Orthopedics & Sports Medicine

Evaluation of the Painful Total Hip Arthroplasty

R. Michael Meneghini, MD

Associate Professor of Orthopaedic Surgery

Indiana University School of Medicine

Disclosures

- **Consulting Payments/Royalties**
  - DJO
  - Osteoremedies
  - PixarBio
  - Stryker (past 12 months)
- **Ownership Shares**
  - IU Health Saxony ASC
- **Research Support**
  - NIH R15
  - IU School of Medicine Foundation
- **Fellowship Funding**
  - OMEGA
- **Editorial Boards**
  - Journal of Arthroplasty

Total Hip Arthroplasty

Lancet 2007 "The Operation of the century: Total Hip Replacement"

- Very reliable in reducing / eliminating pain
- Rarely are patients not satisfied

Pain following THA

- Frustrating for the patient and doctor.
- Long list of possible causes
- Approach systematically
- Do not revise without knowing etiology

Painful THR: Differential Diagnosis

Intrinsic Etiology:

- Loosening
- Infection
- Instability
- Impingement
- Particulate Synovitis
- Poly Wear
- Metal Hypersensitivity
- Modulus mismatch

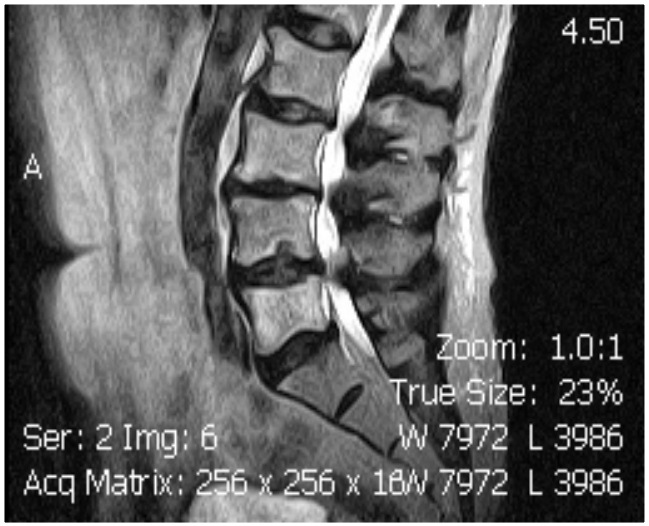
Extrinsic (local):

- Bursitis
- Tendonitis
- Heterotopic Ossification
- Abductor Avulsion
- Stress Fracture

Painful THR: Differential Diagnosis

Extrinsic: Remote

- Spinal Pathology
- Nerve Palsy / Neuropathy
- Nerve Entrapment

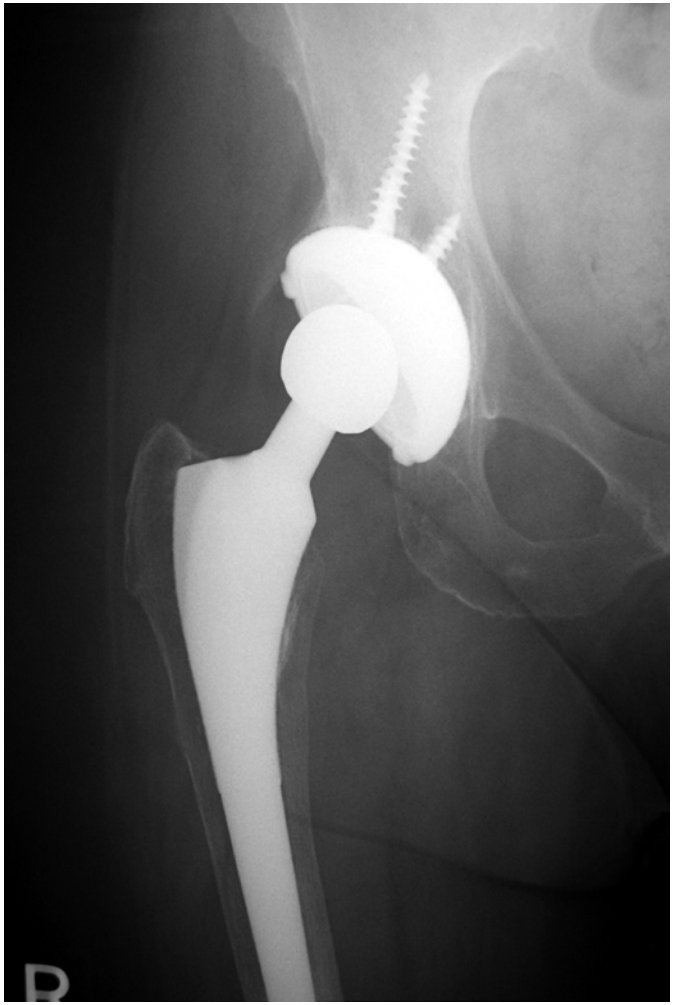


Vascular Disease

- Claudication
- Osteitis Pubis / pubic symphysitis
- Hernia
- Intra-abdominal pathology
- Tumor

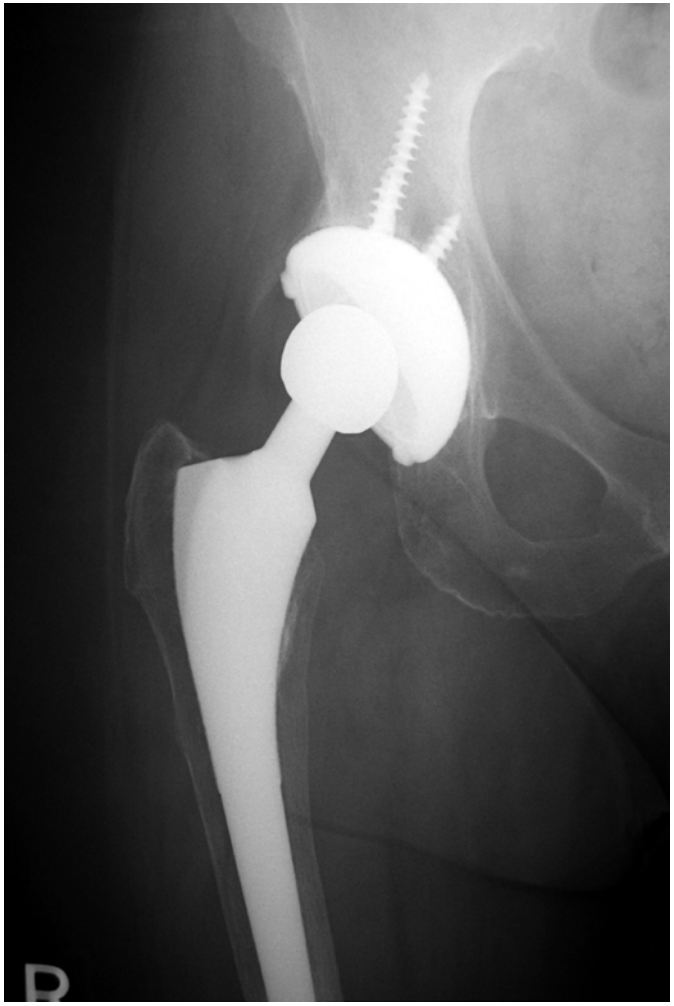
History

- Indications – “Why did you have your hip replaced”
- “What was done prior to surgery”
- “Who did your surgery”
  - Surgical Approach
- Wound Drainage
- Antibiotics
- Recent Infections
- Past Medical History:
  - Medications
  - Chronic disease (Diabetes, RA)



History

- When Did you begin having Symptoms?
  - Early postoperative
    - Acute infection
    - Heterotopic bone
    - Early instability
    - Initial misdiagnosis

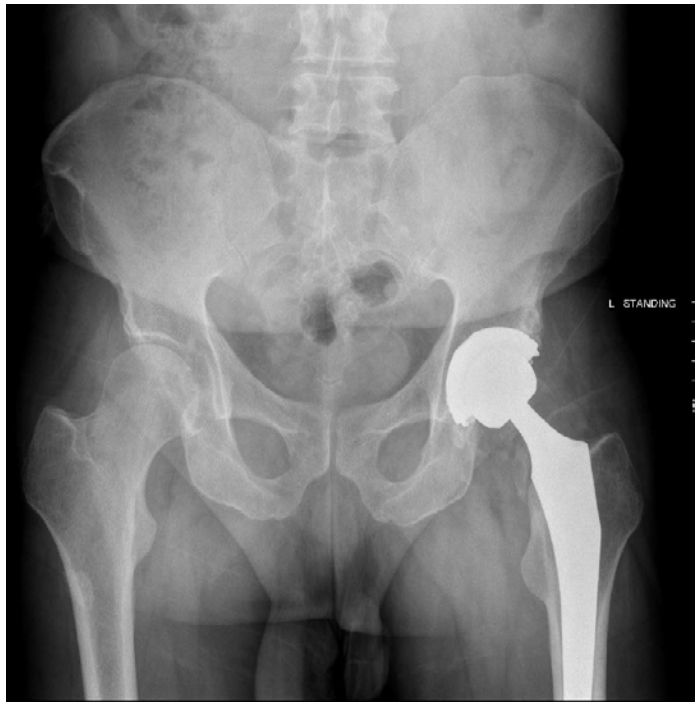


History

- When Did you begin having Symptoms?
  - Late
    - Component loosening
    - Late or chronic infection
    - Bursitis/tendinitis
    - Stress fracture
    - Particulate synovitis

History

- Location
  - Groin
    - Acetabular loosening
    - Iliopsoas
  - Buttock
    - Sacroiliitis or referred LBP
  - Thigh
    - Femoral loosening
    - Modulus mismatch
  - Knee
    - Femoral loosening
  - Lateral thigh
    - Tendinitis or bursitis

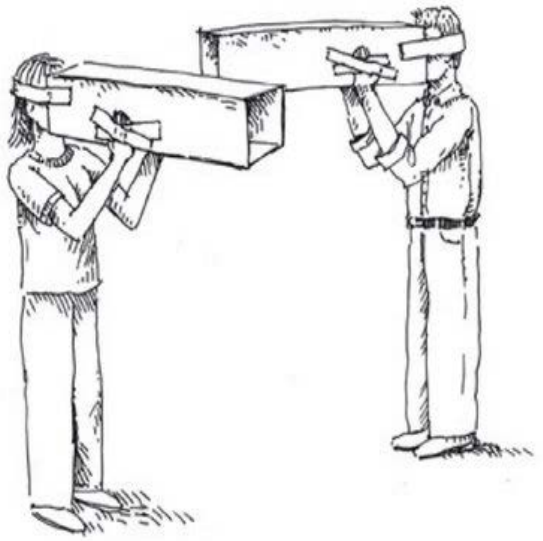


History

- Character
  - Activity related?
  - “Start-up”
  - During “at risk” positions
  - Rest?
  - Night?
  - Snapping?
  - Same as prior to THA?

Painful THR - Examination

- Gait
- Spine
- Hip
- Neurologic
- Vascular
- Abdomen / groin



Avoid Preconceived Diagnosis

Physical Examination

- Gait
  - Trendelenberg sign = weakness
  - Antalgia = pain
- Strength
  - Abductors
  - Hip Flexors
  - Knee Extension

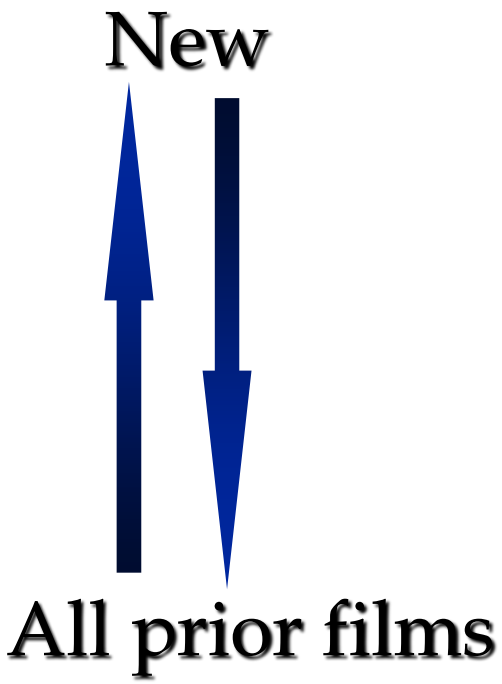
Physical Examination

- Hip
  - Palpation
    - Bursitis
    - Sacroiliitis
    - Specific muscle groups
    - Fascial defects
  - Stinchfield test
    - » Intraarticular pathology
  - Pain with ROM
    - » Any motion…?infection, synovitis
    - » Extremes…?loosening
  - Snapping, crepitation

Physical Examination

- Spine
  - Root tension signs
  - Complete neurologic exam
    - Foot Drop
  - Pain with hyperextension
- Vascular
- Abdomen/groin
  - Hernia
  - Aneurysm
  - Visceral etiology

Painful THR: Radiographs



- Component Position Change
- Cement Fracture
- Prosthesis Fracture
- Progressive Radiolucencies
- Polyethylene Wear
- Periosteal Lamination
- Endosteal Scalloping
- Localized Osteolysis

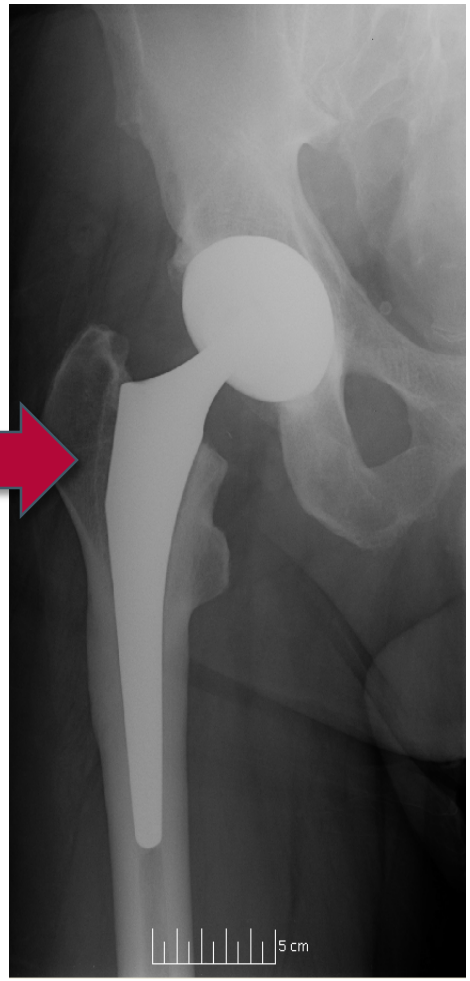
Painful THR: Radiographs

Serial radiographs are the most effective method of detecting component loosening

Attempt to obtain preoperative and initial postoperative radiographs

Painful THR: Radiographs

Significance ??



Painful THR: Radiographs

Cementless Acetabular Loosening

- Radiographic Loosening Criteria
  - Radiolucent lines >1mm that initially appeared after two years
  - Progression of radiolucent lines after two years
  - Radiolucent lines in all three zones
  - Radiolucent lines 2 mm or wider in any zone
  - Migration

94% Sensitivity, 100% Specificity

Udomkiat P, Wan Z, Dorr LD . J Bone Joint Surg Am Dec 2001

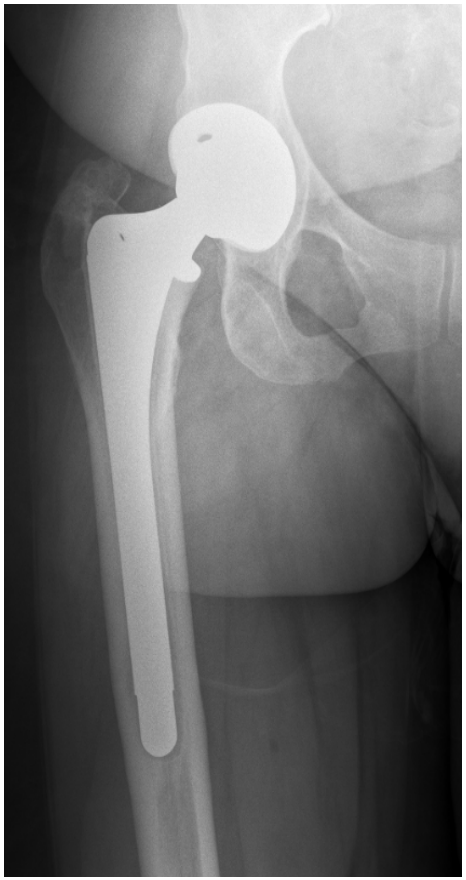
Cemented Stem Loosening

- Definite Loosening
  - Subsidence
  - Fracture of Stem
  - Cement Mantle Fracture
  - Continuous RLL cement/stem

Harris WH, McGann WA. JBJS 1986;68A:1064-1066

Uncemented Stem Loosening

- **Uncemented Stems**
  - Complete RLL over the ***coated*** part of stem
  - Subsidence
  - Position change
  - Abnormal bone remodeling

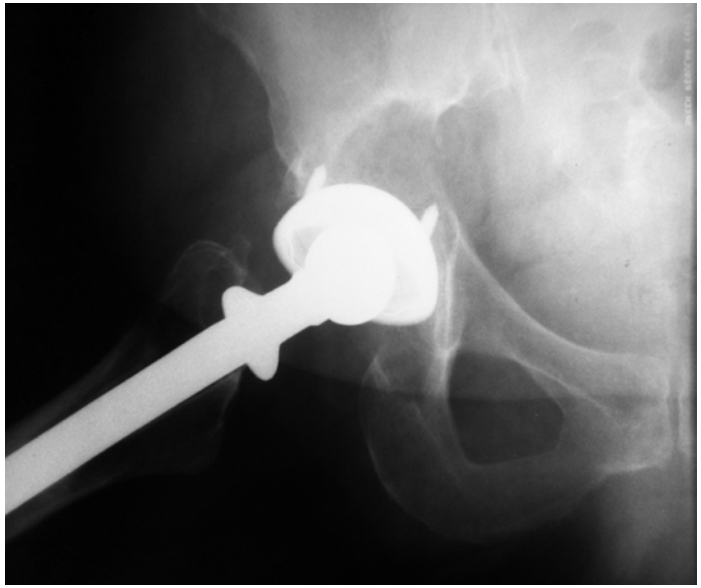


Painful Total Hip Replacement

- **Osteolysis**
  - Most osteolysis in absence of loosening is asymptomatic
  - Stress fracture of Greater Trochanter or Acetabulum

Painful Total Hip Replacement

- Particulate debris
  - Particulate debris synovitis:
    - Joint, psoas sheath
  - Lysis related stress fractures
    - acetabulum
    - greater trochanter
    - lesser trochanter
  - Metal Hypersensitivity
    - MoM Bearing / Trunionosis

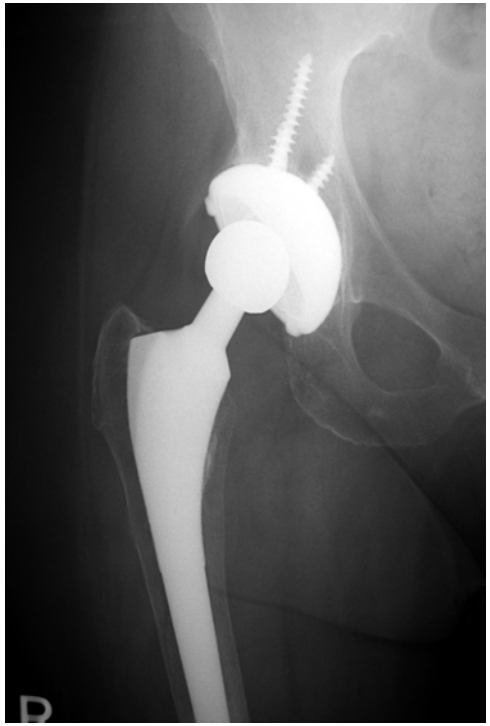


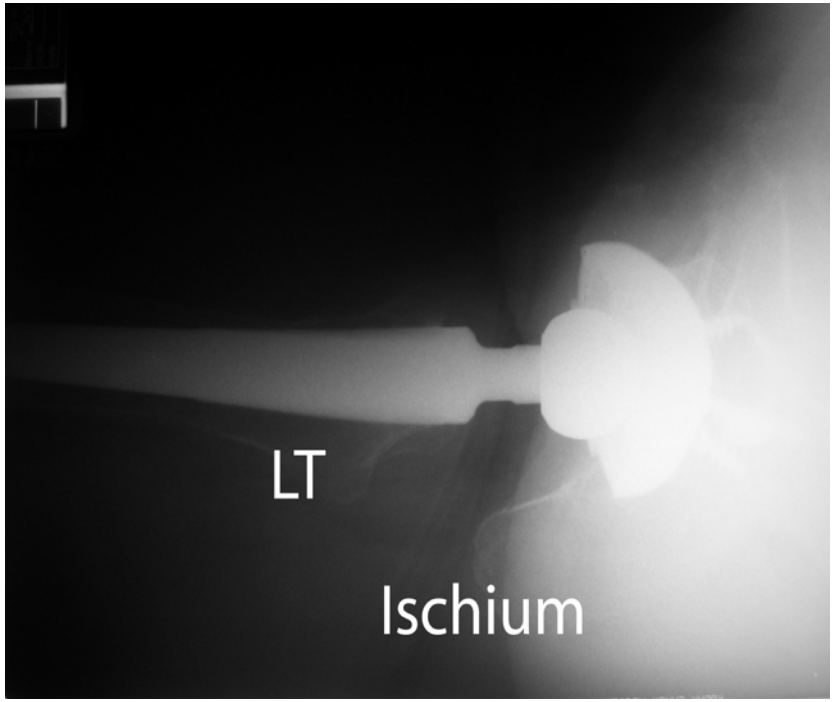
Painful Total Hip Replacement

- Psoas Impingement
  - Acetabular component with anterior or inferior acetabular component prominence
  - usually cup is under anteverted and lateralized
  - Component may appear oversized relative to native acetabulum

Painful Total Hip Replacement

- Psoas Impingement





Laboratory Tests

- History and Physical should provide a differential diagnosis
- Avoid Ordering Unnecessary tests

Painful THR - Infection

- Always suspect infection
- Must always be excluded
  - Delayed wound healing /drainage
  - UTI, URI, etc.
  - Superficial or deep infection immediately post-op
  - Healed or draining sinuses
  - High risk patients

Laboratory Tests: ESR/CRP

- Excellent screening tool
- High sensitivity
  - Rarely normal in the face of infection
    - *Schinsky, Della Valle et. Al, JBJS 2008*
      - 235 consecutive revision THA's
      - No infections found in pts with nl ESR/CRP
    - *Spanghel et. Al, JBJS 1999*
      - 202 consecutive revision THA's
      - No infections found in pts with nl ESR/CRP
- Obtain prior to every revision TJA!

Laboratory Tests: Aspiration

- Consider if ESR/CRP elevated and history is suspicious
- Problem with high rate of false positives
- Must be off of abx for at least 2 weeks prior to aspiration

Aspiration Cell Count

Perioperative Testing for Joint Infection in Patients Undergoing Revision Total Hip Arthroplasty

By Mark F. Schinsky, MD, Craig J. Della Valle, MD, Scott M. Sporer, MD, and Wayne G. Paprosky, MD

Investigation performed at Midwest Orthopaedics at Rush, Rush University Medical Center, and Central DuPage Hospital, Chicago, Illinois

- When used ALONE optimal cut-off 4,200
- Better used in COMBINATION with ESR/CRP
  - ESR/CRP both ⇑ optimal cut-off 3,000
  - ESR or CRP ⇑ optimal cut-off 9,000

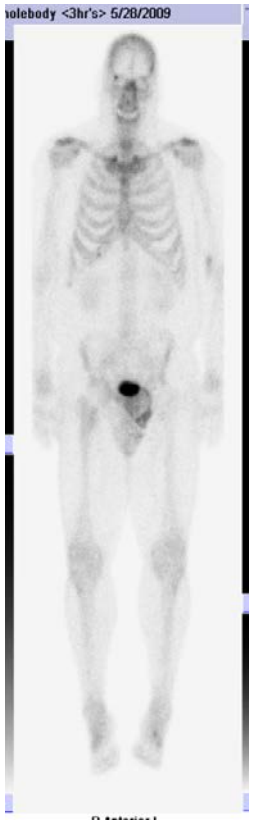
Painful Total Hip Replacement

- Now what???
  - Solidly fixed implants on radiographs
  - Pain
  - Infection excluded

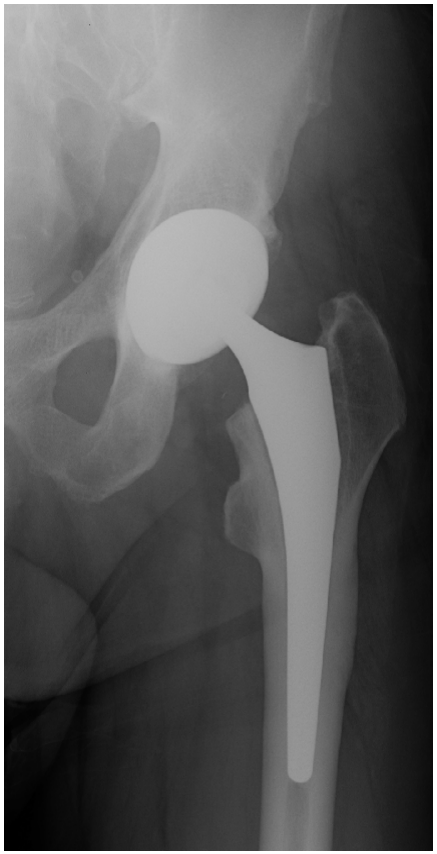
Painful Total Hip Replacement

- Bone Scan - Tc-MDP
  - Sensitive
  - Not specific – false positives
  - Stress Fracture, Sacroiliitis, loosening etc.

Painful Total Hip Replacement



Well Fixed



Aseptic Loosening

Differential Marcaine Injection

- Extrinsic *vs.* intrinsic pain
- Valuable if pain relief obtained
  - Location
  - Quantification
- Absence of pain relief does not rule out loosening

Painful Total Hip Replacement

- End of Stem Pain
  - Activity Related
  - Generally within first 12 months
  - Large stem sizes
  - ? stiffness mismatch
  - Typically uncemented stems

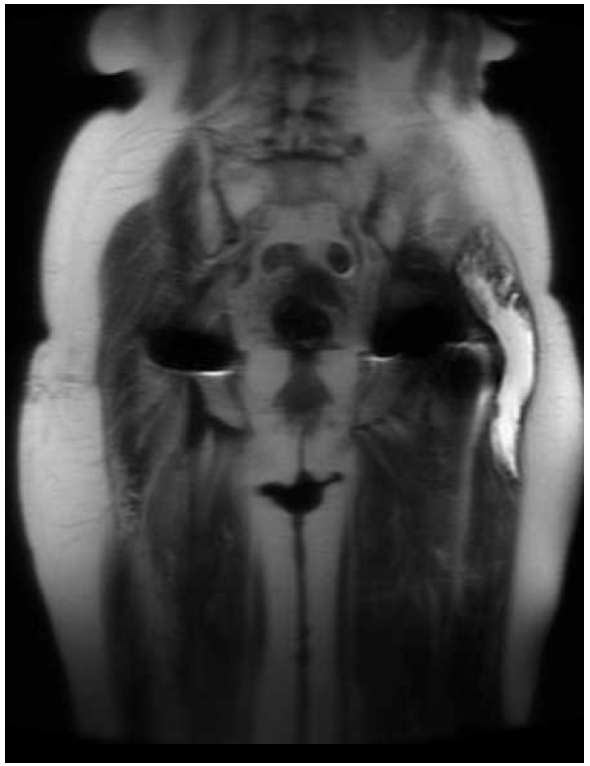
- Modulus of Elasticity Mismatch
  - 297 patients
  - trend toward thigh pain with larger implant sizes
  - Usually diminishes
  - Vresilovic, 1992

Metal Hypersensitivity THA

- Red Flags:
  - New onset pain or weakness
  - Late dislocations
- "At Risk" Implants
  - MOM total Hips
  - Modular Necks
  - Large Diameter Heads
    - Can be ANY size metal head
  - "I can't find anything wrong"

Metal Hypersensitivity Workup

- Serum Metal Ions
  - Cobalt / Chromium
  - May be equally elevated in MoM bearings
  - Trunionosis Cobalt preferentially elevated
- Metal Artifact Reduction "MARS" MRI
- **Decision to Revise Multi-Foctorial**



Conclusions

- Invoke a Systematic Approach
  - Thorough History and Physical
  - Radiographic Evaluation
  - Laboratory and other studies
- Keep Differential in Mind
- Establish Etiology
- Do not be afraid to:
  - **Say No to Surgery and Observe**
  - **Seek a colleagues 2nd Opinion**
- Develop a clear surgical plan targeting etiology

Thank You