

Minimally Invasive Hip and Knee Replacement in the Active Patient

Updates and Emerging Technologies in Diagnosis, Treatment, and Outcomes

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Agenda

- Introduction
- Hip and Knee Arthritis
 - Causes
 - Diagnosis
 - Treatment modalities (conservative to surgical)
- Outcomes
 - Non-Surgical
 - Surgical
- Summary
 - Questions, Discussion, and Answers

My Background

- Pre-orthopaedics:
 - Born in St. Paul, MN
 - Moved to Oak Park, IL at age 2
 - Graduate of Oak Park and River Forest High School
- Hobbies/Activities:
 - Aviation (FAA private pilot)
 - Athletics
 - Family
 - Orthopaedic research/Resident teaching
 - Co-Director NorthShore OPD Orthopaedic Clinic

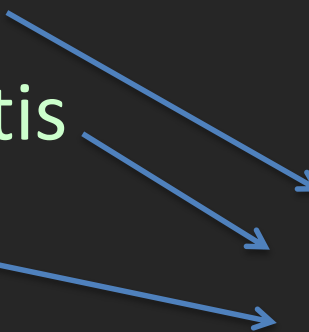
My Background

- Education/Training:
 - Undergraduate Degree (4 years):
 - University of Illinois at Urbana-Champaign
 - Medical School (4 years)
 - University of Pennsylvania School of Medicine – Philadelphia, PA
 - Residency (5 years)
 - Washington University in St. Louis
 - Sub-Specialty Fellowship (optional – 1 year)
 - Hip and Knee Reconstruction – Harris Hip and Knee Fellowship
Harvard Medical School, Massachusetts General Hospital – Boston, MA
- Research interests
 - THA and TKA in young active patients
 - Minimally invasive techniques
 - High performance THA and TKA

Current Practice – Adult Hip and Knee Reconstruction,
NorthShore University Health System

Most Common Types of Arthritis

- Osteoarthritis
- Rheumatoid Arthritis
- Post-traumatic Arthritis
- Avascular Necrosis



More common than OA in younger, active patients

Rheumatoid Arthritis, Post-traumatic Arthritis, Avascular Necrosis

- Rheumatoid Arthritis
Membranes or tissues lining the joint become inflamed
- Post-traumatic Arthritis
Irregularities lead to more wear on the joint
- Avascular Necrosis
Bone may collapse and damage the cartilage

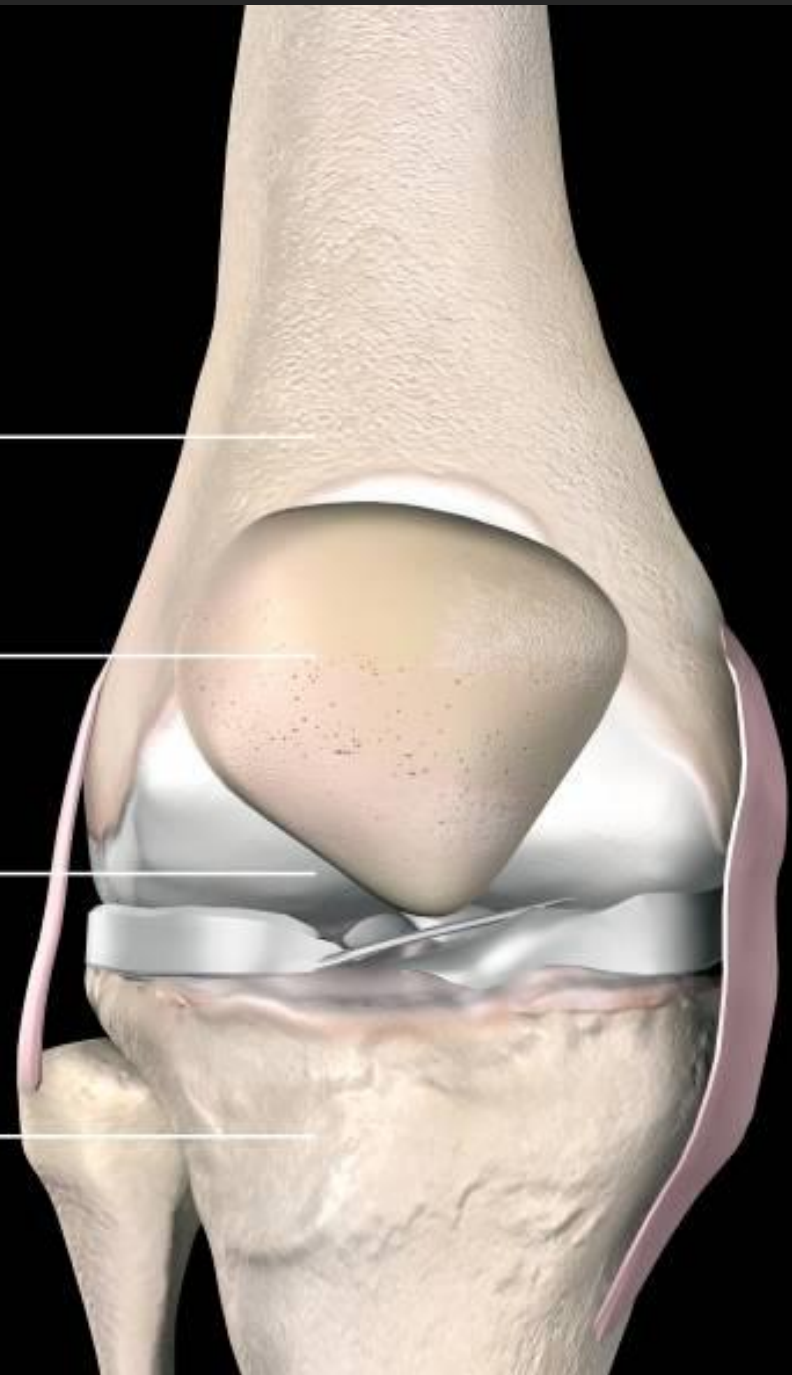
A Normal Knee

Femur (thigh bone)

Patella

Healthy Cartilage

Tibia (shin bone)

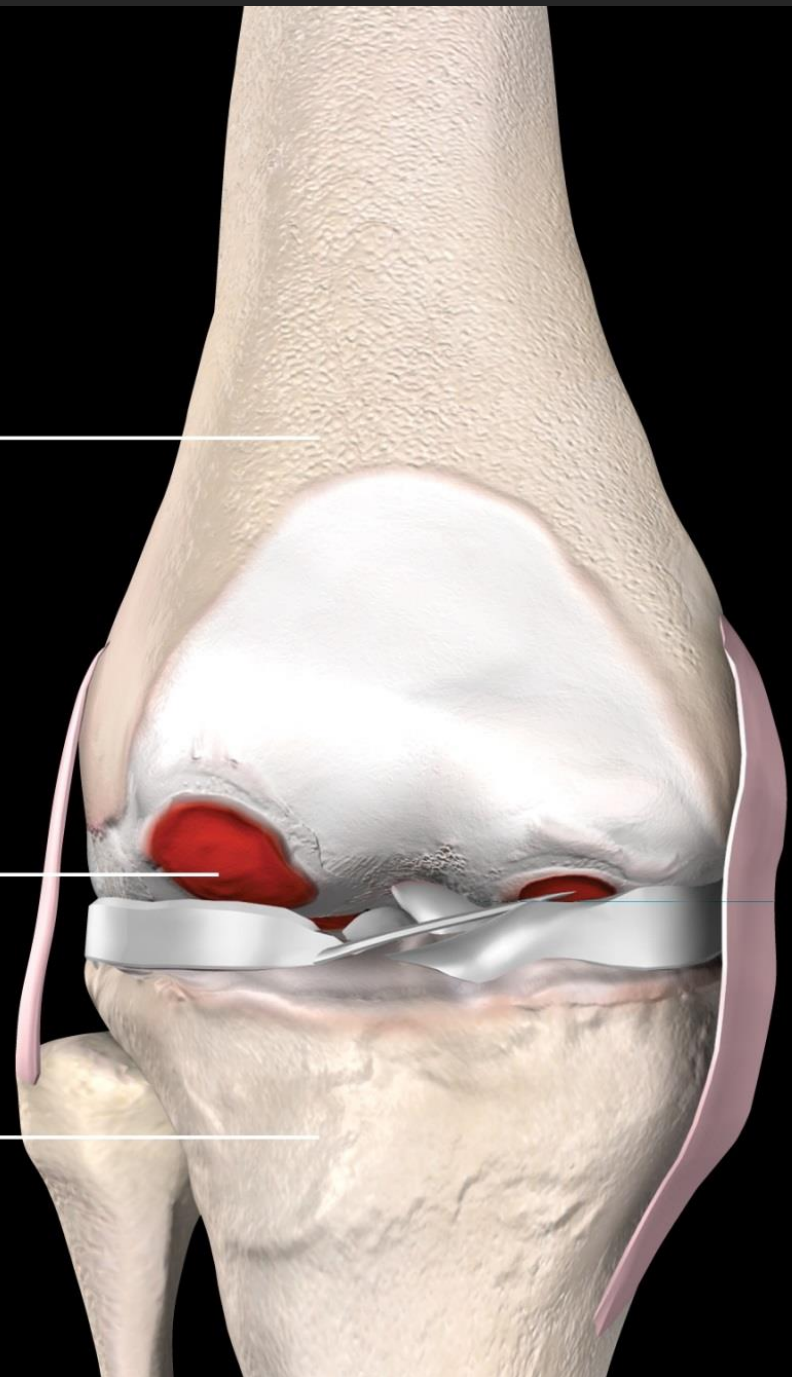


An Arthritic Knee

Femur (thigh bone)

Diseased Cartilage

Tibia (shin bone)



Normal Knee X-ray



Arthritic Knee X-ray

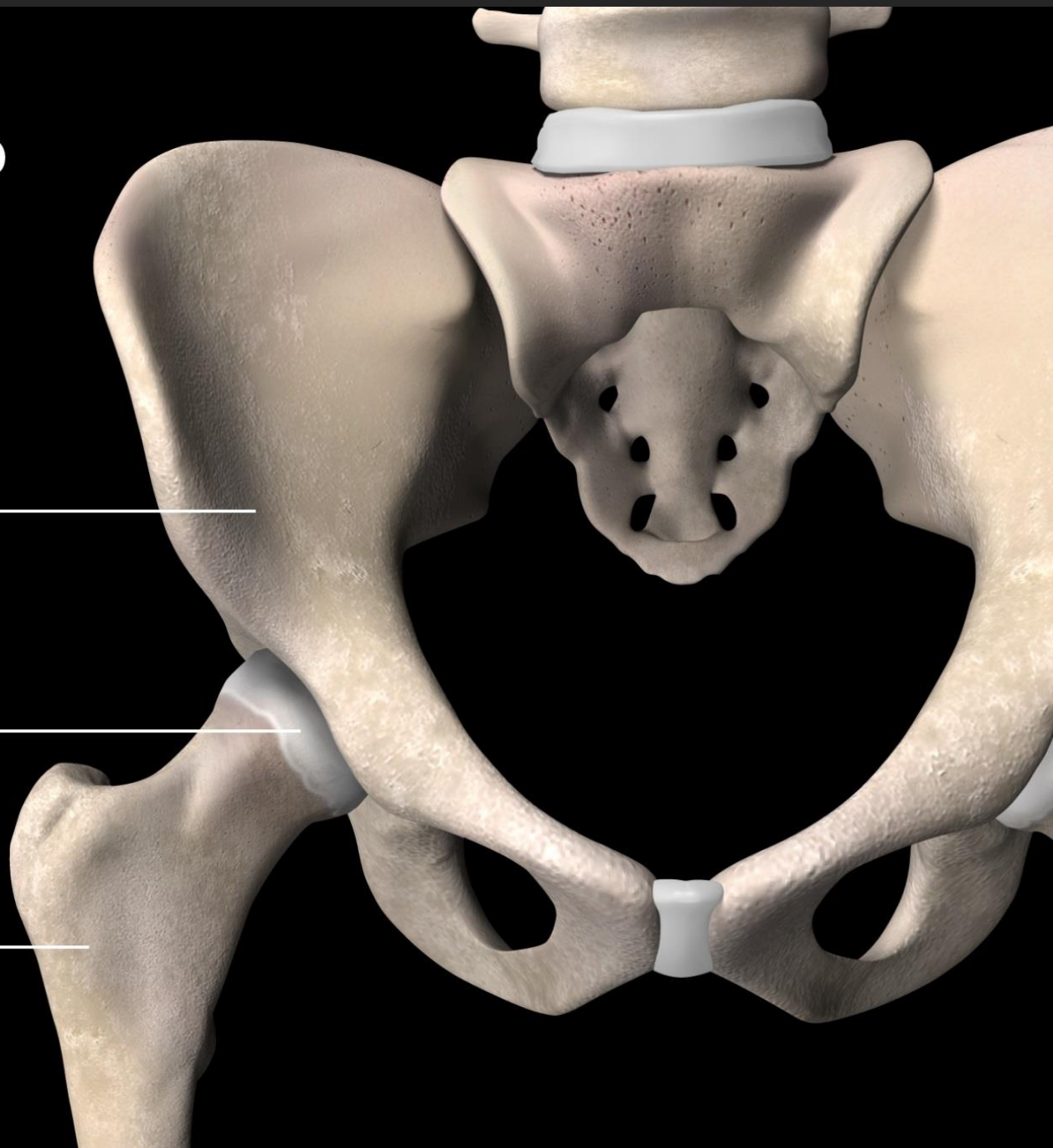


A Normal Hip

Pelvic Bone

**Healthy
Cartilage**

**Femur
(thigh bone)**

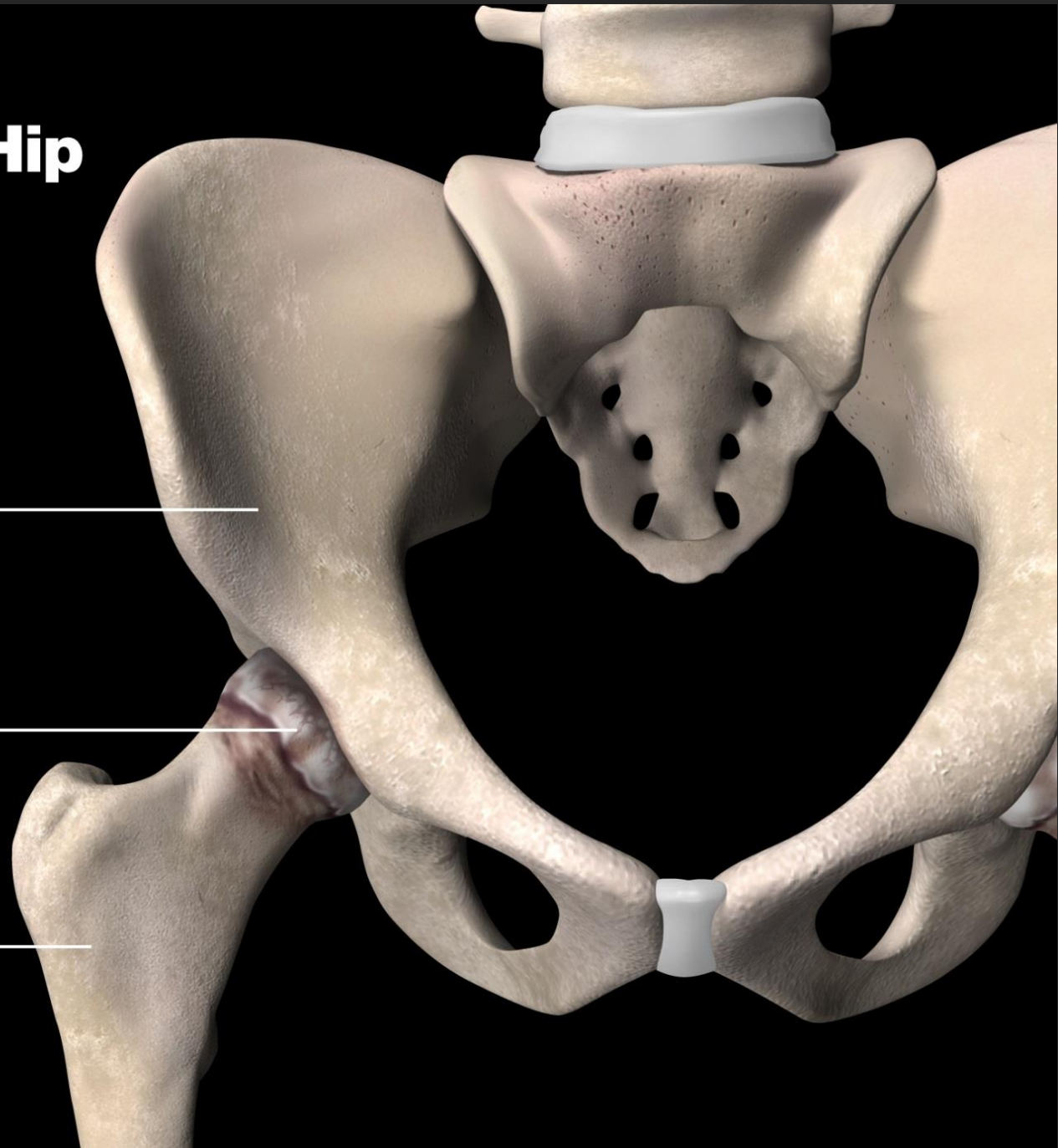


An Arthritic Hip

Pelvic Bone

**Diseased
Cartilage**

**Femur
(thigh bone)**



Normal Hip X-ray



Arthritic Hip X-ray



Treatment Options

- Medication
- Physical therapy
- Injections
- Surgery
 - Partial joint replacement
 - Total joint replacement

Medications

- Aspirin-free pain relievers—acetaminophen
- Nonsteroidal anti-inflammatories (NSAIDs)
- Supplements/Glucosamine?

Physical Therapy

- Passive range-of-motion exercises may help:
 - Reduce stiffness
 - Keep joints flexible
- Isometric (“pushing”) exercises help build muscle strength
- Isotonic exercises (“pulling”) further increase muscle strength and preserve function
- Daily walking, using a cane or other assistive device

Injections

For patients whose joint pain does not improve with medication or physical therapy, injections may provide temporary relief.

- **Corticosteroids (aka cortisone, or steroid shots)**
 - Quick, effective pain relief
 - Only use a few times a year; they can weaken bone and cartilage
- **Viscosupplementation (aka “gel” or “cushioning” shots)**
 - Made from the comb of a rooster
 - Usually 3-5 shot series
 - Rare flare reaction
- **Stem Cells/Regenerative???**

Injections provide temporary relief – length of effect is variable

When conservative measures are no longer effective, and pain/stiffness start to affect quality of life, it may be time to discuss surgical options.

Joint Replacement

- Joint replacement is a decision that should include:
 - Patient
 - Family
 - Primary care provider
 - Orthopaedic surgeon

Partial Joint Replacement (knees)

- Partial joint replacement is a surgical procedure in which only the damaged or diseased surfaces of the joint are replaced, leaving much of the natural bone and soft tissue in place.
 - Post-operative pain may be reduced
 - Recovery period may be shorter than total knee replacement

Total Joint Replacement

- Total joint replacement is a surgical procedure in which certain parts of an arthritic or damaged joint are removed and replaced with a plastic or metal device or an artificial joint.
- The artificial joint is designed to move just like a healthy joint.

Joint Replacement

- Joint replacement is a treatment option when pain:
 - Is severe
 - Interferes with daily activities
 - Interferes with work

Did you know?

- Total joint replacements of the hip and knee have been performed since the 1960s. Today, these procedures have been found to result in **significant restoration of function and reduction of pain in 90% to 95% of patients.**



Joint Surgery

- May be suitable for patients who:
 - Have a painful, disabling joint disease of the joint resulting from a severe form of arthritis
 - Are not likely to achieve satisfactory results from less invasive procedures, medication, physical therapy, or joint injections

Total Joint Replacement

– Goals of total joint replacement are to help:

- Relieve pain
- Restore motion



Did you know?

- More than 300,000 knee replacements are performed each year in the US.¹
- More than 300,000 hip replacements are performed in the United States each year.²
- Both going up fast!

Emerging expectations with THA and TKA

- “quick” recovery/rehab
- “small” incision
- Return to higher level of activity sooner

As THA/TKA has become more “routine” advancing patient expectations have resulted in innovation, but must keep in mind initial goals

Minimally Invasive THA and TKA

- Advances in technique, instrumentation, and implants have allowed for THA/TKA to be done through smaller incisions with less soft tissue disruption, and with potential advantages in rehabilitation and return to function

Minimally Invasive THA and TKA

- However, certain “keystone” points must be kept in mind:
 - Need to see enough for accurate component placement
 - Need to critically examine the clinical outcome advantages of MIS vs standard approaches

Goal is for a better operation that results in improved outcomes without increased complications in the APPROPRIATE candidate

Minimally Invasive THA and TKA

- Contraindications to MIS include:
 - Complex deformity
 - Revisions
 - Increased BMI

Remember – MIS is a philosophy of minimal damage to soft tissues to achieve appropriate component positioning – so techniques and principles can still be utilized in these patients

MIS THA

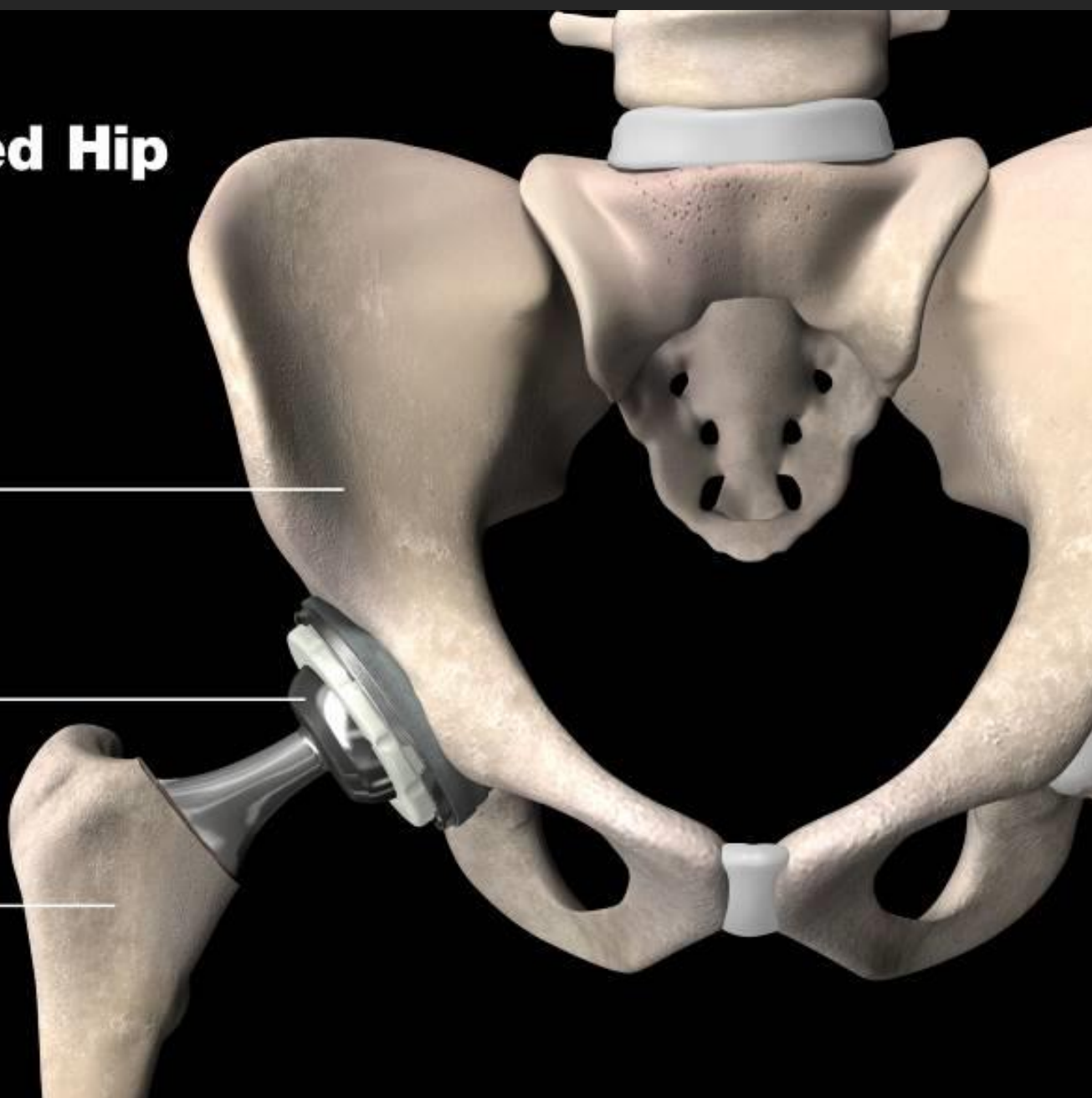
- Numerous THA approaches
 - Posterolateral
 - Anterolateral
 - Direct lateral
 - Direct anterior
- “MIS” portion of the surgery more dependent on technique (muscle sparing) than approach only

A Replaced Hip

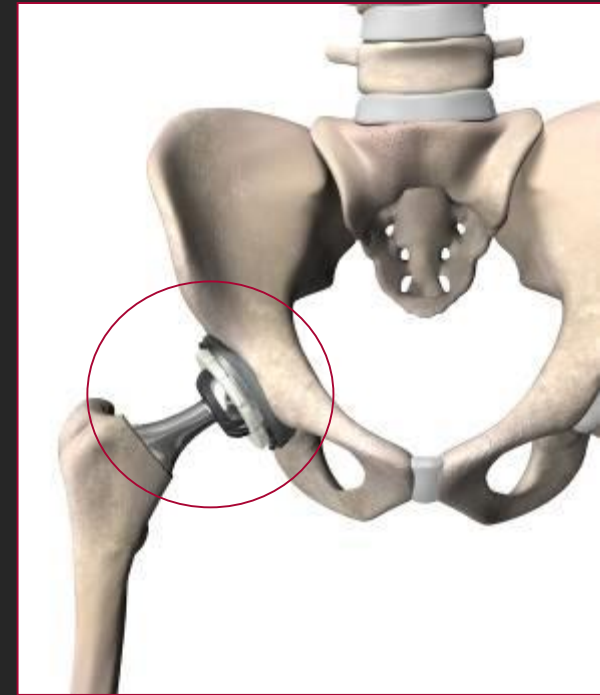
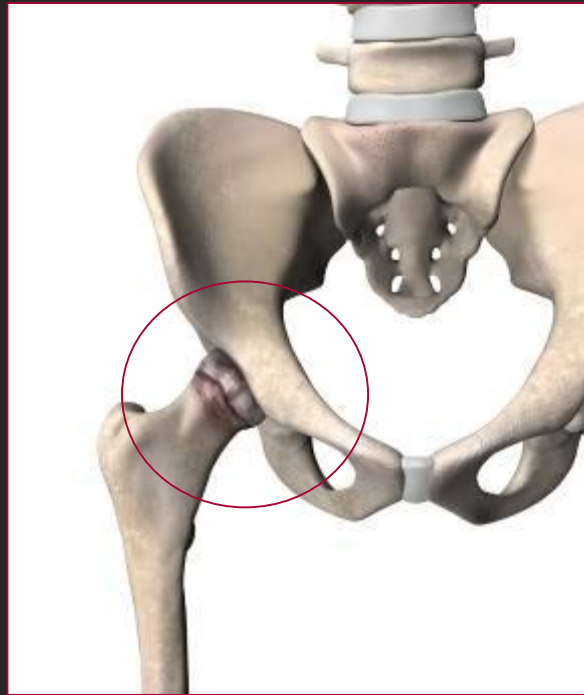
Pelvic Bone

**Artificial Hip
Implant**

**Femur
(thigh bone)**



Total Hip Replacement



Normal Hip X-ray



Arthritic Hip X-ray



Replaced Hip X-ray

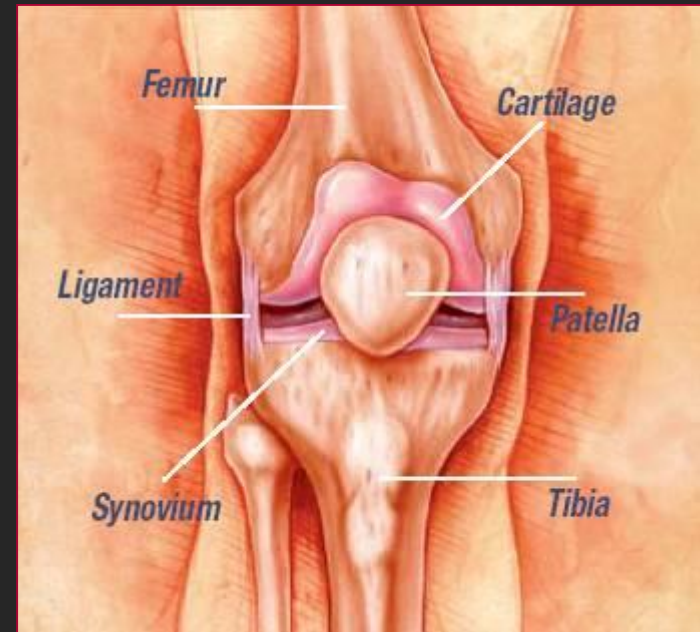


Bearing Surfaces/Improved Materials

- Metal on Metal
 - Soft tissue risks
- Ceramic on Ceramic
 - Fracture risks
 - Squeaking
- Metal or Ceramic on Polyethylene
 - Favorable wear characteristics
 - UHMWPE improved over prior generation

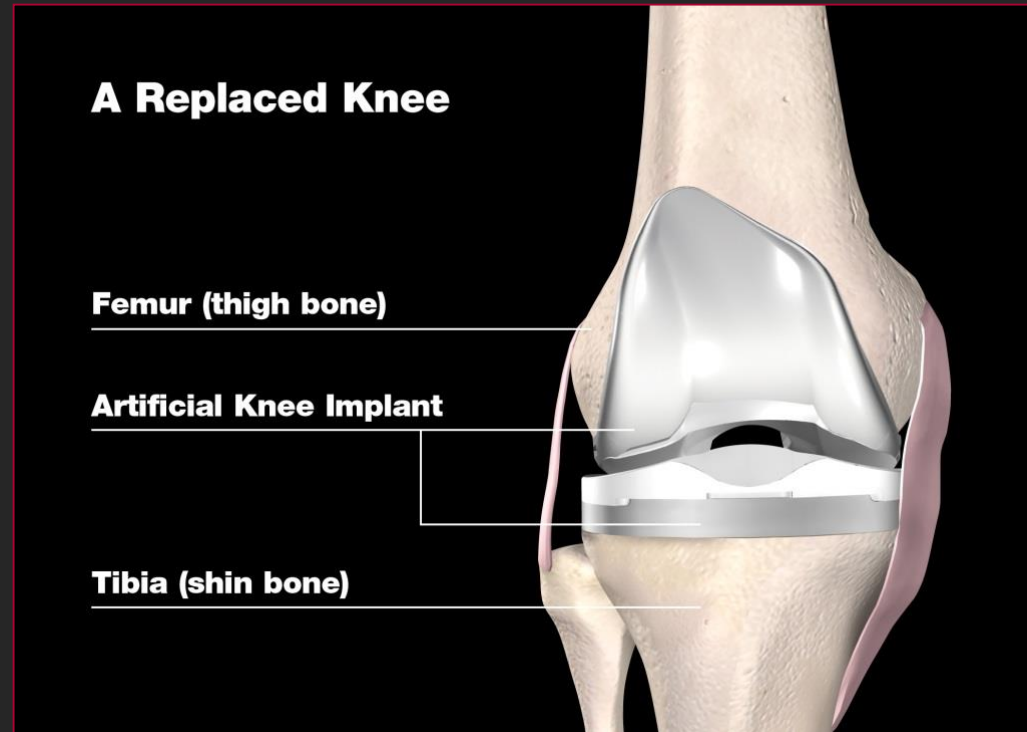
Your Knee Joint

- Femur – thigh bone
- Cartilage – tissue between bones that provides cushioning
- Patella – knee cap
- Tibia – shin bone
- Synovium – tissue that provides lubricating fluid to joint
- Ligament – flexible tissue that holds knee joint together



Total Knee Joint Replacement

- End surface of femur replaced with metal
- End surface of tibia replaced with metal
- Plastic liner is inserted between femur and tibia
- Patella is resurfaced with plastic

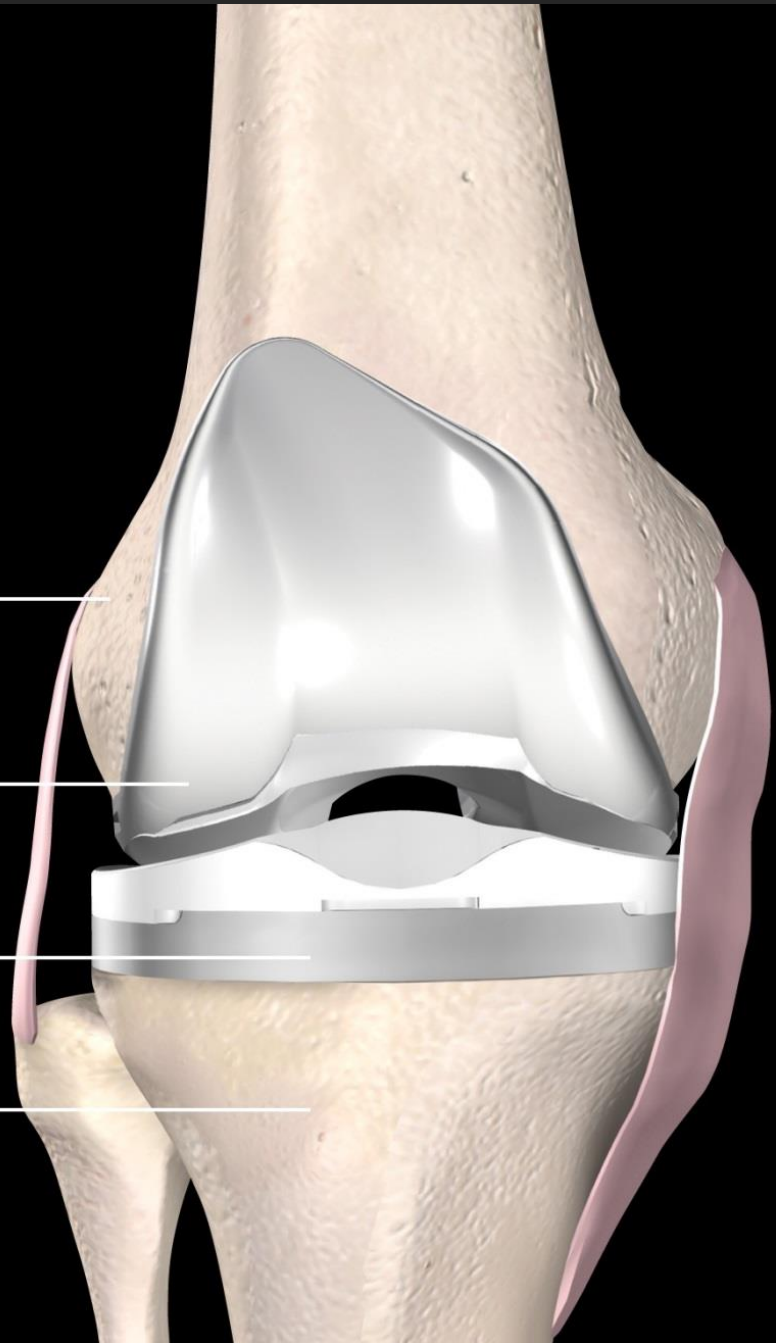


A Replaced Knee

Femur (thigh bone)

Artificial Knee Implant

Tibia (shin bone)



Total Knee Replacement



Normal Knee X-ray



Arthritic Knee X-ray



Replaced Knee X-ray

Anterior (front) View



Lateral (side) View



REMEMBER - Goals of THA and TKA

- Pain Relief
- Increased Mobility
- Return to ADLs
- Safe, reproducible, reliable surgery
- New technologies/innovations continue to emerge, and allow faster recovery, and higher levels of activity post-op

Thank You

Questions?