

Evaluation and Treatment of Knee Arthritis

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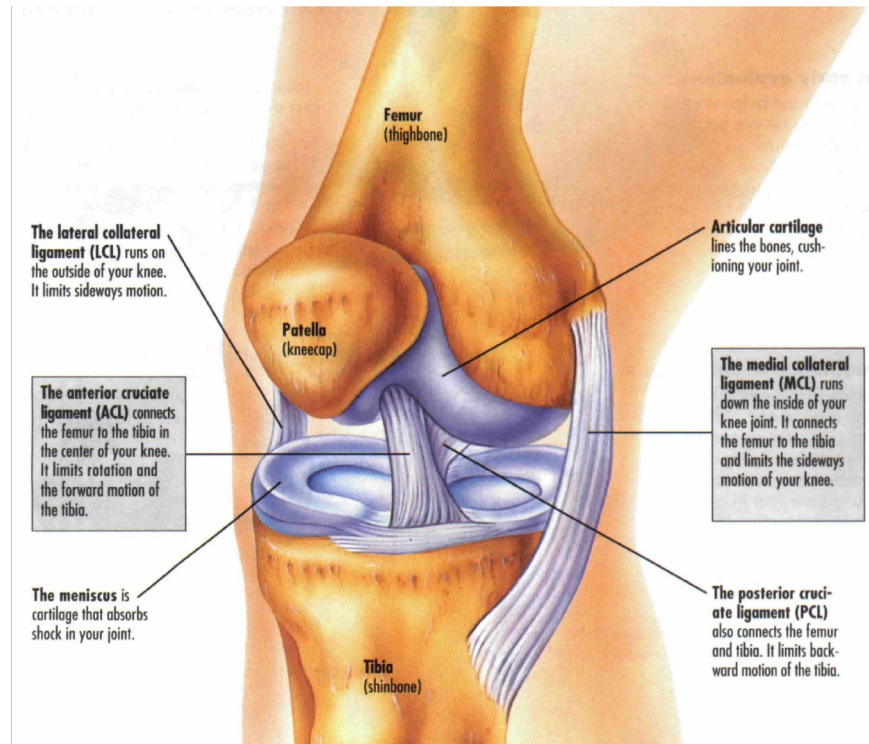


Types of Arthritis:

- Rheumatoid Arthritis
- Osteoarthritis
- Crystalline Arthropathies
- Seronegative Arthritis
 - Psoriatic Arthritis
 - AS
 - SLE, etc.

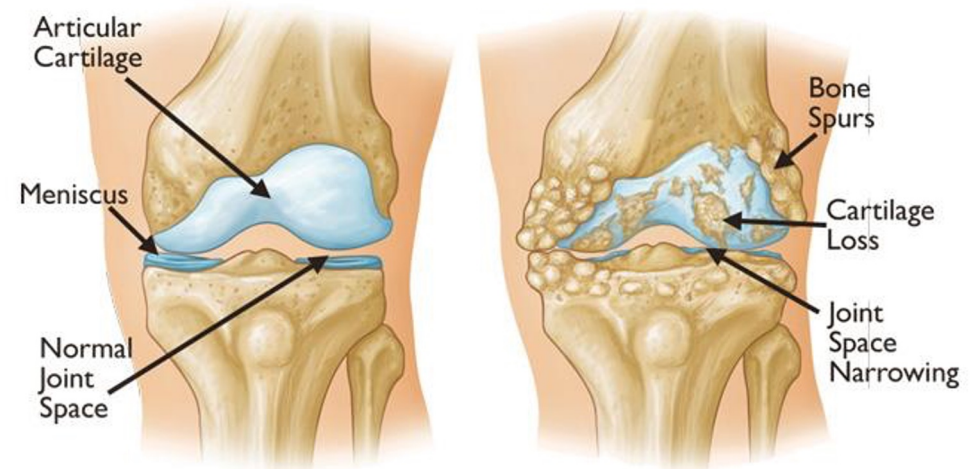
What does normal look like first....

- Native Knee Anatomy



Now, what is pathologic....

- Depends on the type of arthritis
- Look at the bone quality
- Joint space?
- Osteophytes present?
- Cysts? Sclerosis?
- What can't you see on a radiograph?
 - Menisci likely degenerative
 - Cruciates may be absent
 - Instability apparent (ALIGNMENT)



Osteoarthritis:

- Bone usually sclerotic
 - Asymmetric Joint Space narrowing
 - Osteophyte Formation
 - Subchondral Sclerosis
 - Subchondral Cysts
-
- You don't need all the signs to make this diagnosis!

Normal Knee



Advanced Osteoarthritis (Grade III)



Causes of OA:

- Primary/Degenerative “wear and tear”
- Secondary:
 - Trauma
 - Infection
 - AVN
 - Developmental: Perthes/Dysplasia/SCFE

Rheumatoid Arthritis:

- Bone usually with osteopenia
- Symmetric Joint Space narrowing
- Limited osteophyte Formation
- Limited Subchondral Sclerosis
- Limited Subchondral Cysts

- If there are osteophytes, etc., the patient can still have RA.

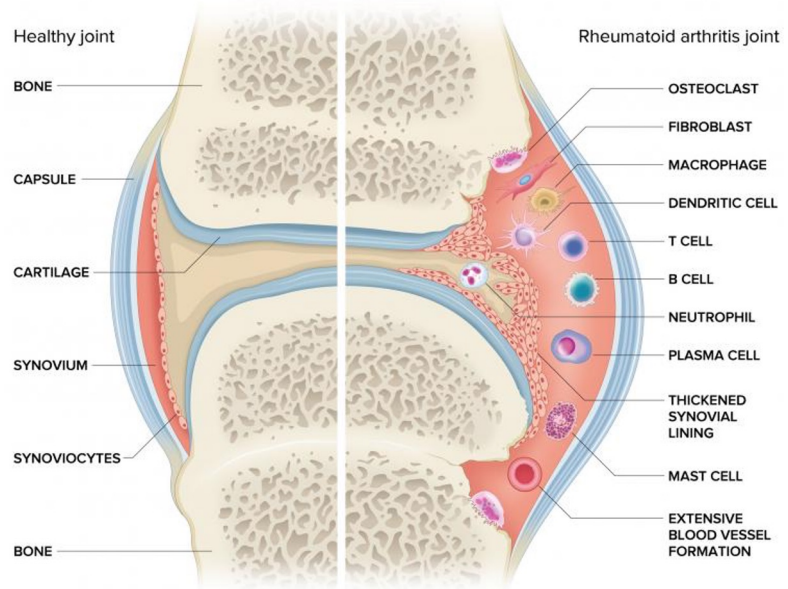


Rheumatoid Arthritis:

- Bilateral Symmetry
- Periarticular Soft Tissue Swelling
- Uniform Joint Space Loss
- Marginal Erosions
- Justarticular osteoporosis
- Joint Deformity

Anatomy of an RA joint

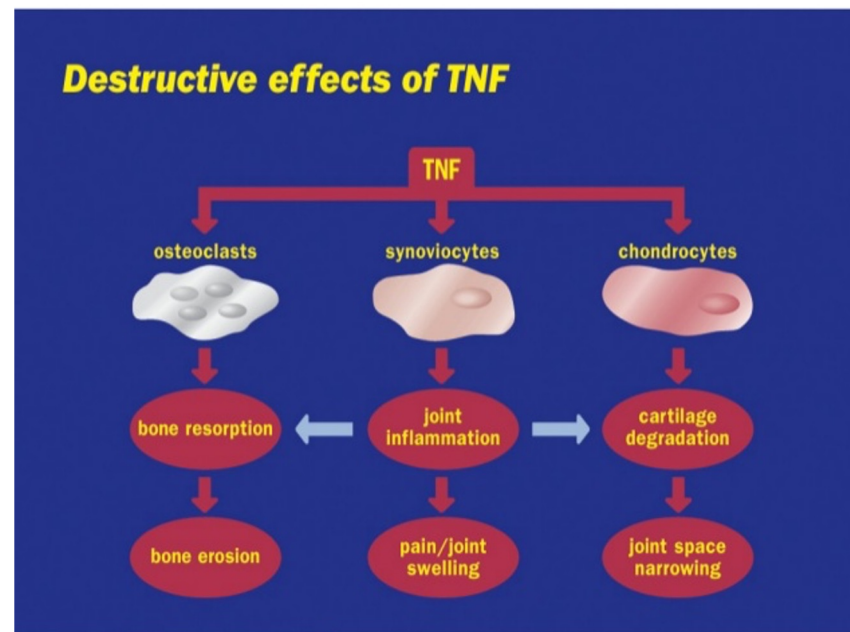
In contrast to a healthy joint (left), one affected by rheumatoid arthritis harbors a multitude of cells that cause inflammation and damage the bone and cartilage.



SOURCE: J.S. SMOLEN ET AL / THE LANCET 2016

5W INFOGRAPHICS / KNOWABLE

Rheumatoid arthritis is a TNF/synovial driven disease:



Crystalline Arthropathies:

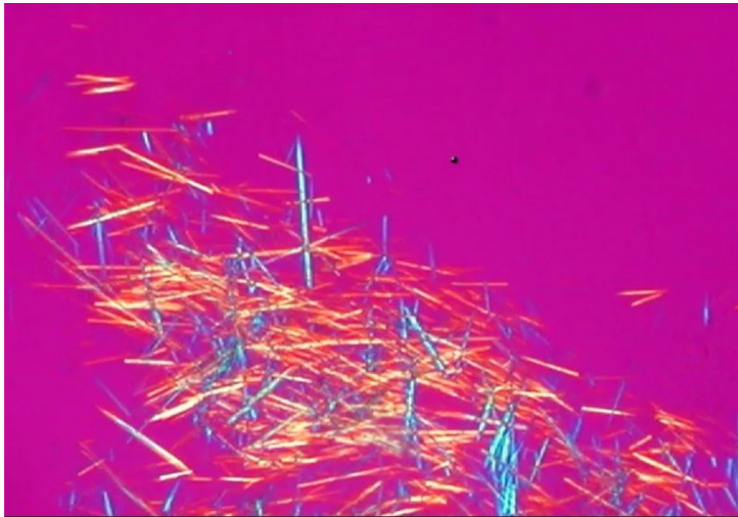
- Hot swollen joint - mimics septic arthritis
- Gout: negatively birefringent sodium monourate crystals
- Pseudogout: positively birefringent calcium pyrophosphate crystals
 - Meniscal deposition on radiograph

- Diagnosed via aspiration

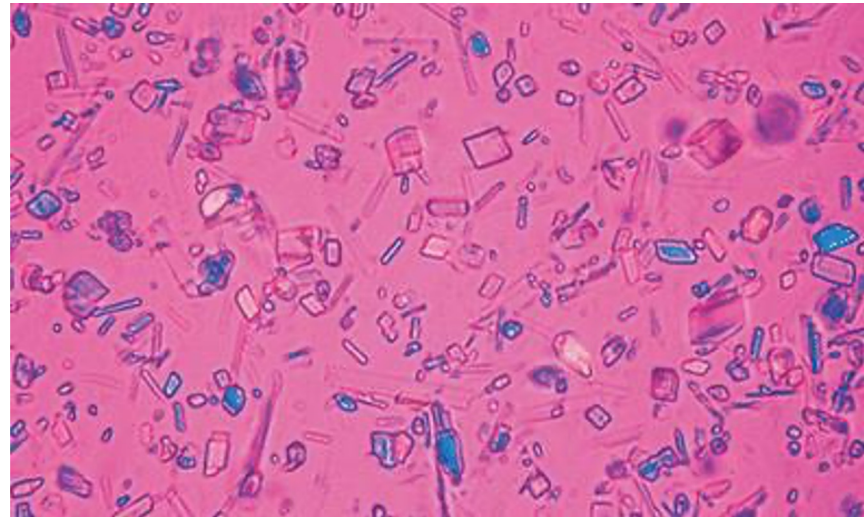
- You don't need all the signs to make this diagnosis

Crystals: Viewed Under Polarized Light

Sodium Monourate Crystals



Calcium Pyrophosphate Crystals



Causes of Crystalline Arthropathy:

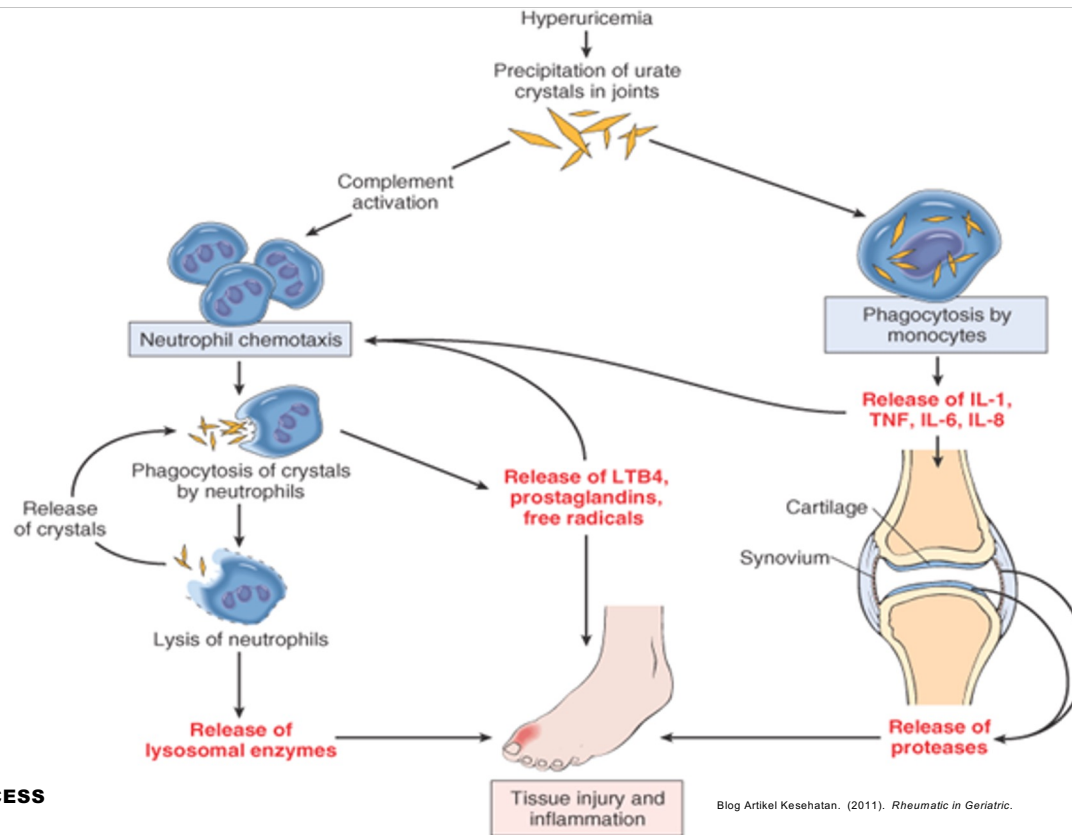
- Dietary causes: high protein diets
- Urate is the end product of purine metabolism
- As serum urate levels rise, reaches a level where it is NO LONGER soluble in the serum THEN crystalizes in the tissues.
- Hyperuricemia is either OVERproduction or UNDERsecretion

Gout on x-rays:

- Common in First MTP joint.



Gout Pathology:





History taking: Patient Symptoms

Right Knee Pain:

- 58 y.o. gentleman with left knee pain
 - Common Complaints:
 - Pain
 - Swelling/Effusions (fluid palpable in joint)
 - Bowing of the leg (deformity)
 - Instability, “It feels like it gives out.”
 - Stiffness, doesn’t bend like it used to.

History Cont.:

- Location of the pain
- Frequency of symptoms
- Intensity of the pain
- Treatment thus far?
 - Meds
 - Injections
 - PT



Physical exam: Signs of arthritis

Physical Exam: Be gentle!

- Exam the other extremity
- ALWAYS examine the hip with including an evaluation of internal rotation
 - Hip disorders can present with ipsilateral knee pain
- Have the patient walk
 - Gait pattern
 - Antalgic gait - painful, shortened stride
 - Varus or valgus thrust
 - Need for a gait aid

Physical Exam:

- Swelling/redness in the leg
- Evaluate for the presence of an effusion in the knee
- Active and Passive Range of Motion compared to other extremity
 - Assess for flexion contracture
 - Assess for extensor lag
- Palpate the area of interest
- Perform a ligament exam of the extremity
 - ACL, PCL, MCL, LCL



Imaging: Signs of arthritis

Radiographs: Standing AP Left Knee

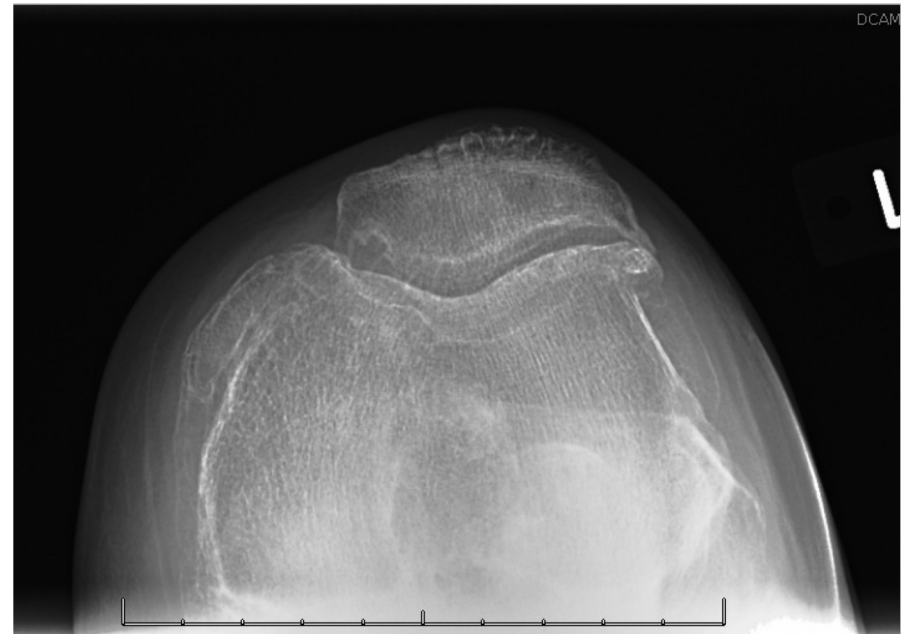
- Try to obtain standing films to assess joint when bearing weight.



Radiographs: Lateral Left Knee



Radiographs: Sunrise View Right Patellofemoral Joint



Radiographs: Long Leg Alignment

- Allows you to assess the weight bearing axis.
- If plumb line falls medial (varus alignment) or lateral (valgus alignment) to the joint it is pathologic.

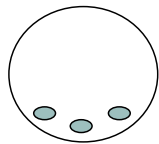
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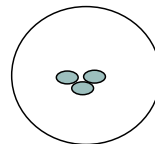


Radiographs:

- Weight bearing imaging will be listed on the film:
 - By saying, “Weight Bearing” on the film
 - With an arrow pointing up or proximal
 - With a marker that has three BBs.
 - The BBs fall to the bottom of the cup in weight bearing.



Weightbearing



Non-weightbearing



Diagnosis and Treatment

The plan

Treatment Options:

Non-operative

- NSAIDs
- Physical Therapy
- Ice
- Activity Modification
- Weight Loss
- Assist Devices

Operative

- Arthroscopy for mechanically symptomatic meniscus tear
- Osteotomy
- Fusion
- Partial Arthroplasty
- Total Arthroplasty

Non-Operative Treatment:

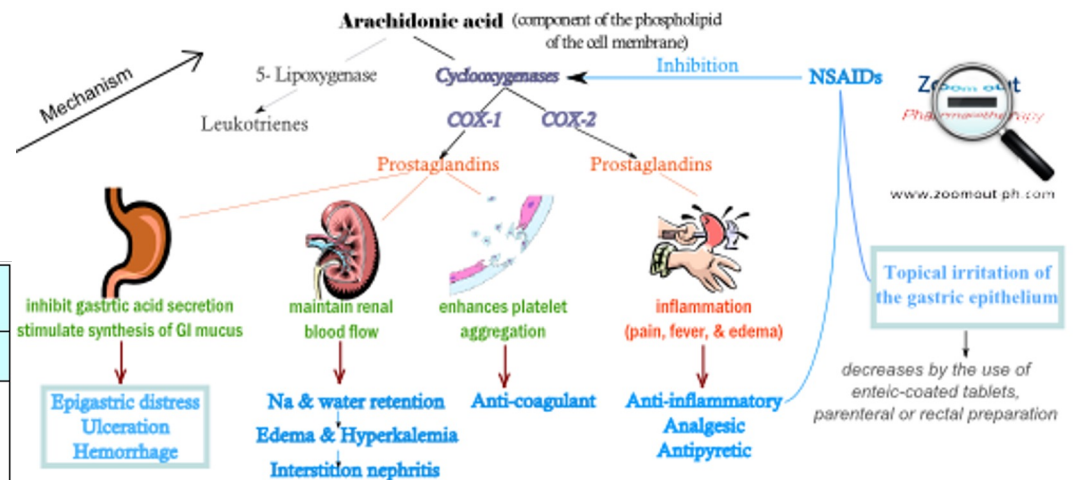
- NSAIDs
 - COX 1 vs. COX 2
 - Can irritate the stomach
 - Cannot give with renal disease.

Non-steroidal Anti-inflammatory Drugs (NSAIDs)	
Generic	Brand name
Aspirin*	Ascriptin, Bayer, Ecotrin
Celecoxib	Celebrex
Diclofenac	Cambia, Cataflam, Volateren, Zipson, Zorvolex
Ibuprofen*	Advil, Motrin
Indomethacin	Indocin, Tivorbex
Meloxicam	Mobic, Vivlodex
Naproxen*	Aleve, Anaprox, Naprelan, Naprosyn
Oxaprozin	Daypro
Piroxicam	Feldene

* available over the counter

Figure 1: Common oral NSAIDs

Non-steroidal Anti-inflammatory Drugs - Mechanism of Action



Socratic. (2016). Is Tramadol a non-steroidal anti-inflammatory drug?. Referenced from: <https://socratic.org/questions/is-tramadol-a-nonsteroidal-anti-inflammatory-drug>.

Non-Operative Treatment:

- Physical Therapy:
 - ROM
 - Quad Strength (VMO)
 - Gait Training
 - Balance



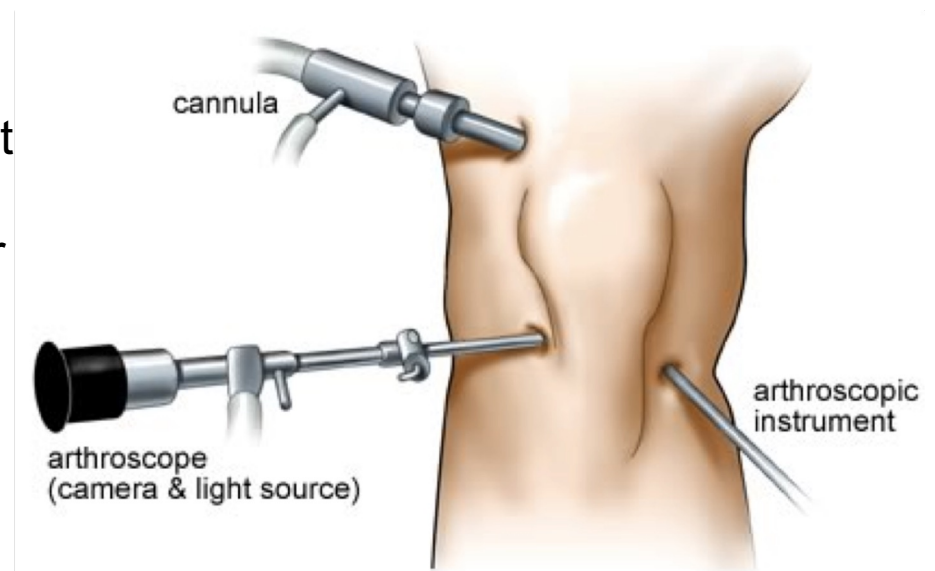
Non-Operative Treatment:

- Use a Gait Aid: Opposite hand for a Cane!



Operative Options: Knee

- Arthroscopy:
 - Little value for Arthritis treatment
 - Only indicated for mechanical symptoms from a meniscus tear or loose body
 - Locking
 - Catching



Operative Options: Fusion

- Bone grows together
- Eases pain in the joint
- Functionally limiting
- Alternative to amputation in infection cases
- Can cause pain in other joints in ipsilateral extremity

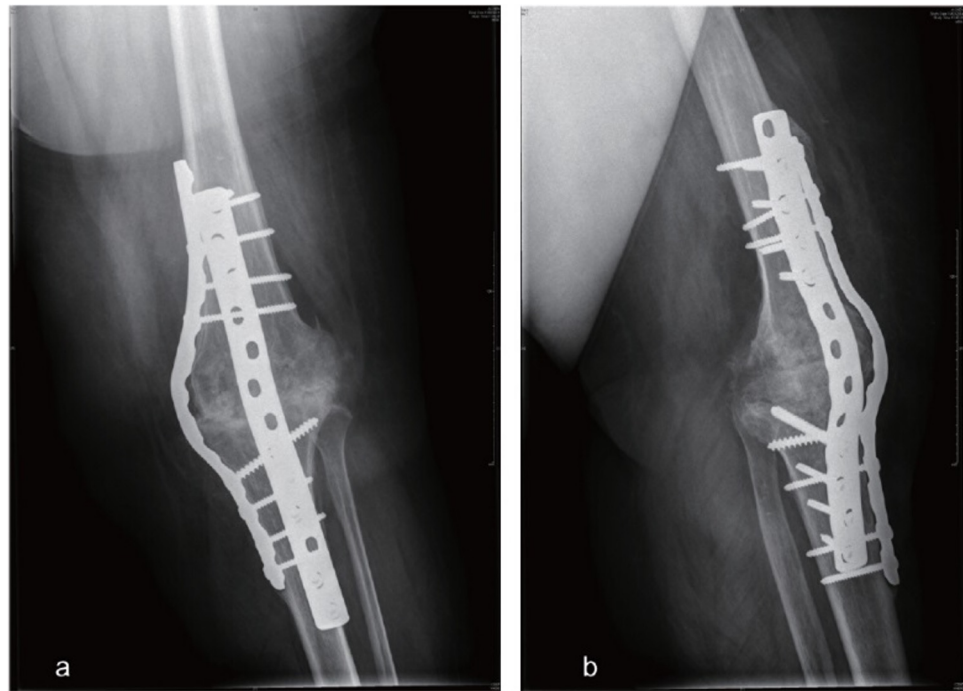
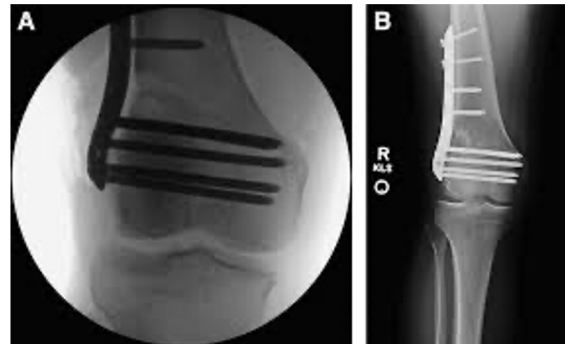


Figure 5 Knee fusion with compression plate technique after failed TKA.

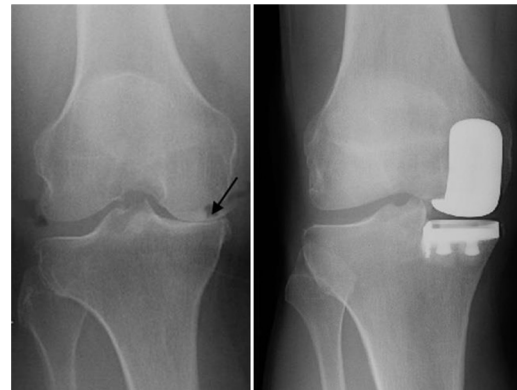
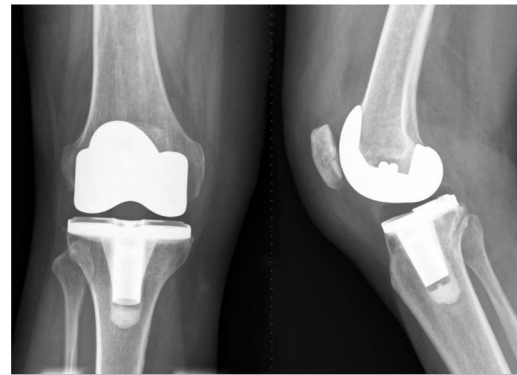
Operative Options: Knee

- Osteotomy:
 - Reserved for younger, active patients
 - Often a stepping-stone to joint replacement
- Distal Femoral:
 - Varus Producing
 - Offloads Lateral Knee
- High Tibial:
 - Valgus Producing
 - Offloads Medial Knee



Operative Options: Knee

- Arthroplasty (uni vs total):
 - Procedure Selection
 - Location of pain
 - Location of damage (XR)
 - Patient expectations
 - Patient Selection
 - Overall health status
 - DM – want good glycemic control
 - BMI – caution with morbidly obese as risk of complications increases



Summary

- Variety of types of arthritis: osteoarthritis, post-traumatic, inflammatory
- Understand the key points to a good history and physical
- Radiographs are your best imaging test – should be weight bearing
- Treatment ranges from nonsurgical treatments to surgical treatments including joint replacement

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