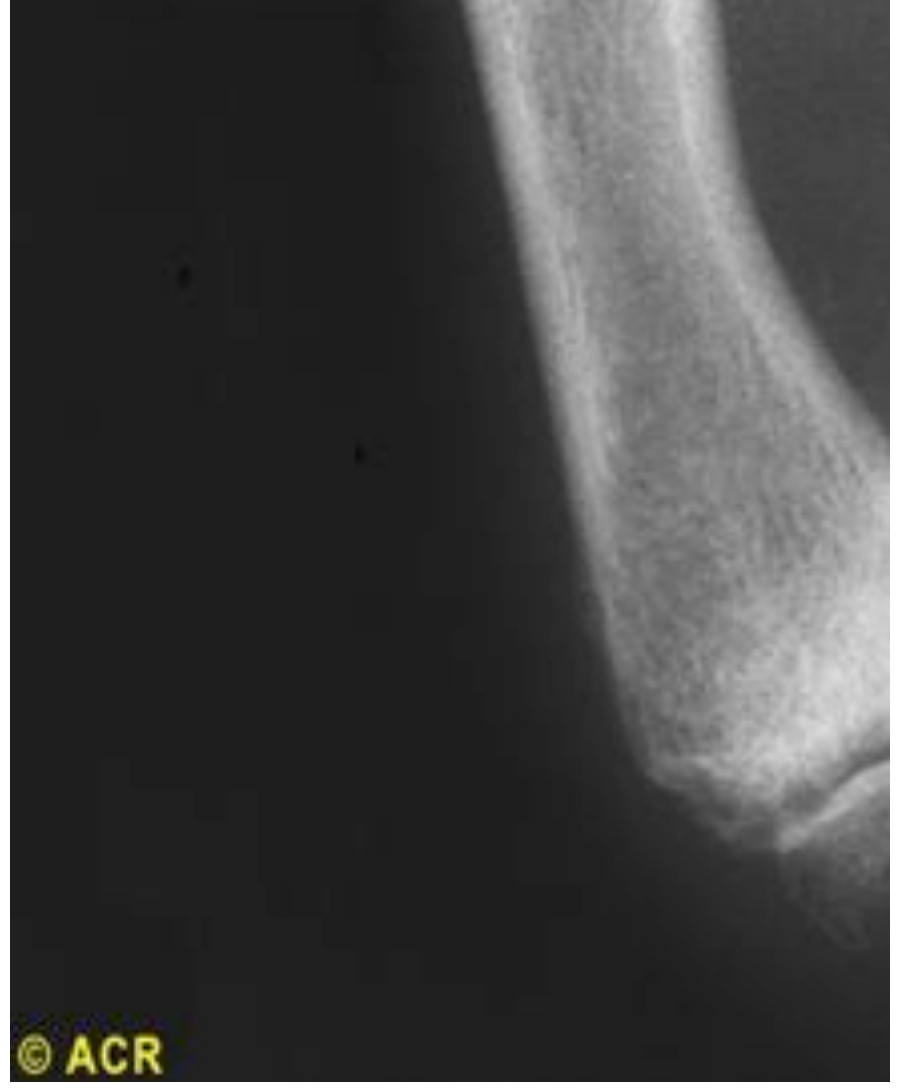
Xrays in OA

- Diagnosis is made clinically; xrays are supplementary/confirmatory
 - Early OA can be painful but without xray changes
 - Radiographic OA can be present but without pain, or not the source of patient's pain

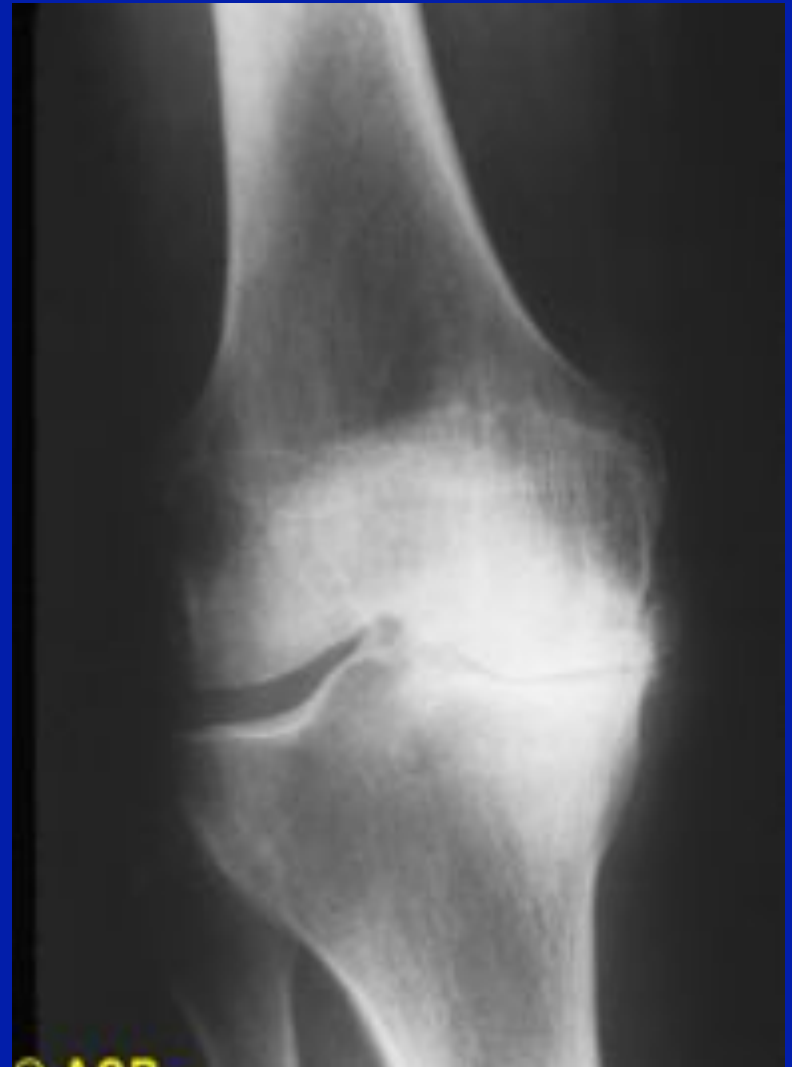
Hand OA



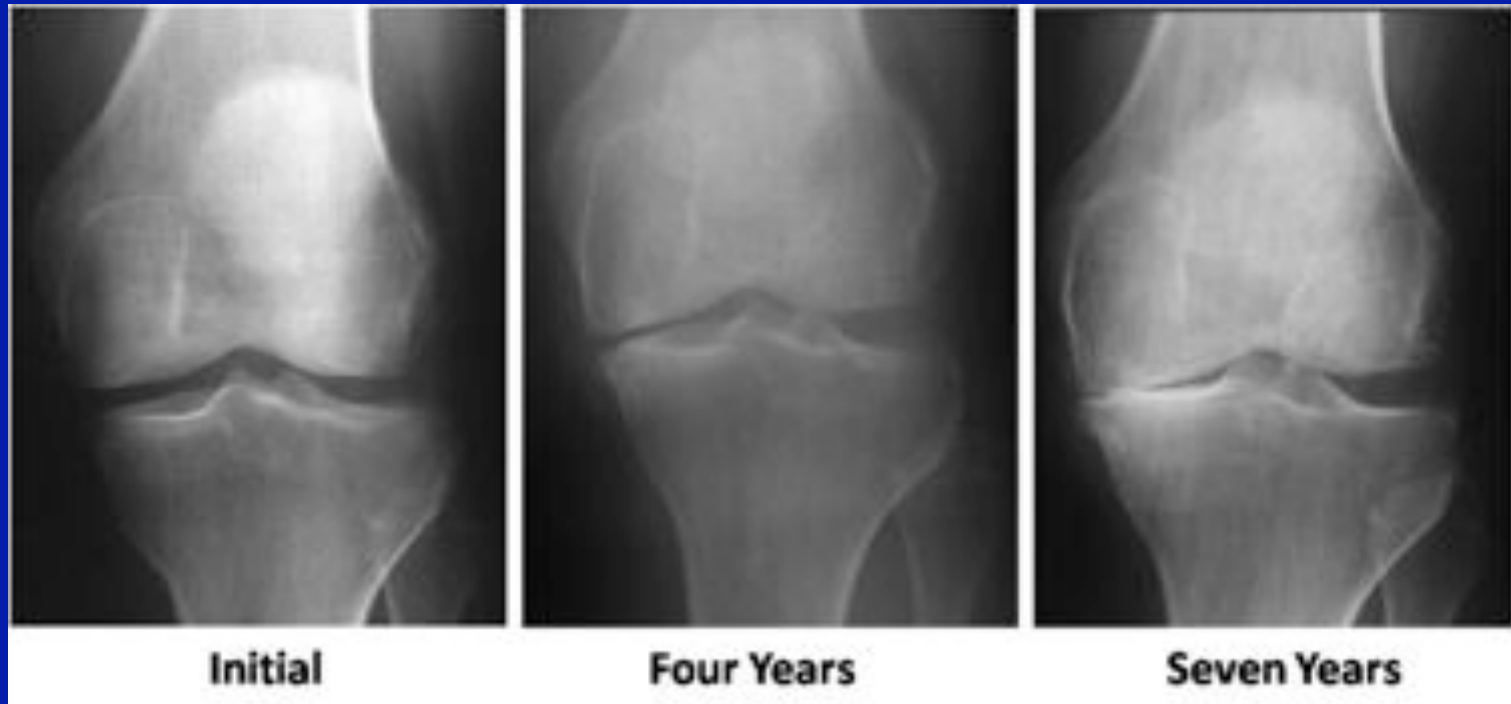
First CMC OA



Knee OA



Knee OA



Normal hips



OA of hips



What if the patient has OA in the “wrong” joint?

Then you must consider
secondary causes of OA

- Ask about previous trauma and/or overuse
- Consider neuromuscular disease, especially diabetic or other neuropathies (lower extremity bias)
- Consider metabolic disorders, especially CPPD (calcium pyrophosphate deposition disease) (upper extremity bias)



Secondary OA: Diabetic Neuropathy

- MTPs 2 to 5 involved in addition to the 1st bilaterally
- Destructive changes on x-ray far in excess of those seen in primary OA
- Midfoot involvement also common



Differential Diagnosis

- Non-joint pain
 - Hip pain: ex. trochanteric bursitis, iliopsoas tendinitis
 - Knee pain: ex. pes anserine bursitis, patellar tendinitis
- Inflammatory arthritis



Treatment

- Goals
 - Patient education about disease and management
 - Pain control
 - Improving function and decrease disability
 - Altering the disease process and its consequences*
- Treatment modalities
 - Nonpharmacologic
 - Pharmacologic
 - Surgical

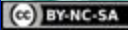
Nonpharmacologic

- Patient education
 - Heat/cold application
 - Weight loss
- Physical therapy: progressive exercise to
 - Increase function
 - Increase endurance and strength
 - Reduce fall risk
- Orthotics
 - Neoprene sleeves
 - Braces (unicompartmental knee OA)
 - Shoe inserts



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 [Aqua Fit](#) by GWSA

Pharmacologic: Analgesia

- Acetaminophen: first line
 - Maximum dose 4 g/day
 - Hepatic toxicity
 - Caution with multiple acetaminophen containing compounds
- NSAIDs: if acetaminophen ineffective/signs of inflammation
 - Possibly more effective than acetaminophen but more toxicity (GI, renal, cardiovascular)
 - Lowest effective dose
 - COX-2 inhibitors
 - Topical NSAIDs (1% diclofenac gel)

Pharmacologic therapy

- Tramadol
 - Affects opioid and serotonin pathways
 - Nonulcerogenic
 - May be added to NSAIDs, acetaminophen
 - Side effects: nausea, vomiting, lowered seizure threshold, rash, constipation, drowsiness, dizziness
- Opioids
- Topical agents
 - Capsaicin
 - NSAIDs

OA: Intra-articular Therapy

- Intra-articular steroids
 - Good pain relief
 - Most often used in knees, up to q 3 mo
 - With frequent injections, risk infection, worsening diabetes, or CHF
- Hyaluronate injections
 - Symptomatic relief
 - Improved function
 - Expensive
 - Require series of injections
 - Predominantly used in knees

Other pharmacologic agents

- Nutraceutical: Glucosamine sulfate/
chondroitin sulfate
 - Analgesia
 - Possibly reduced joint space narrowing?

Surgical

- Arthroscopic irrigation: No benefit (Bradley JD et al, *Arthritis Rheum* 2002; Mosely JB et al, *NEJM*, 2002)
- Osteotomy: May delay need for TKR for 2 to 3 years
- Total joint replacement: When pain severe and function significantly limited

OA: Management Summary

- First: Be sure the pain is joint related (not a tendonitis or bursitis adjacent to joint)
- Initial treatment
 - Muscle strengthening exercises and reconditioning walking program
 - Weight loss
 - Acetaminophen first
 - Local heat/cold and topical agents

OA: Management Summary

(cont' d)

- Second-line approach
 - NSAIDs if acetaminophen fails
 - Intra-articular agents
 - Other agents
 - Opioids
- Third-line
 - Osteotomy
 - Total joint replacement

Additional Source Information

for more information see: <http://open.umich.edu/wiki/CitationPolicy>

Slide 4: Help Your Bilateral Knee Osteoarthritis by soni2006, Hubpages.com,

<http://hubpages.com/hub/Advice-for-patients-suffering-from-osteoarthritis-both-knees>

Slide 5: American College of Rheumatology

Slide 6: Source Undetermined

Slide 8: American College of Rheumatology

Slide 9: A. Kierszenbaum. Histology and Cell Biology. Mosby, Inc. 2002

Slide 10: Source Undetermined

Slide 11: Rheumatology Image Bank, <http://images.rheumatology.org/>

Slide 14: Source Undetermined

Slide 17: Source Undetermined

Slide 19: J. Klippel. Primer on the Rheumatic Diseases. 13th Ed. Springer Science+Media Business, LLC. 2008; Source Undetermined

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Slide 22: American College of Rheumatology (both Images)

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Slide 31: Goldman: Cecil Medicine, 23rd ed., 2007

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