

VA/DoD Clinical Practice Guideline for Non-surgical Management of Knee and Hip Osteoarthritis

Toolkit

Diagnostic Imaging of Osteoarthritis Tutorial



Diagnostic Imaging of Osteoarthritis

X-Ray

Consider Radiographic Imaging to confirm diagnosis of OA and to rule out other diagnoses.

- History and examination alone are usually sufficient to give a working diagnosis of osteoarthritis (OA) in adults (age > 45 years).
- Radiographic findings in OA are often non-specific, may be absent in the early stages, and often correlate poorly with symptoms and disability.
- Note that the presence of typical radiographic changes of osteoarthritis does not exclude other diagnoses in patients with joint pain. X-rays, particularly of weight-bearing joints, can be used to exclude trauma.
- Although radiographs are not required to make a diagnosis of knee osteoarthritis, they can be used to confirm the diagnosis and to rule out fracture, osteonecrosis, malignancy, or other red flags.



Diagnostic Imaging of Osteoarthritis

- There is no evidence that routine plain radiography in patients with knee or hip pain is associated with a greater improvement in patient outcomes. In addition, exposure to unnecessary ionizing radiation should be avoided.
- Routine advanced imaging (computed tomography [CT] or magnetic resonance imaging [MRI]) is also not associated with improved patient outcomes and identifies many radiographic abnormalities that are poorly correlated with symptoms but could lead to additional, possibly unnecessary interventions.



Diagnostic Imaging of Osteoarthritis

Typical radiographic changes of OA include:

- (A) Narrowing of cartilage space
- (b) Marginal osteophyte formation
- (C) Subchondral sclerosis
- (d) Subchondral bone cysts
- (e) Joint subluxation



Diagnostic Imaging of Osteoarthritis

MRI

- Most knee/hip pain can be diagnosed by a focused history and physical examination. MRIs can show soft tissue and bone injuries that may not be visible on traditional x-ray.
- As a tool for routine diagnosis for OA, MRI is not recommended.
- An MRI may be considered in patients **without** radiographic evidence of osteoarthritis, especially in patients with an acute injury and normal radiographs. Meniscal tears are common in the setting of osteoarthritis; however, the osteoarthritis and not the meniscal tear is often the primary source of the pain.
- Magnetic resonance imaging may be considered for evaluating patients with persistent pain who are potential candidates for invasive interventions (surgery). Patients with OA who have concomitant signs and symptoms of loose body, meniscal pathology or an injury or incident with a sudden onset of pain and effusion, MRI may be indicated.



OA of the Knee

If radiographic imaging is considered in adults with non-traumatic **knee** pain, obtain the following weight bearing radiographs:

- 1.AP (Antero-Posterior) view
- 2.Knee view in 30 degrees of flexion (also known as a tunnel or Rosenberg view)
- 3.A lateral view
- 4.A Merchant view (also known as a Sunrise or Skyline view).

Weight bearing radiographs of the knee especially the Rosenberg view are the most sensitive for detecting early joint space narrowing.



OA of the Hip

In adults with non-traumatic **hip** or groin pain, obtain the following radiographs:

1. Weight bearing (standing) AP pelvis radiograph
2. Non-weight bearing frog lateral of the affected hip

Plain radiographs may be used to confirm the diagnosis and to rule out fracture, osteonecrosis, malignancy, (either primary or metastatic) or other red flags.



Osteoarthritis of the Knee

Normal Knee

- [AP view](#)
- [Lateral view](#)
- [Tunnel view](#)
- [Merchant View](#)

Mild-Moderate OA

- [AP view](#)
- [Lateral view](#)
- [Tunnel view](#)
- [Merchant View](#)

Moderate -Severe OA

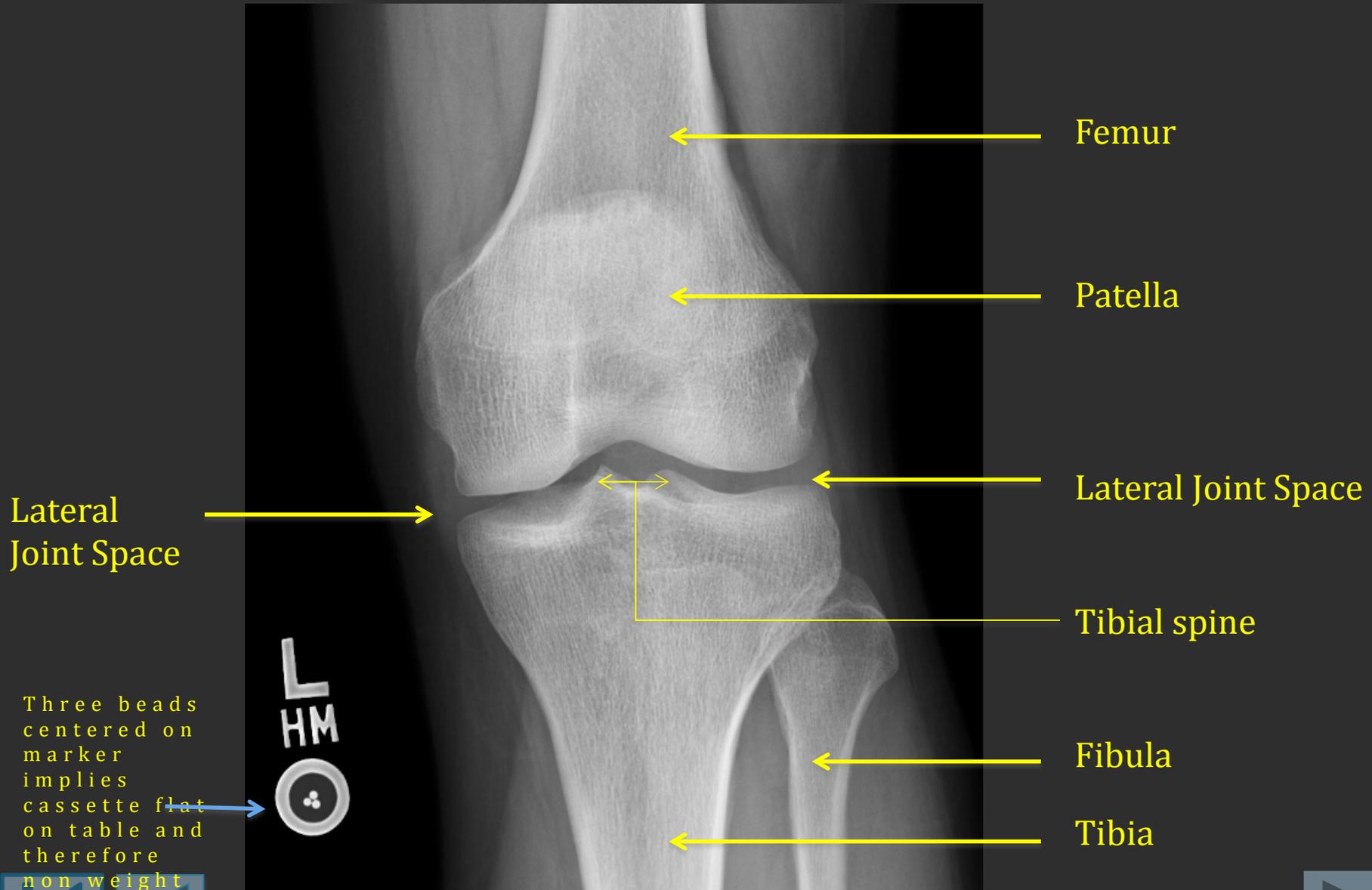
- [AP view](#)
- [Lateral view](#)
- [Tunnel view](#)
- [Merchant View](#)

Select (Click) on any of the above view, or click to continue to review all units



Normal Knee - No Weight Bearing

AP KNEE RADIOGRAPH



Lateral Joint Space

Femur

Patella

Lateral Joint Space

Tibial spine

Fibula

Tibia

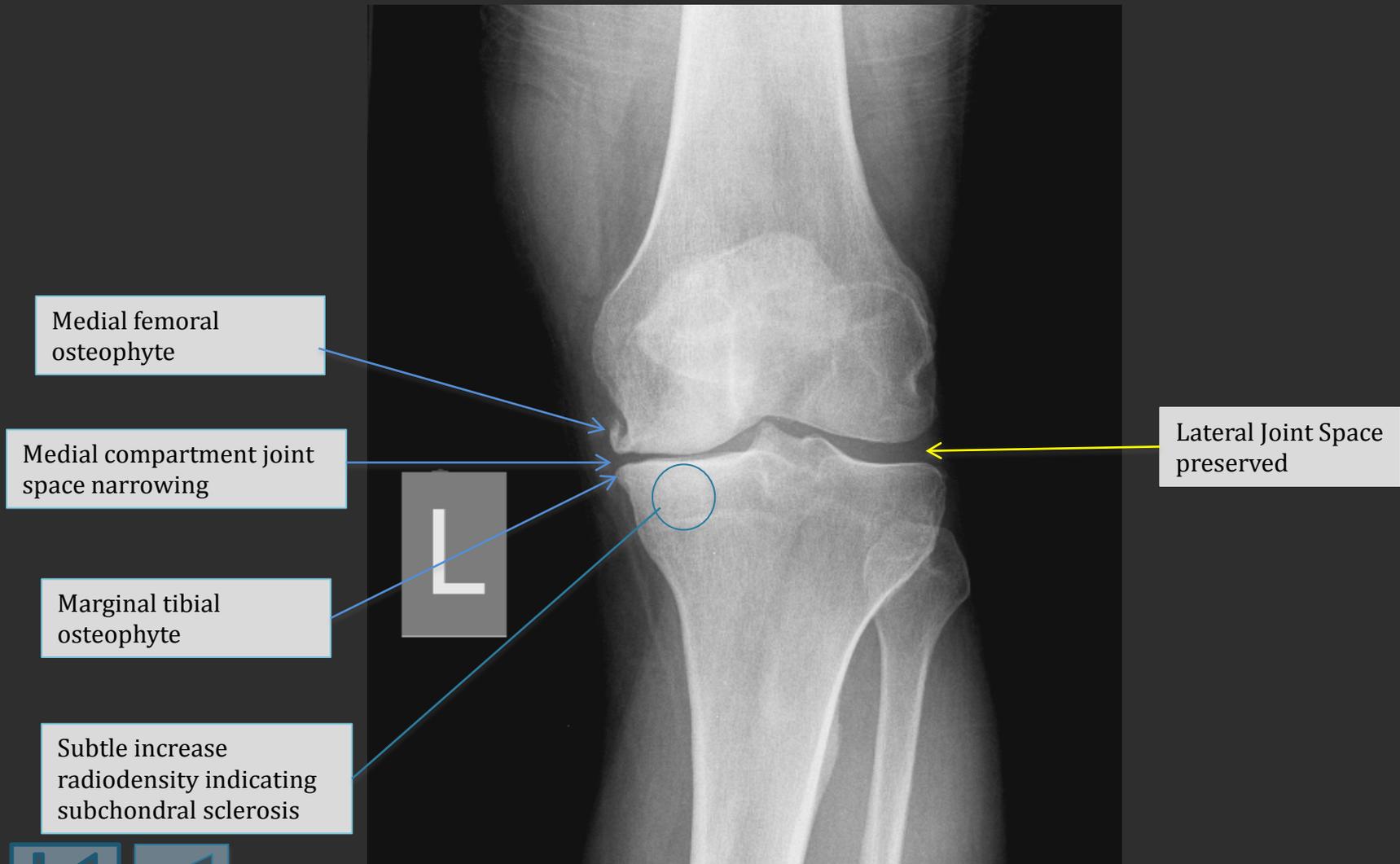
Three beads centered on marker implies cassette flat on table and therefore non weight bearing



Mild Knee Osteoarthritis

Primarily involving the medial compartment

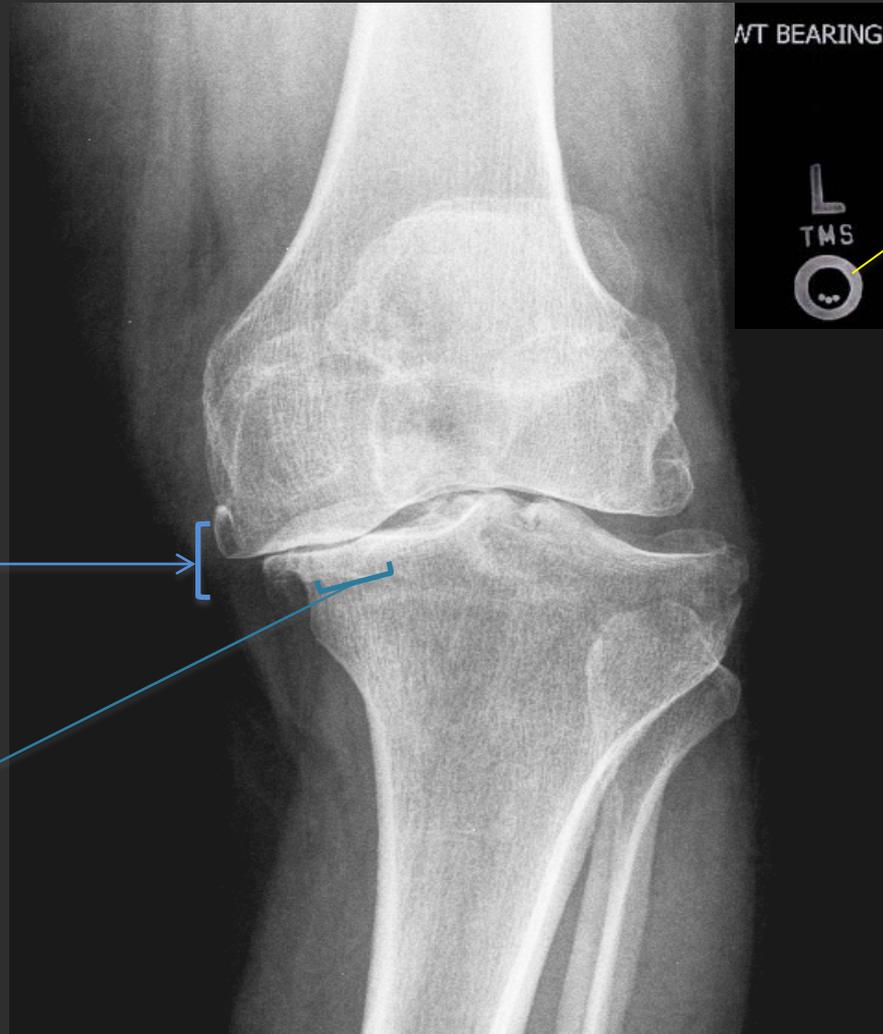
AP KNEE RADIOGRAPH



Moderate to Severe Knee Osteoarthritis

Moderate to Severe Radiographic Osteoarthritis
involving three compartment

AP KNEE RADIOGRAPH



Osteophyte and loss of medial joint space

Increased subchondral sclerosis and bone loss

Three beads at bottom of marker implies weight bearing

- Subluxation of femor-tibial joint
- Medial and lateral borders of the joint are incongruous

Radiographic findings may not correlate with patient complaint or disability

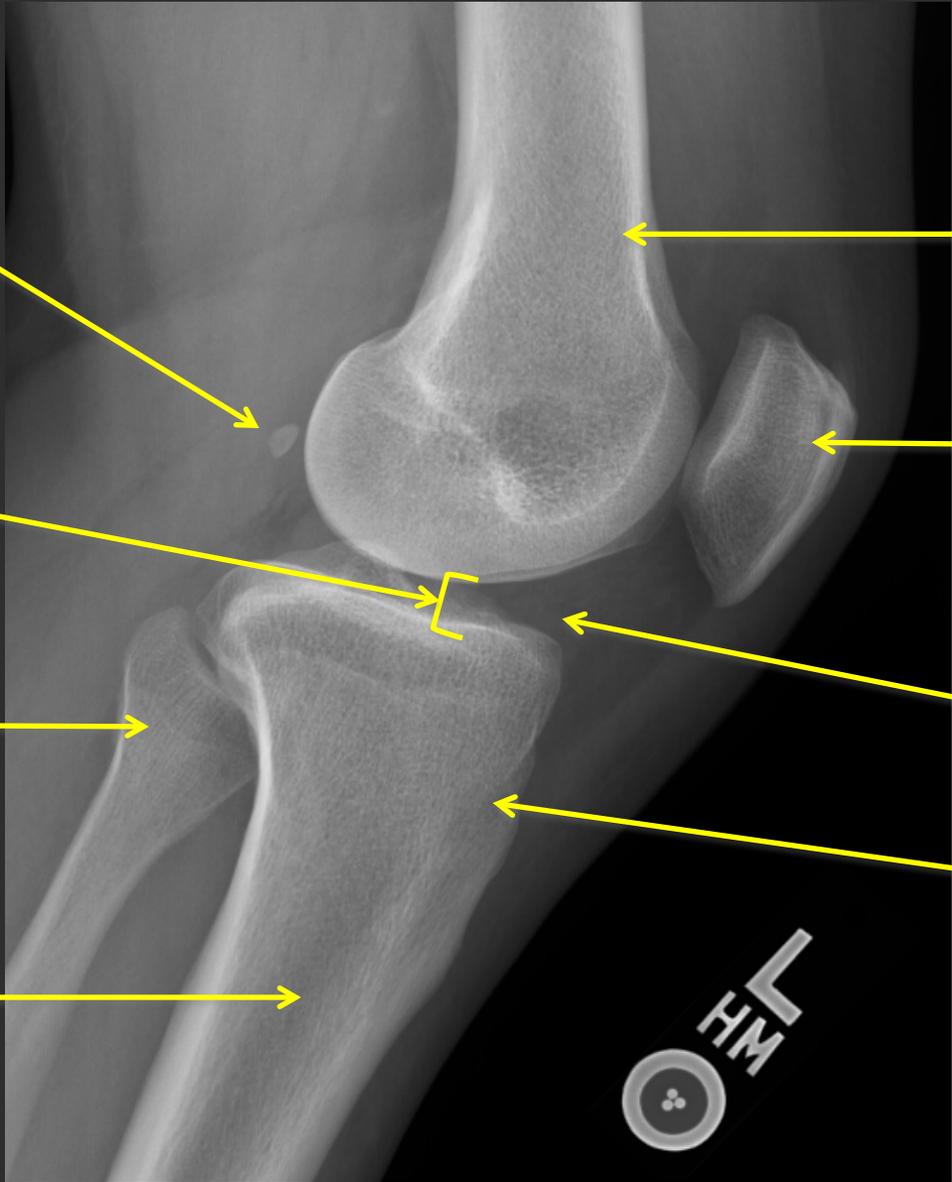


Normal Knee

LATERAL KNEE RADIOGRAPH

OS fabella often present normal sesamoid bone

Good lateral should have overlap of medial + lateral condyles



Femur

Patella

Joint Space

Tibial tubercle

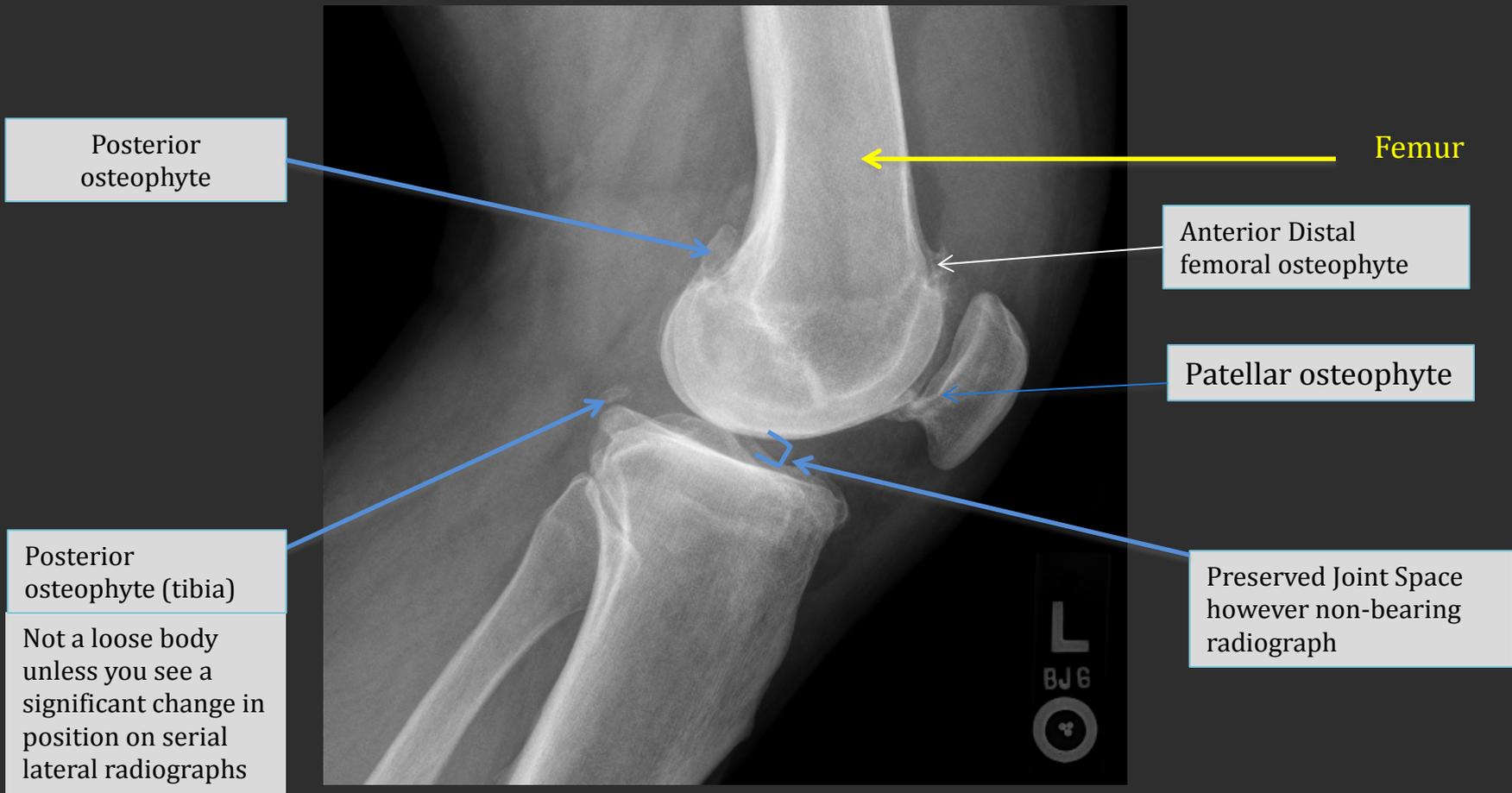
Fibular head

Tibia



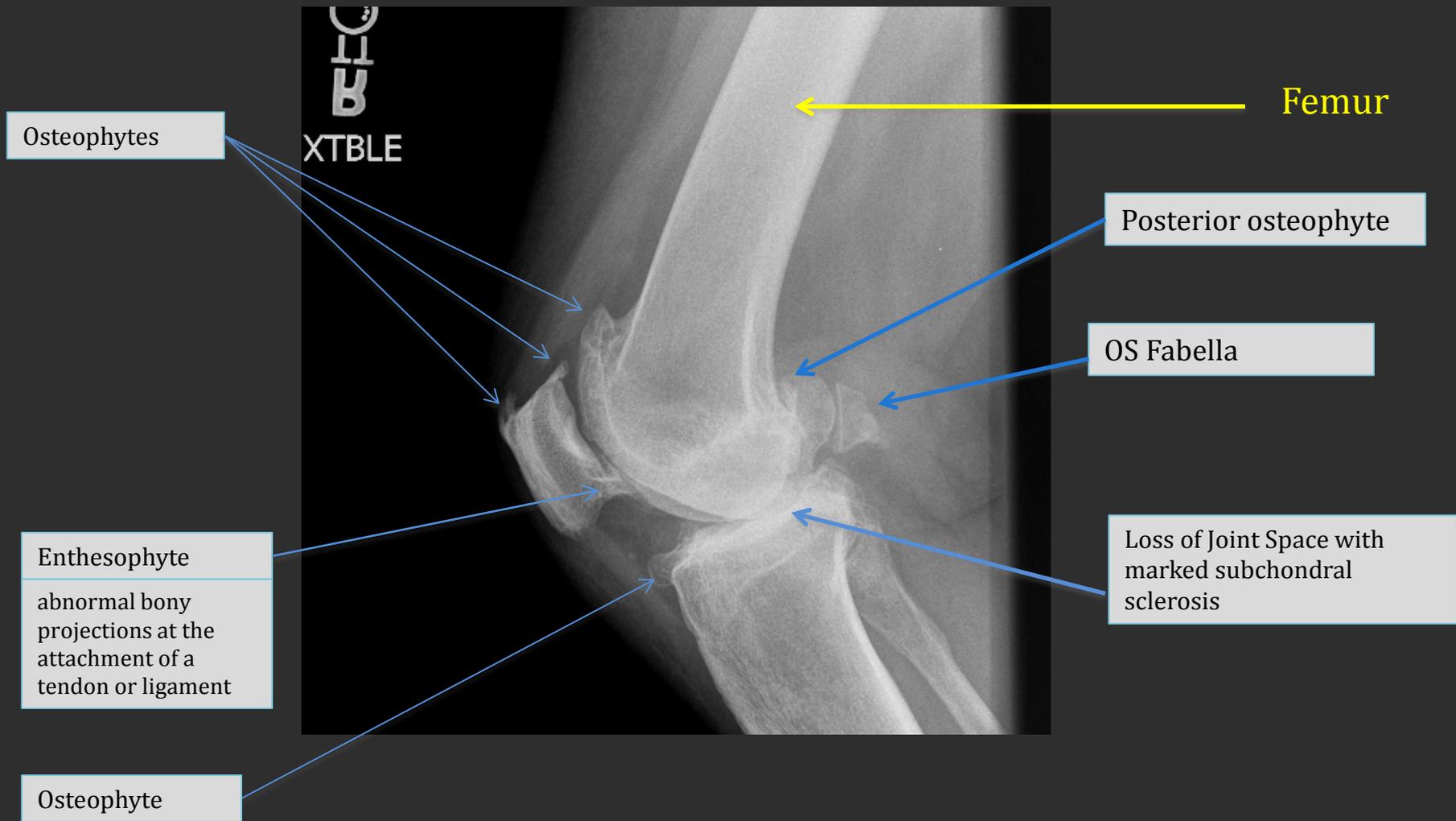
Mild to Moderate Osteoarthritis

LATERAL KNEE RADIOGRAPH



Moderate to Severe Osteoarthritis

LATERAL KNEE RADIOGRAPH



Normal Knee

TUNNEL KNEE RADIOGRAPH (Rosenberg View)

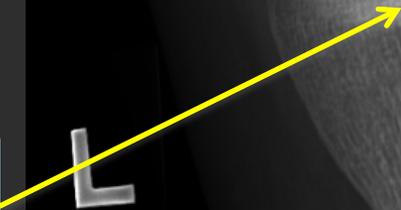
No osteophytes



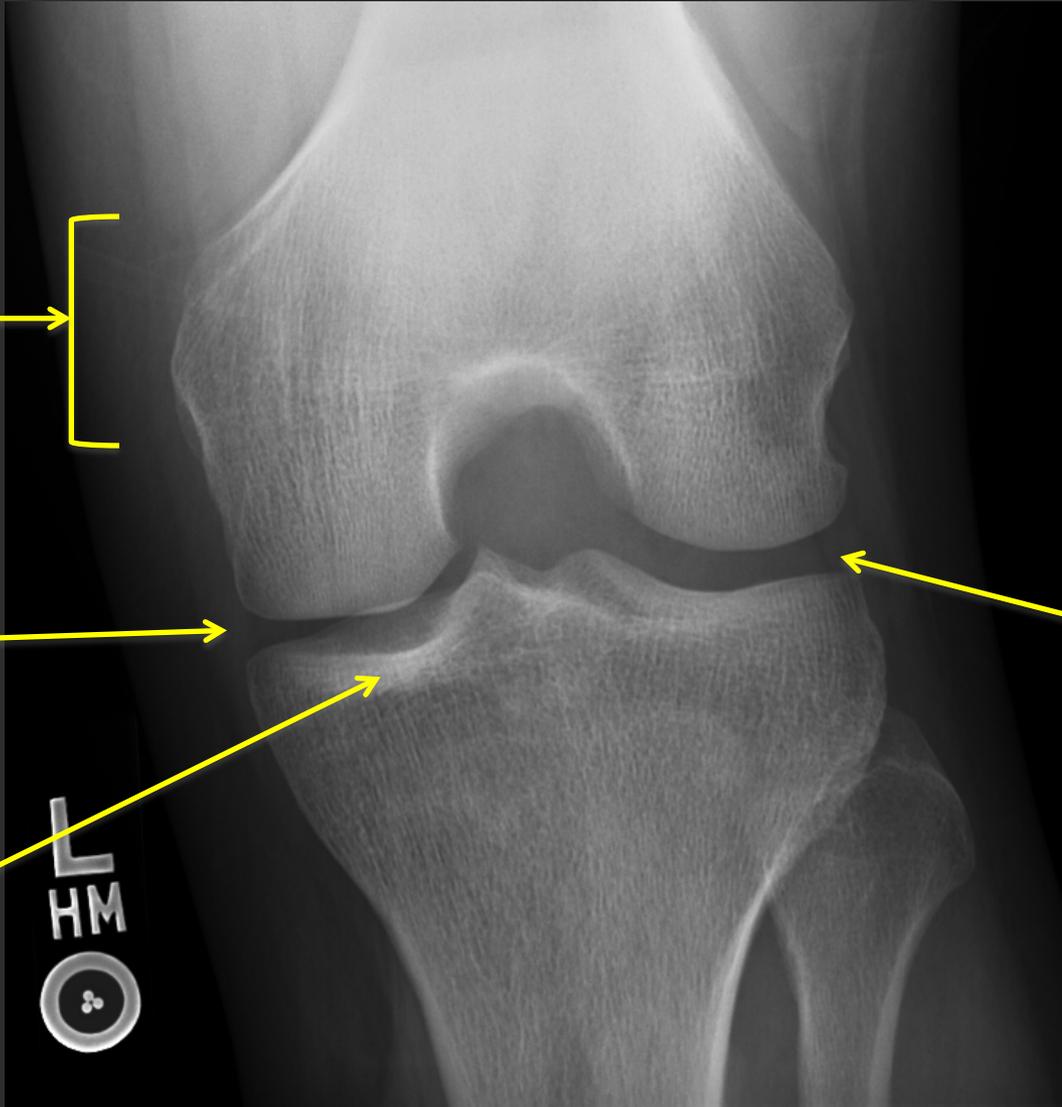
Normal medial joint space



Subtle increased subchondral sclerosis may be normal

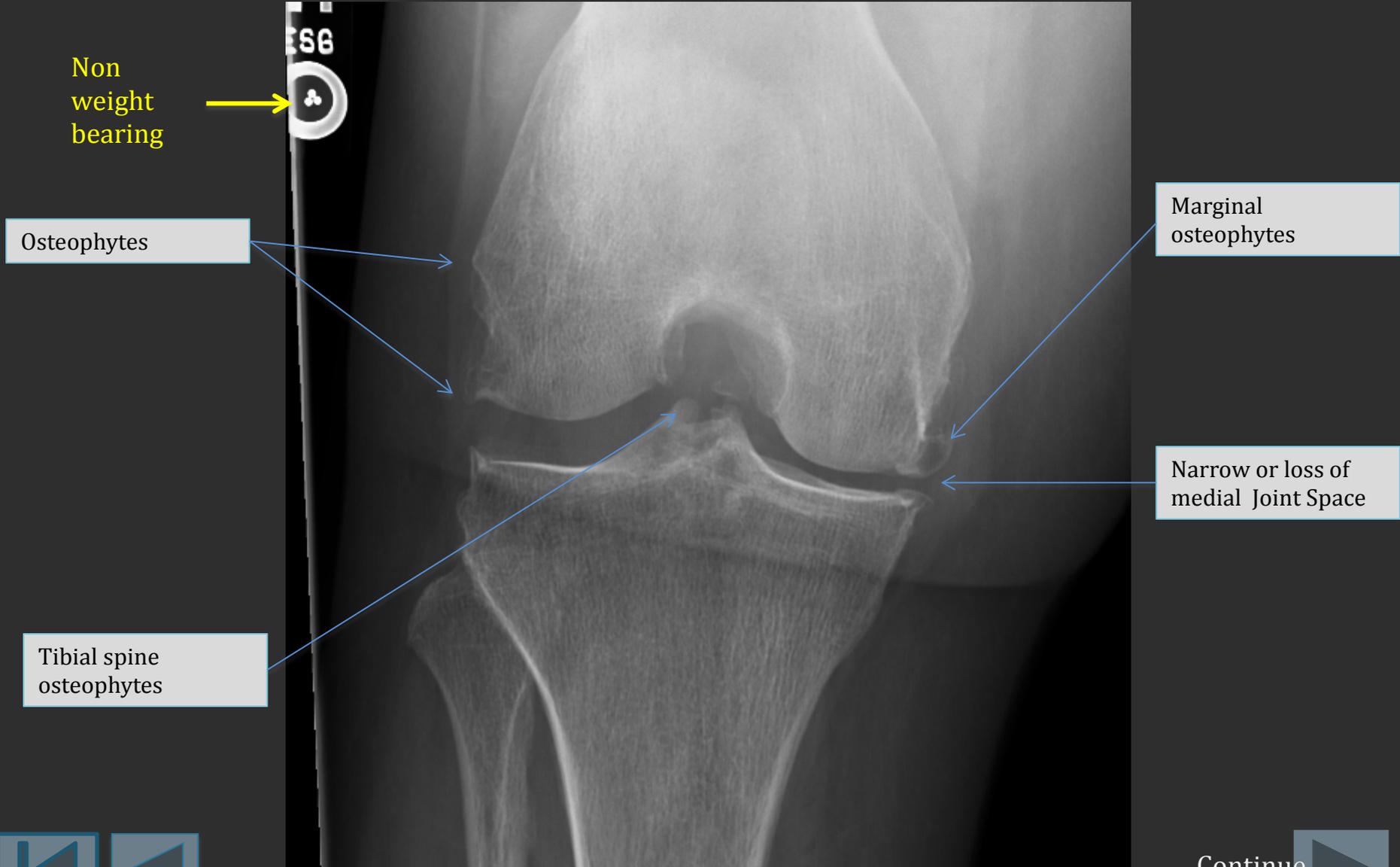


Normal lateral Joint Space



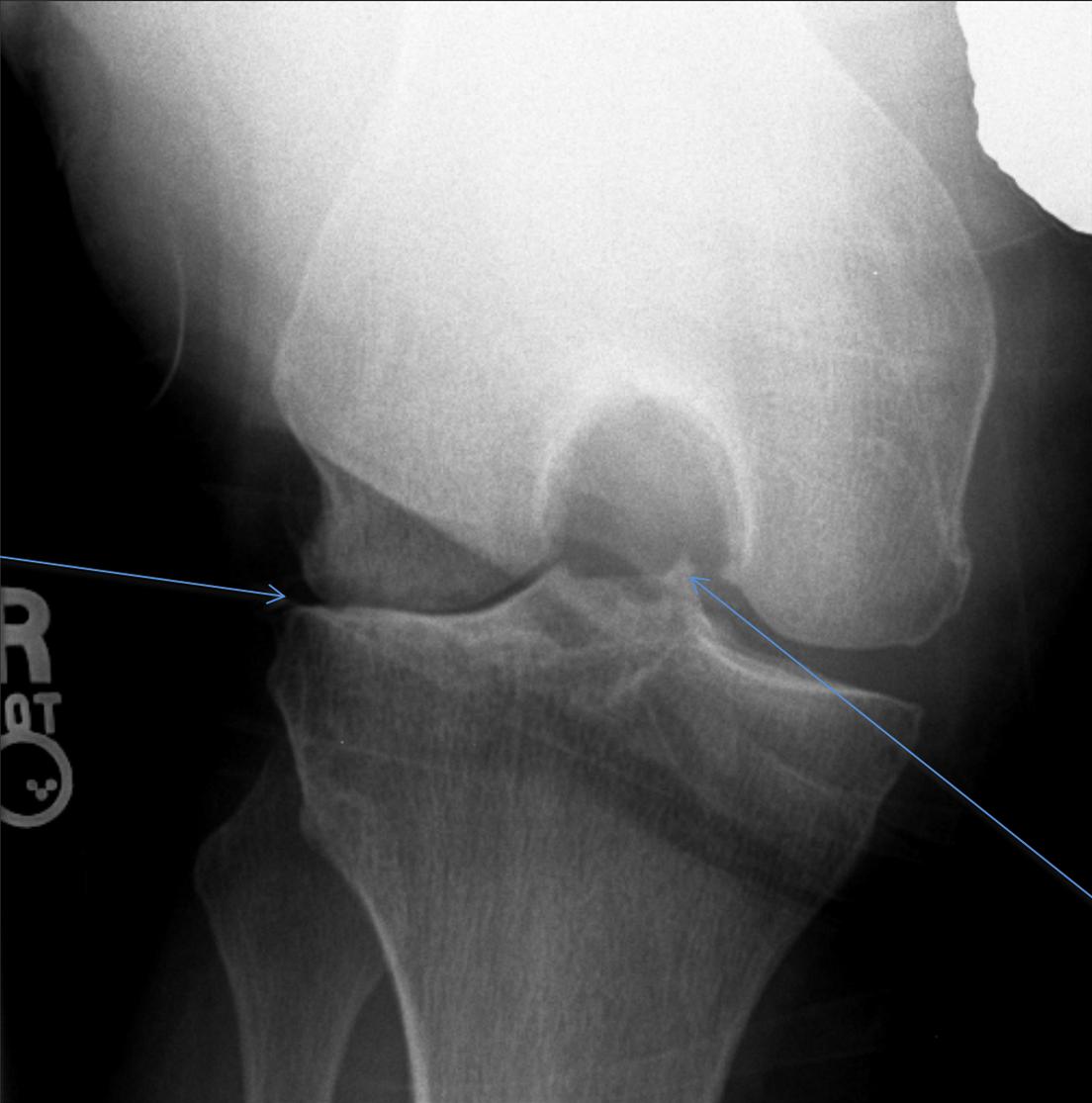
Mild to Moderate Knee Osteoarthritis

TUNNEL KNEE RADIOGRAPH (Rosenberg View)



Moderate to Severe Knee Osteoarthritis

**TUNNEL KNEE RADIOGRAPH
(Rosenberg View)**



Complete loss of lateral Joint Space
Bone on bone

Weight bearing →

Osteophytes



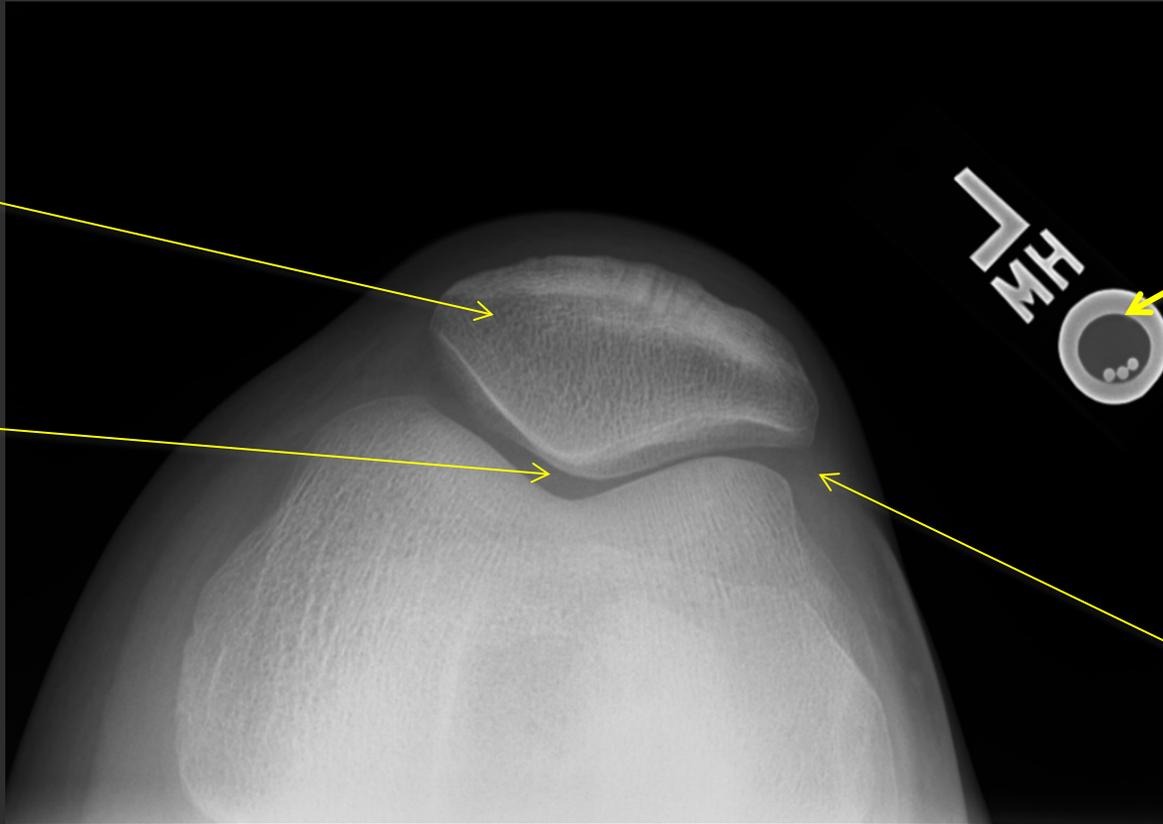
Normal Patellofemoral Joint

MERCHANT VIEW RADIOGRAPH (SUNRISE VIEW or SKYLINE VIEW)

Medial facet

Normal overall space

No osteophytes



Despite the marker the Merchant View is a **non** weight bearing. The marker reflects that the film is vertical in this view



Lateral Facet Flatter
Normal joint space



Mild Patellofemoral Osteoarthritis

**MERCHANT VIEW RADIOGRAPH
(SUNRISE VIEW or SKYLINE VIEW)**



Marginal osteophytes

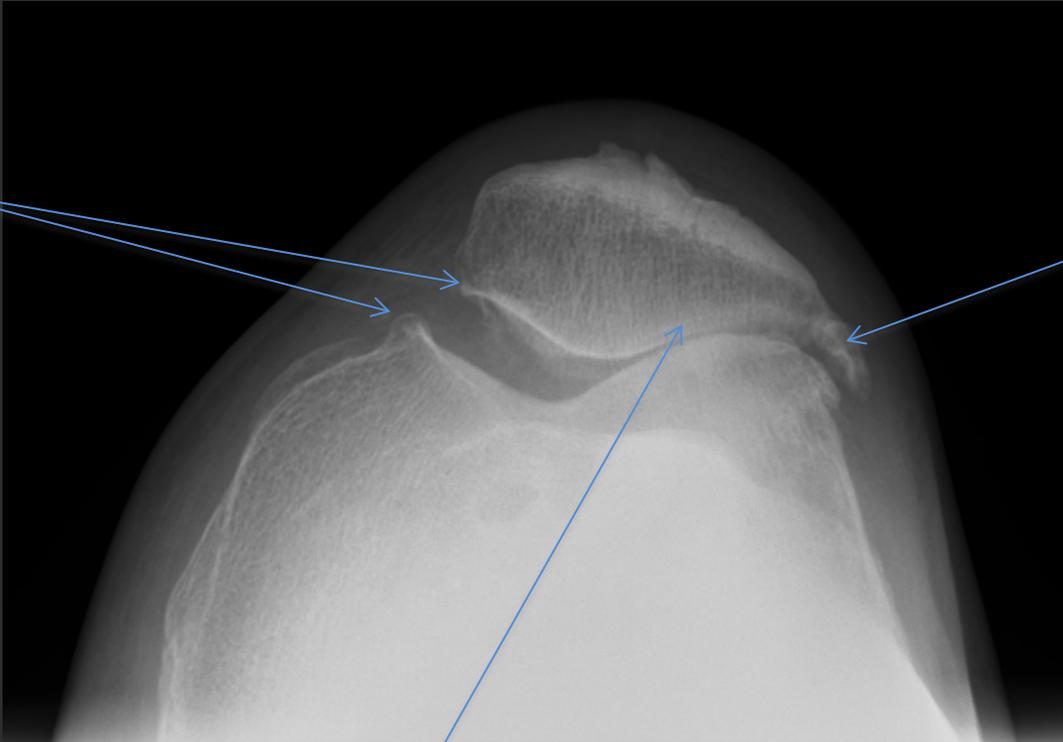
Slight narrowing of lateral patellofemoral joint space



Moderate to Severe Patellofemoral Osteoarthritis

**MERCHANT VIEW RADIOGRAPH
(SUNRISE VIEW or SKYLINE VIEW)**

Osteophytes



Osteophytes

Complete loss of Joint Space
Bone on bone



Osteoarthritis of the Hip

Pelvis Radiographs

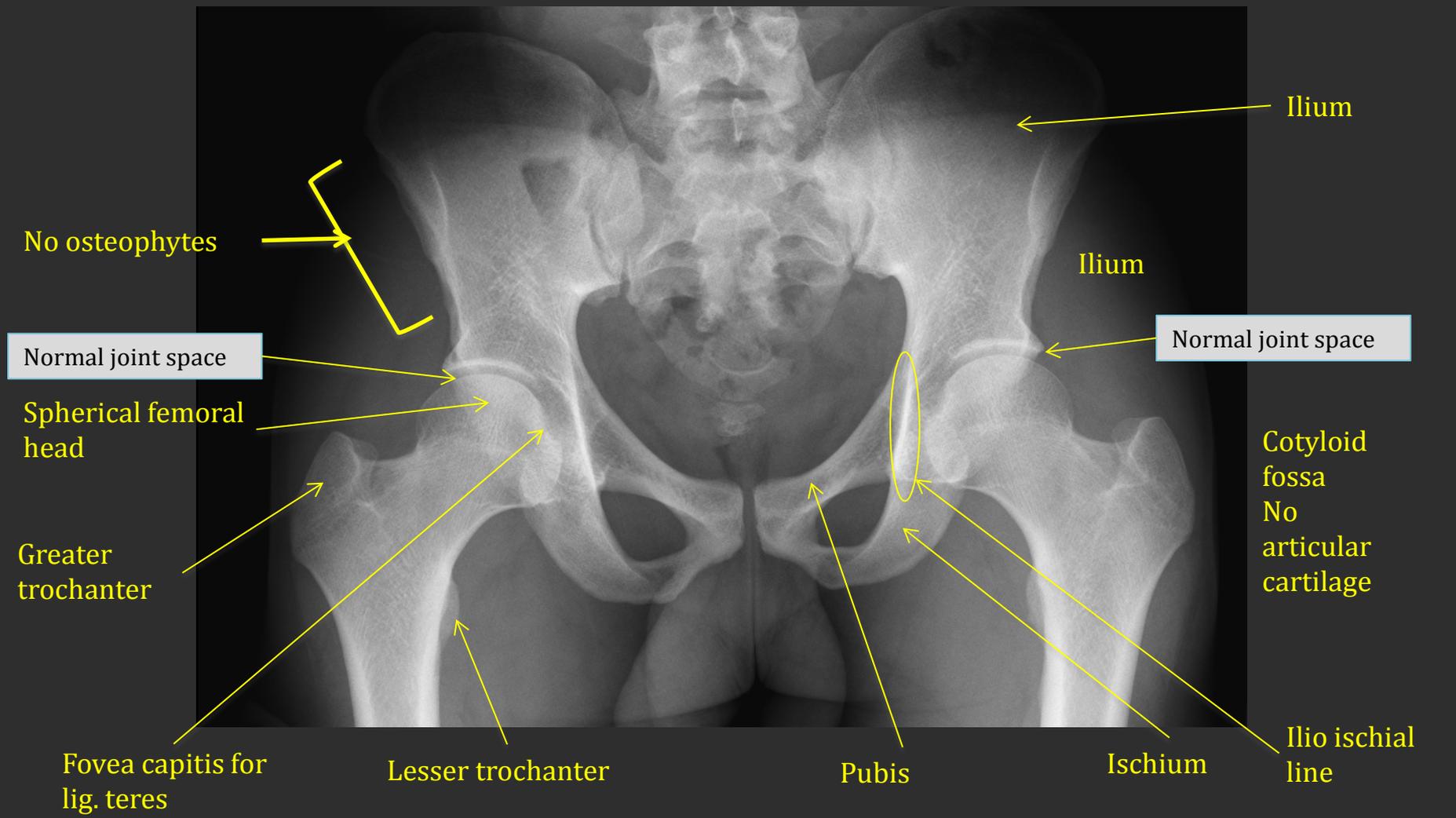
- [AP view - normal](#)
- [AP Moderate HIP OA](#)
- [AP Severe HIP OA](#)

Select (Click) on any of the above view, or click to continue to review all examples



Normal Hip

AP PELVIS RADIOGRAPH



Moderate to Sever OA of Hip (R >> L)

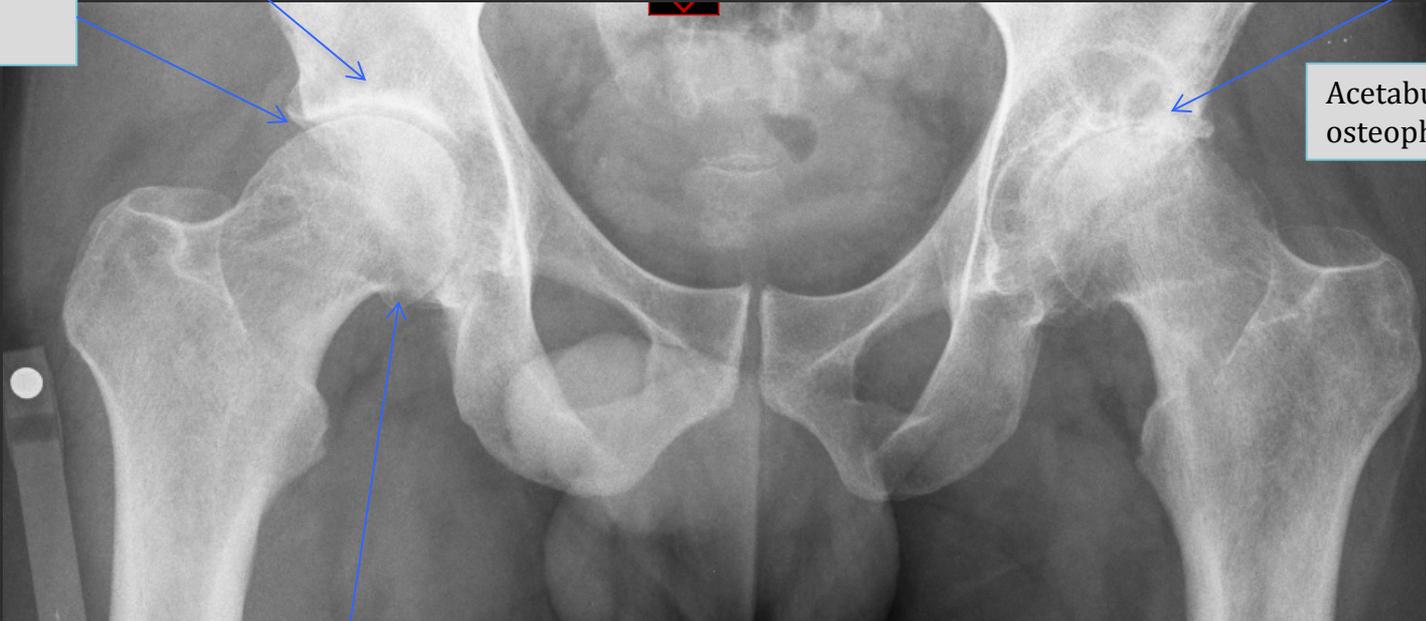
AP PELVIS RADIOGRAPH

Increase subchondral sclerosis

Joint space narrowing

Loss of joint space
Bone on bone

Acetabular osteophyte



Medial femoral osteophyte

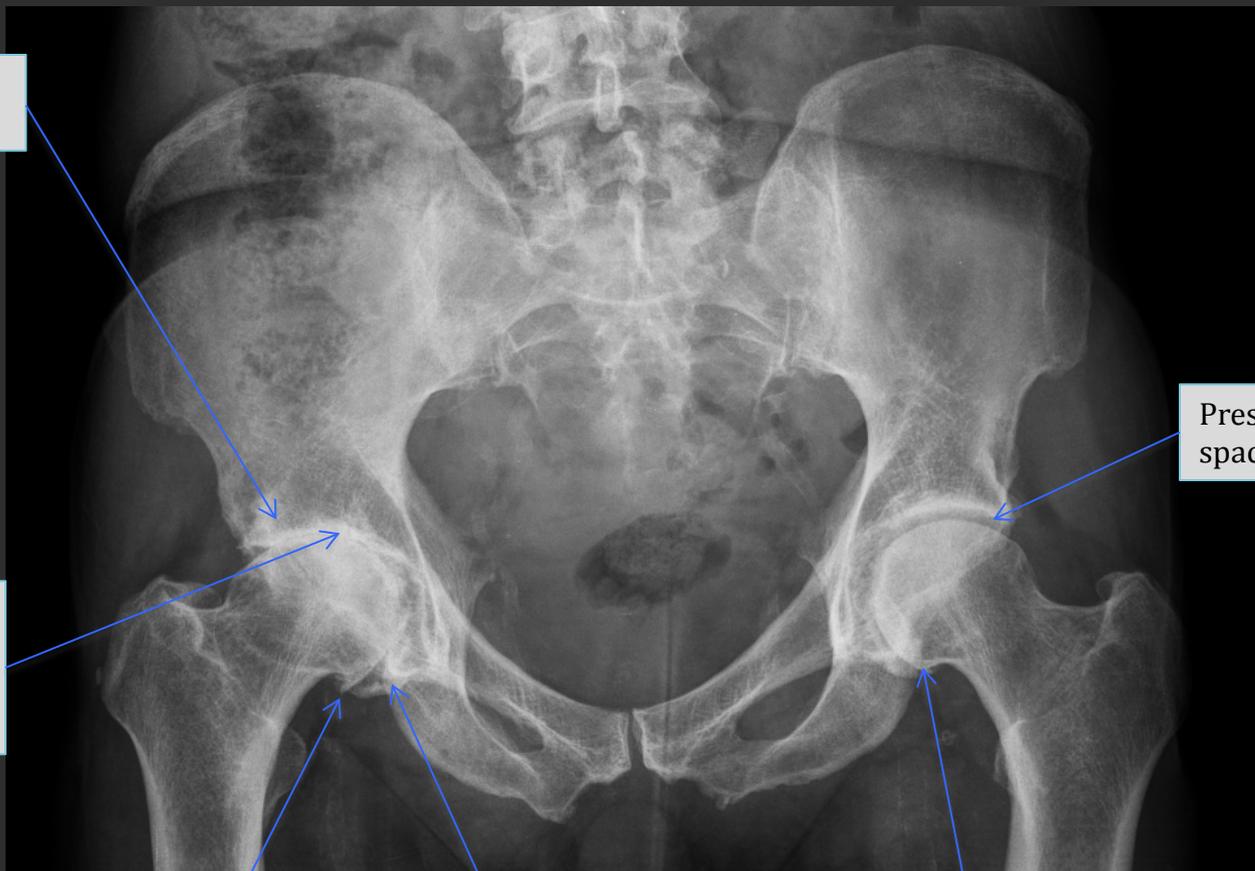
More prominent lesser trochanter due to loss of hip internal rotation



Sever OA of Hip (R >> L)

AP PELVIS RADIOGRAPH

Increase subchondral sclerosis



Preserved joint space

Complete loss of joint space narrowing
Bone on bone

Medial femoral osteophyte

Acetabular osteophyte

Subtle marginal osteophyte

