



UNIVERSITY *of* MARYLAND
GRADUATE SCHOOL

Hip and Knee Osteoarthritis Cases: Clinical Presentation and Radiographic Assessment

Jeanine Gargiulo, PA-C
University of Maryland Baltimore

Disclosures

- Ethicon Consultant

Objectives

- Review classic clinical presentations of hip and knee osteoarthritis
- Discuss basic radiographic assessment of hip and knee joints
- Identify classic osteoarthritic changes on radiographs

Hip Case

- 67 y/o M
- CC: chronic left hip strain
- Sharp groin pain and aching thigh
- Gradually increasing stiffness over 3 years
- Struggles to put on socks and shoes
- Worse with getting up from a chair/out of car
- Better with Tylenol
- Occ lower back pain and knee pain

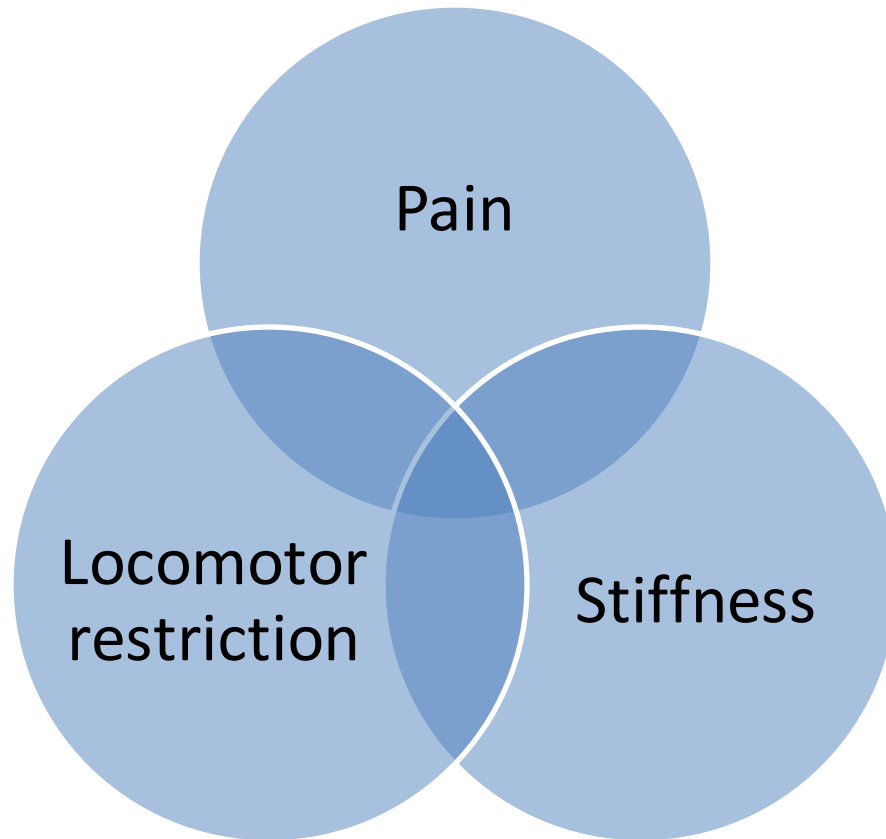


Knee Case

- 75 y/o F
- CC: left knee pain
- Gradual onset over last 5 years, worsening
- Dull ache with occ sharp pains
- Intermittent
- Ibuprofen QAM helps to “get her moving”
- Uses a cane for long walks
- Limiting QOL and ADLs



Classic OA Presentation



Classic OA Presentation



**Morning stiffness < 30
minutes**



**Pain with activity,
relieved by rest**



No systemic symptoms

Classic Hip OA Presentation



Onset: gradual

Location: groin

Duration: intermittent to constant

Characteristics: achy, stiff, limited ROM

Aggravating: walking, driving, socks/shoes ROM

Alleviating: rest, NSAIDs

Radiation: anterior thigh

Timing/Temporal: “age”, “chronic groin pull”

Severity: variable, worsening

Assoc manifestations: lower back pain, limp, poor balance, NO numbness/tingling

Classic Knee OA Presentation

Onset: gradual

Location: localized or global

Duration: intermittent

Characteristics: achy, stiff, crunching, grinding

Aggravating: WB activity

Alleviating: rest, NSAIDs, ice

Radiation: +/- inferior

Timing/Temporal: “age” or previous injury/surgery

Severity: variable, worsening

Associated manifestations: localized swelling, instability/weakness



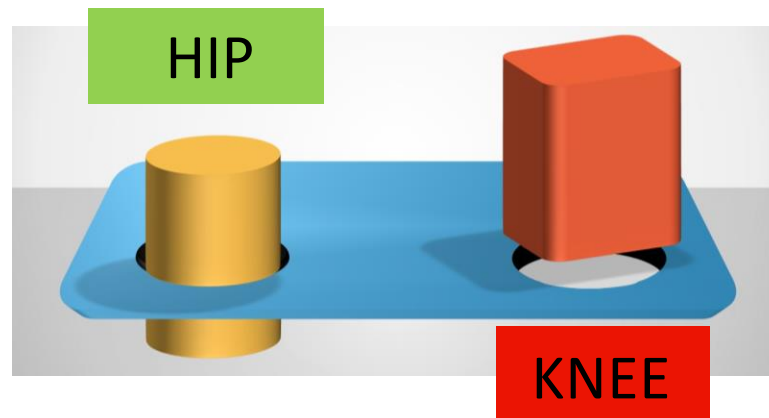
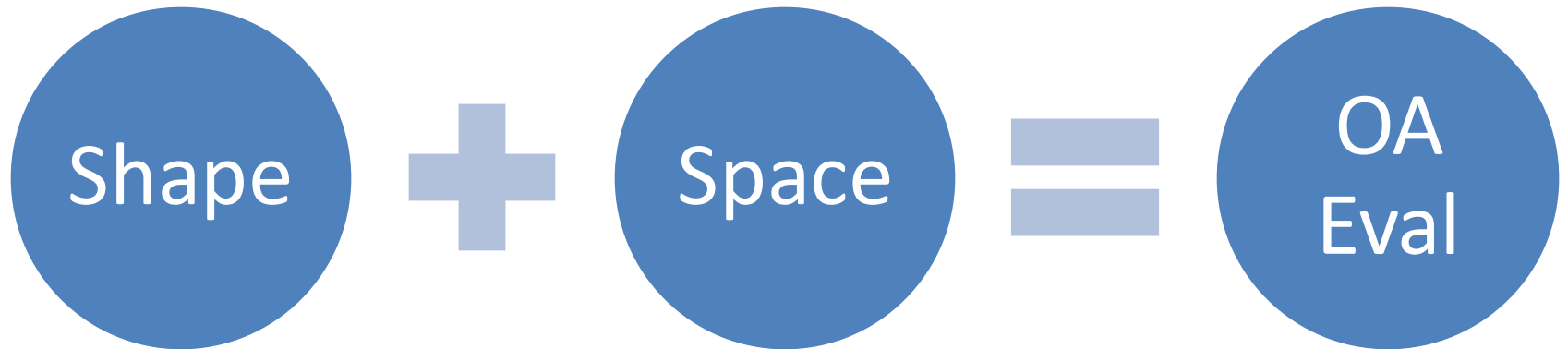
IMAGING



Hallmark of OA on Radiographs

1. Joint space loss
 - Lack of cartilage between two bones
2. Osteophyte formation
 - Extra bony formations growing from joint margins
3. Subchondral sclerosis
 - Hardening of bone under cartilage surface

OA on Radiographs



Radiographic Assessment: Hip Pain

Views

- AP pelvis, AP femur, lateral femur
- Supine or WB*

Landmarks

- Femur, acetabulum

Shape

- Femoral head: round, spherical
- Acetabulum: smooth, half crescent

Space

- Between the bones
- Position of bones in relation to each other

Normal AP Pelvis

- Compare hip joints for symmetry
 - Best view to measure LLD
- 3-5mm of cartilage **space** in joint space between femur and acetabulum



Normal AP Femur

- Round, spherical **shape** of femoral head
- Crescent **shape** of acetabulum
- 3-5 mm cartilage **space**



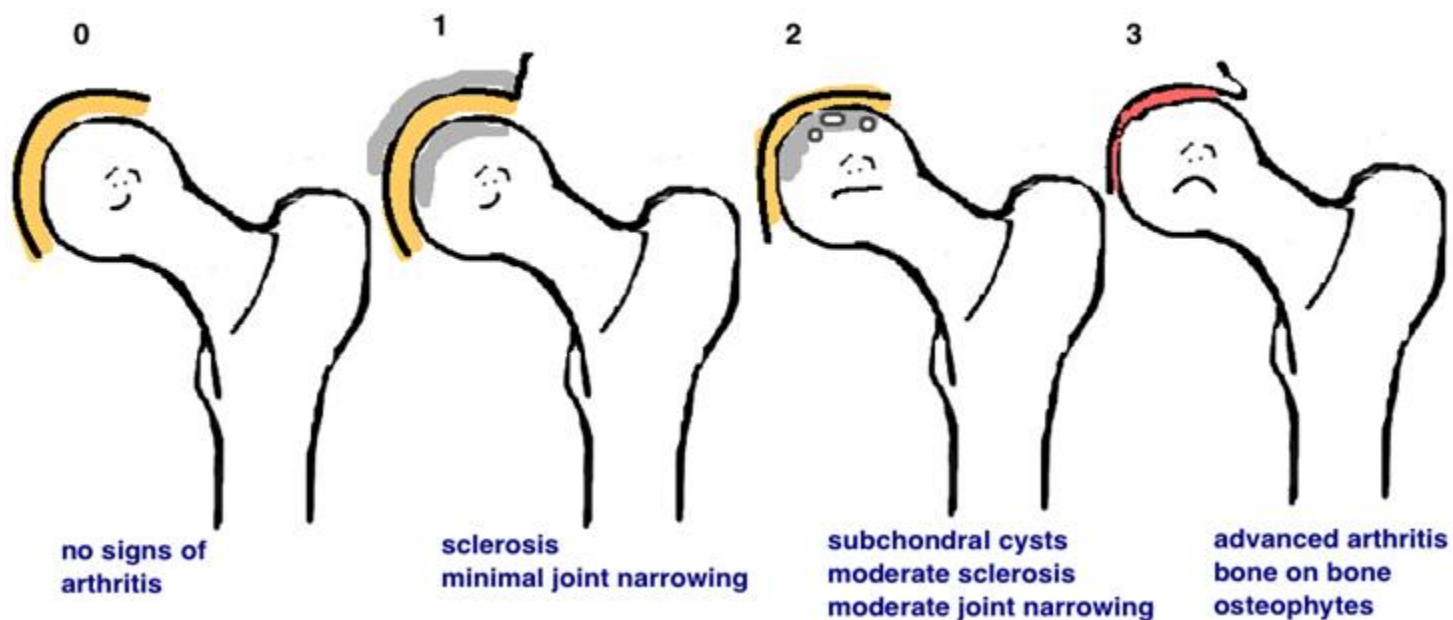
Normal Lateral Femur

- Round, smooth, spherical **shape** of femoral head
- Crescent **shape** of acetabulum
- 3-5 mm cartilage **space**



Classification of Hip OA

- Tonnis Classification
 - Graded 0-3 to indicate severity
- There are *many* others!



Hip OA on Radiographs

- Hallmark*- joint **space** narrowing and loss
- M/C superior, WB portion



Hip OA on Radiographs

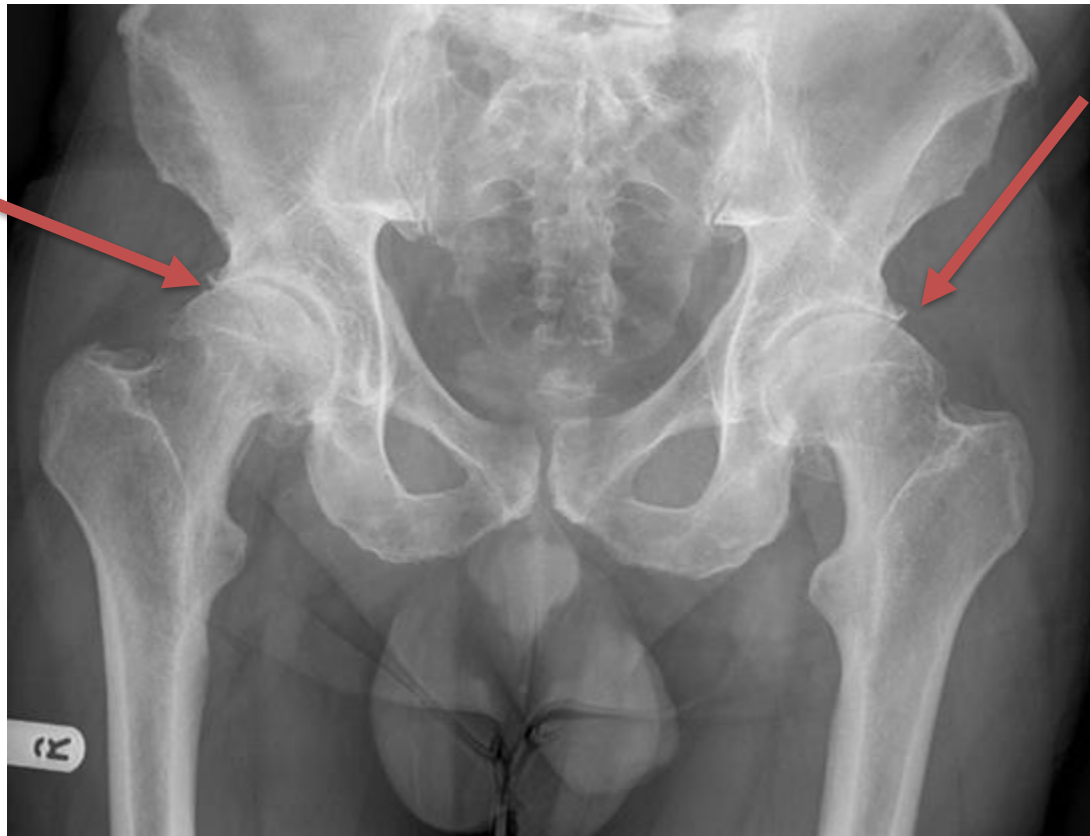


- Joint **space** loss can occur *anywhere* in the joint



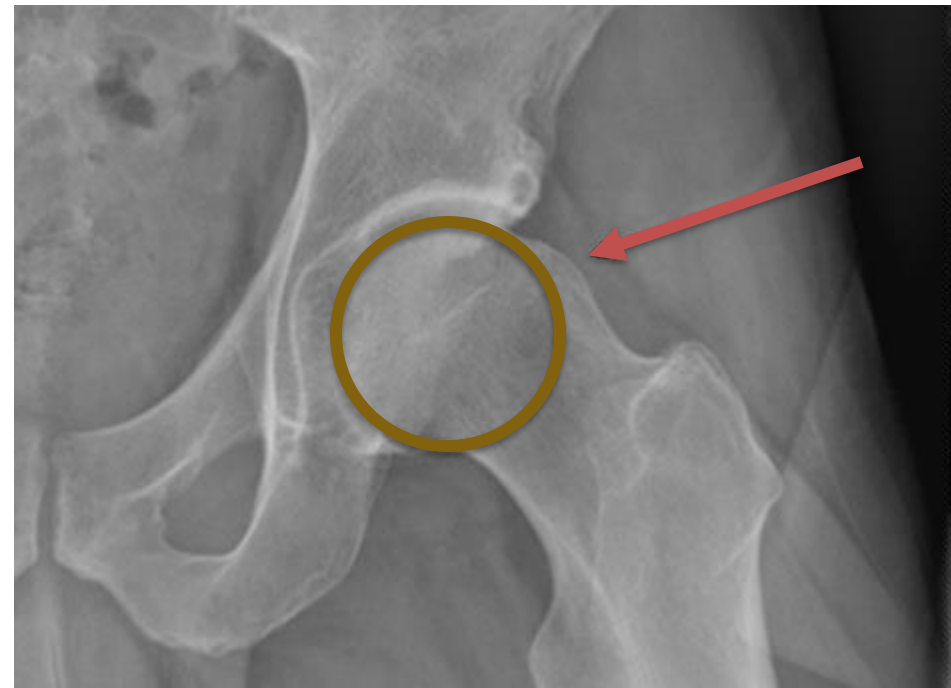
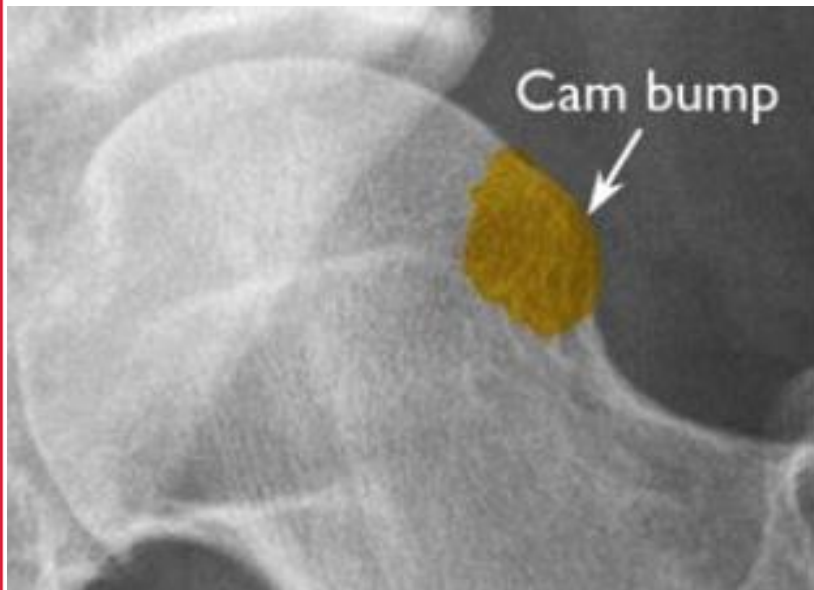
Hip OA on Radiographs

- May be present bilaterally



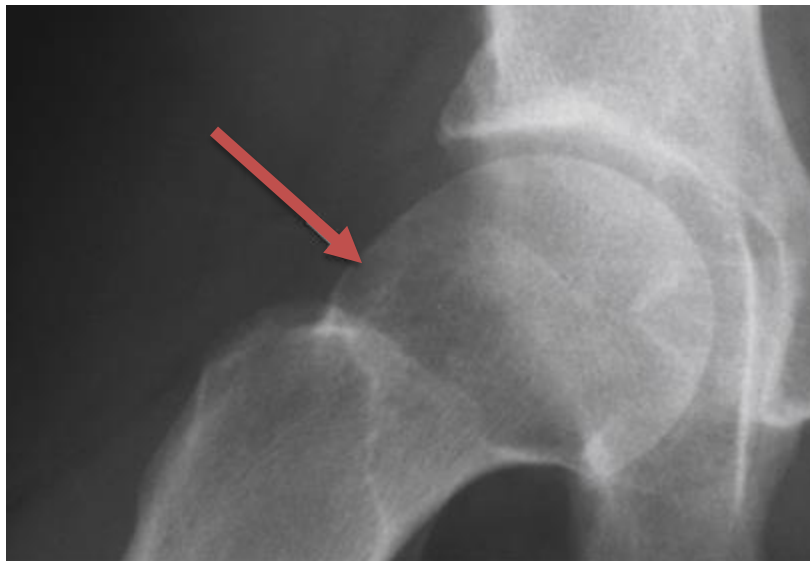
Hip OA: Abnormal Femoral Head

- Always look for a spherical **shape**
 - Assess for bumps or flattening



Hip OA: Abnormal Femoral Head

- Always look for a spherical **shape**
 - Assess for bumps or flattening



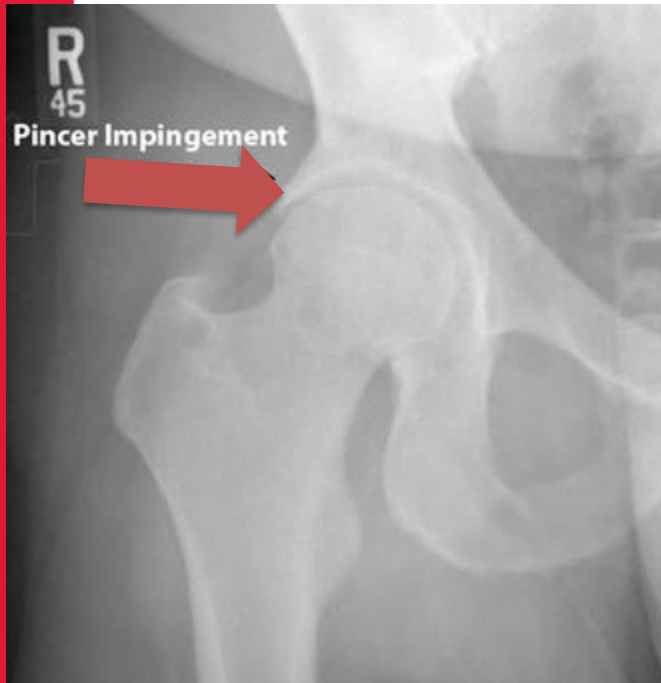
Hip OA: Abnormal Acetabulum

- Always look for a crescent **shape**
 - Assess for deep or shallow socket



Hip OA: Abnormal Acetabulum

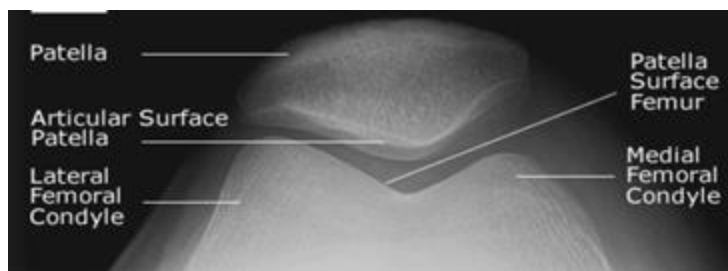
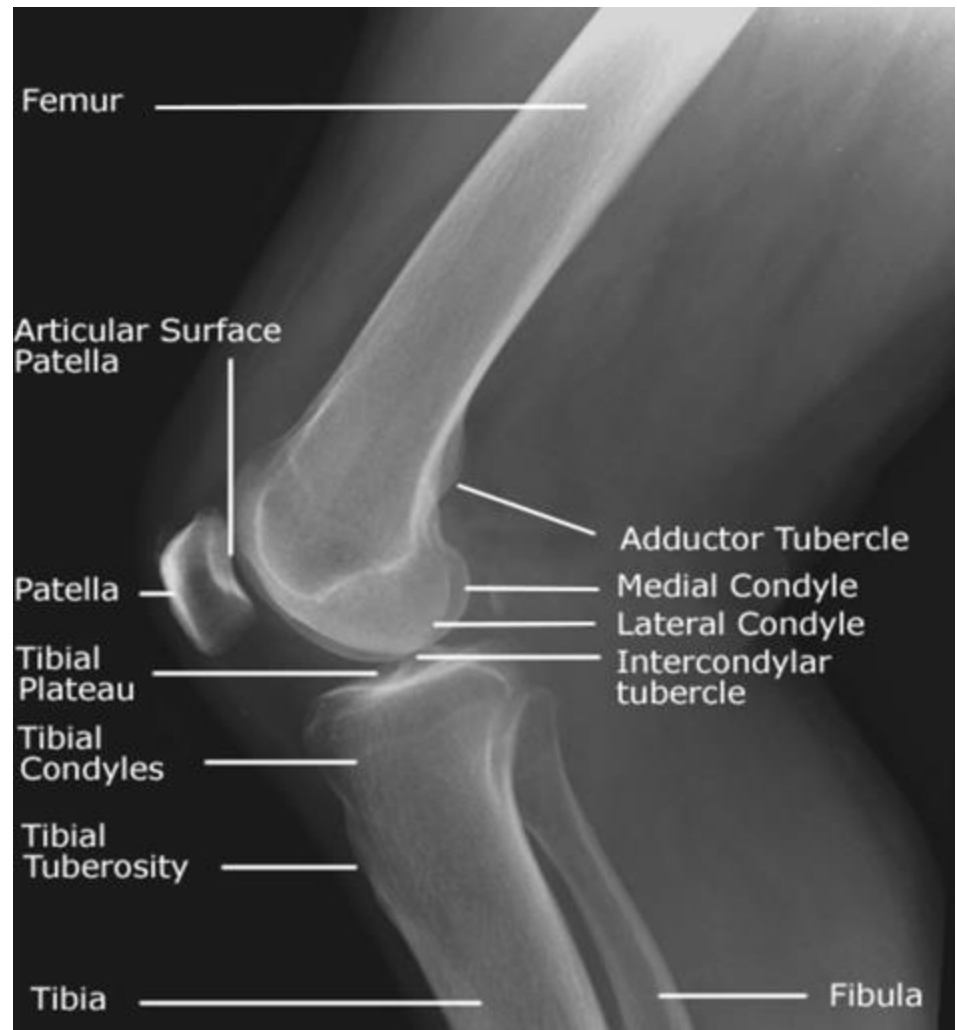
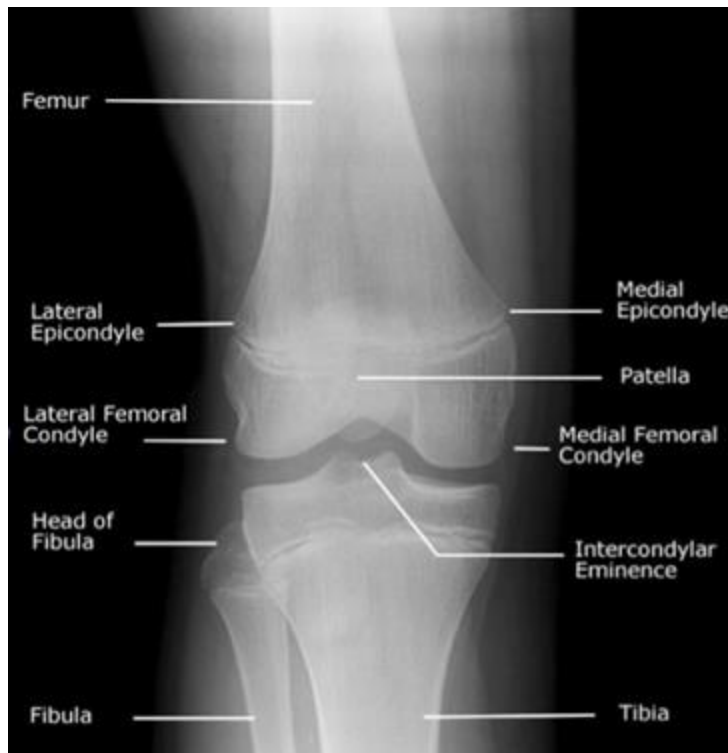
- Always look for a crescent **shape**
 - Overhanging icicles



IMAGING



**Take it
nice and KNEE-sy**



ANATOMIC REVIEW

Knee OA

- May occur in 1, 2, or all 3 compartments of the knee
 - Symptoms vary by affected compartment of knee
- 1. Joint **space** loss
- 2. Osteophyte (bone spur) formation
 - Changes **shape** of bones
- 3. Subchondral sclerosis
 - White, thickened areas of bone

Radiographic Assessment: Knee Pain

Views:

- AP, lateral, sunrise, PA flexion
- 4 view*

Landmarks

- Femur, tibia, patella

Shape

- **Femur:** should be round and smooth
- **Tibia:** flat, smooth, normal “mountains”
- **Patella:** level, triangular

Space

- Between bones
- Position of bones in relation to each other

Normal AP Knee

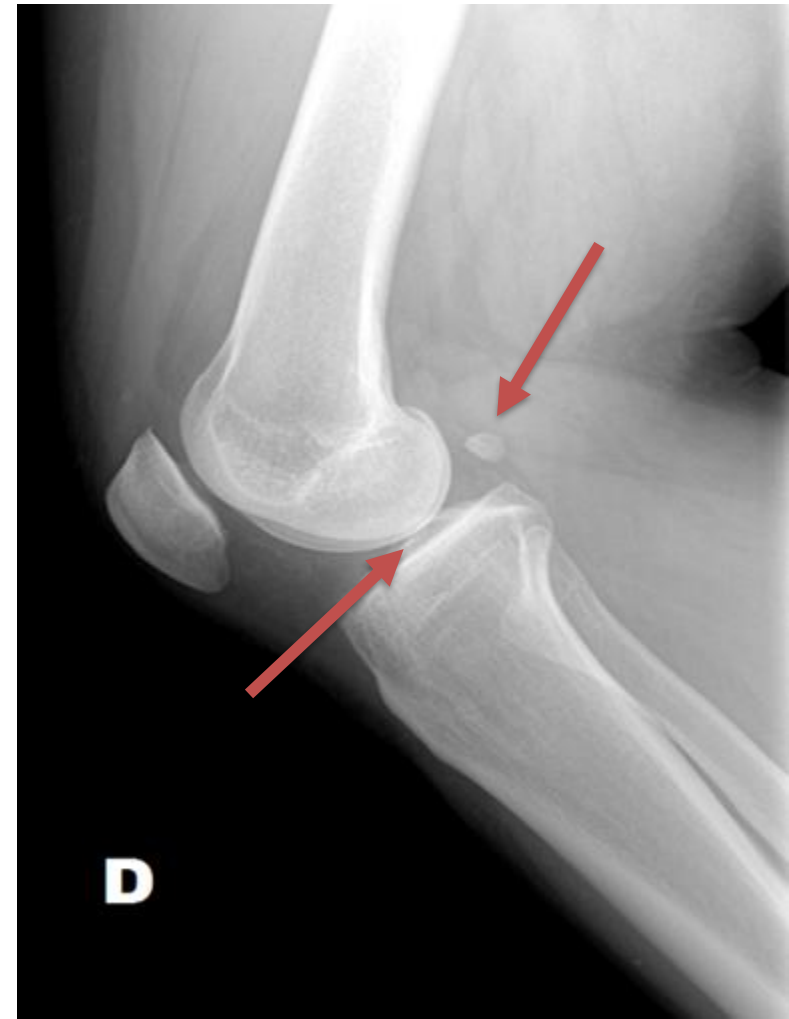
- Standing, WB film
 - Femur straight over tibia
 - Patellar outline centered
- ~7 mm cartilage **space**
- Smooth bony **shape**
- Normal “mountains” **shape**
 - AKA tibial spine





Normal Lateral Knee

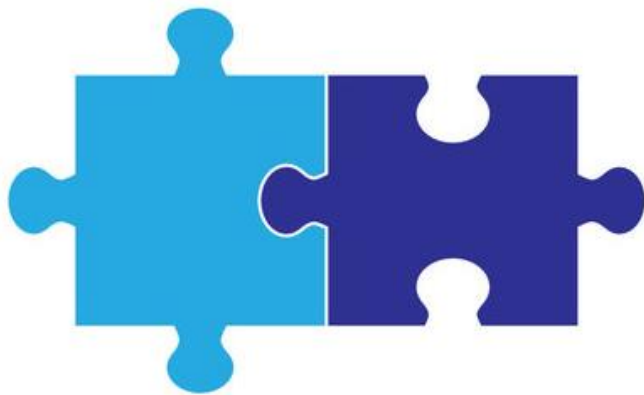
- M/C 30 or 90 degrees
 - Anterior patella
 - Femur centered over tibia
- Eval joint **space** on true lateral
- Fabella!
 - “Little bean” **shaped** sesamoid bone in gastric muscle tendon behind the knee



D

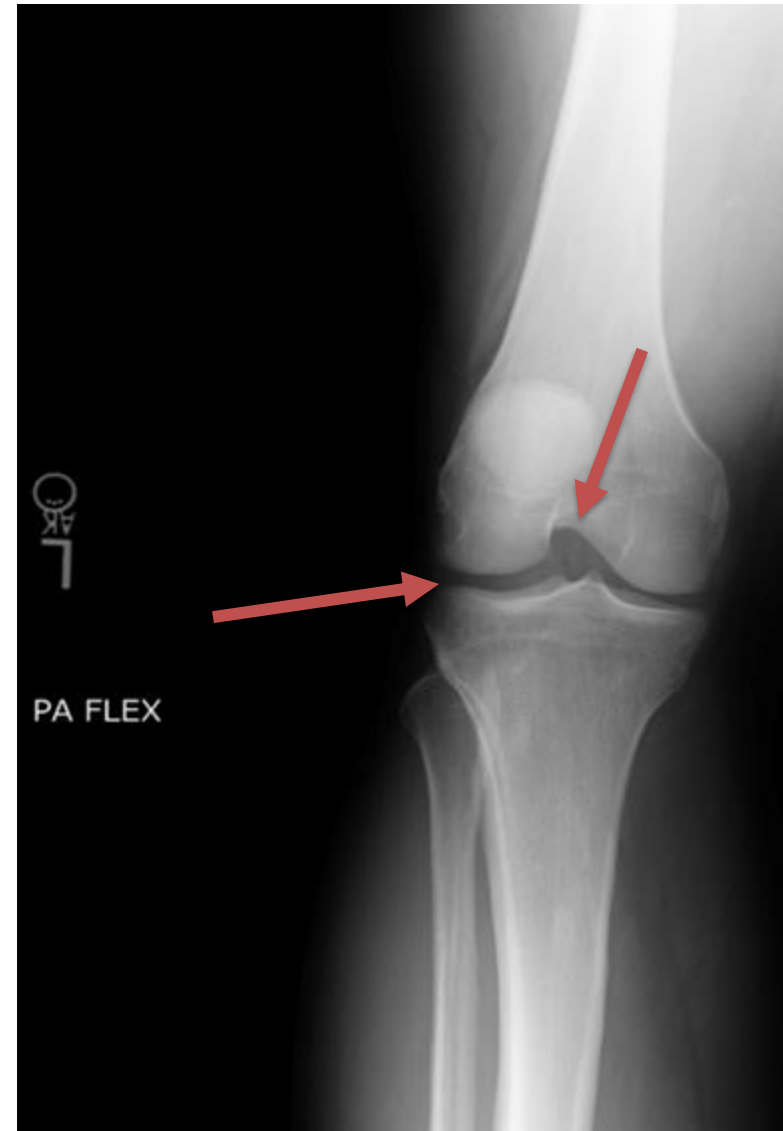
Normal Sunrise/Merchant View

- Bent knee view
 - Patellar alignment: “sunset over the horizon”
 - Longer side is lateral side
- *Best* patellar assessment for **space**
- Smooth triangular **shape** and edges



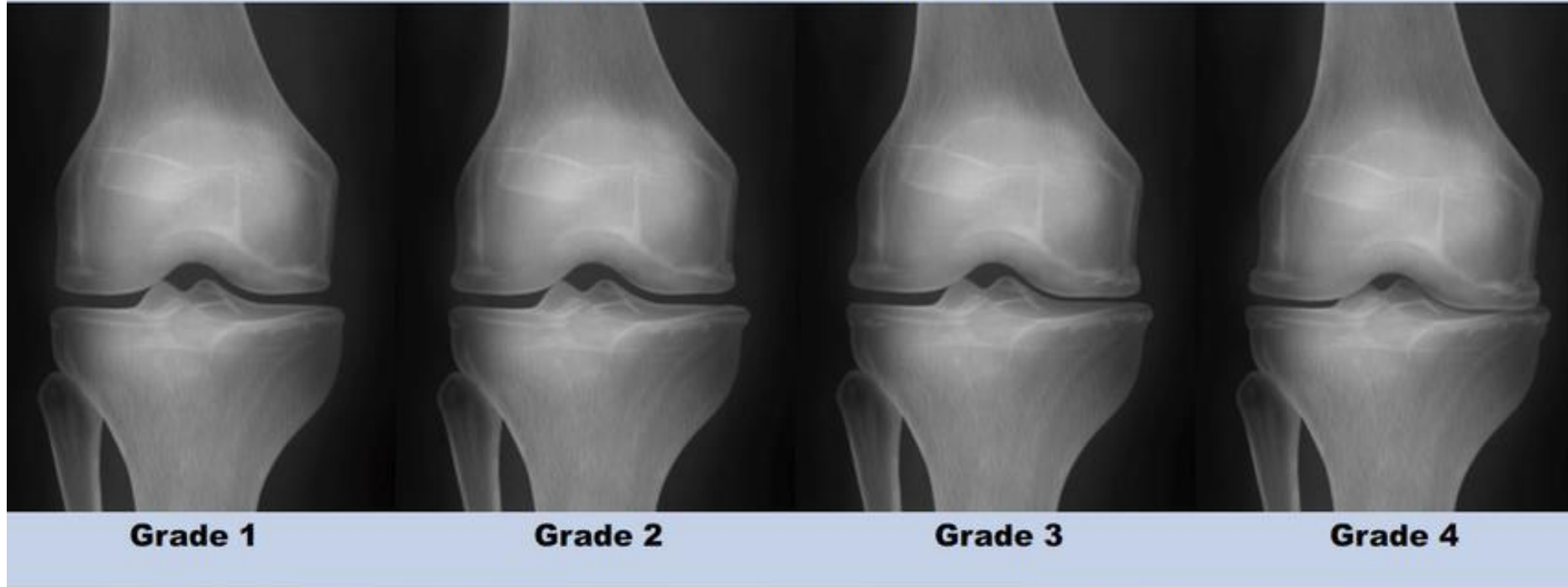
Normal PA Flexion/Tunnel View

- PA view!!!!
 - 20-45 degrees of flexion, in WB
 - Best to eval valgus knees
- Eval notch **shape**
- Eval **space**
 - Posterior/lateral femoral cartilage



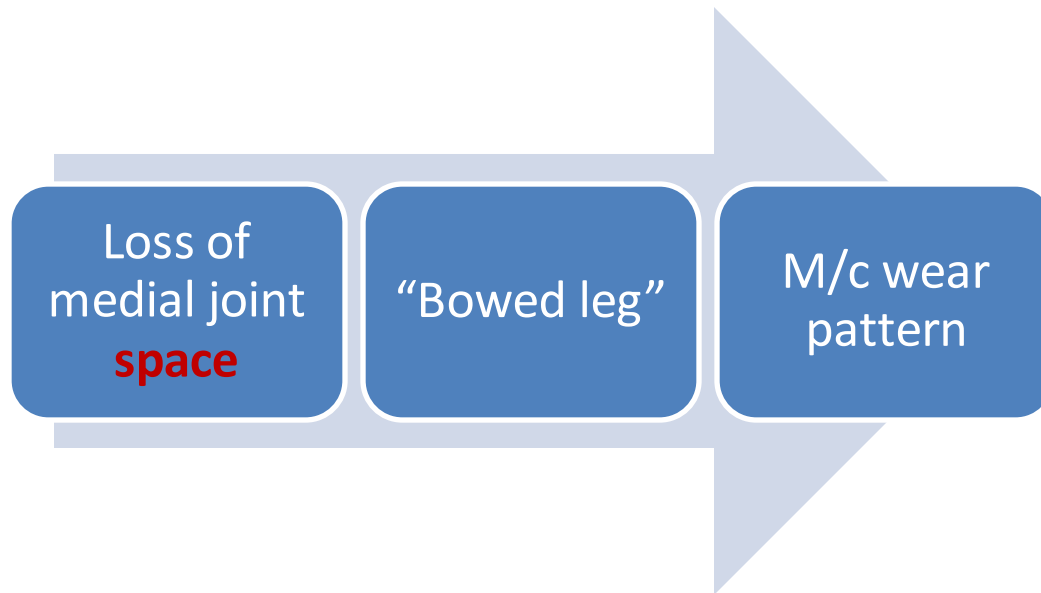
Classification of Knee OA

Kellgren-Lawrence (KL) grading scale

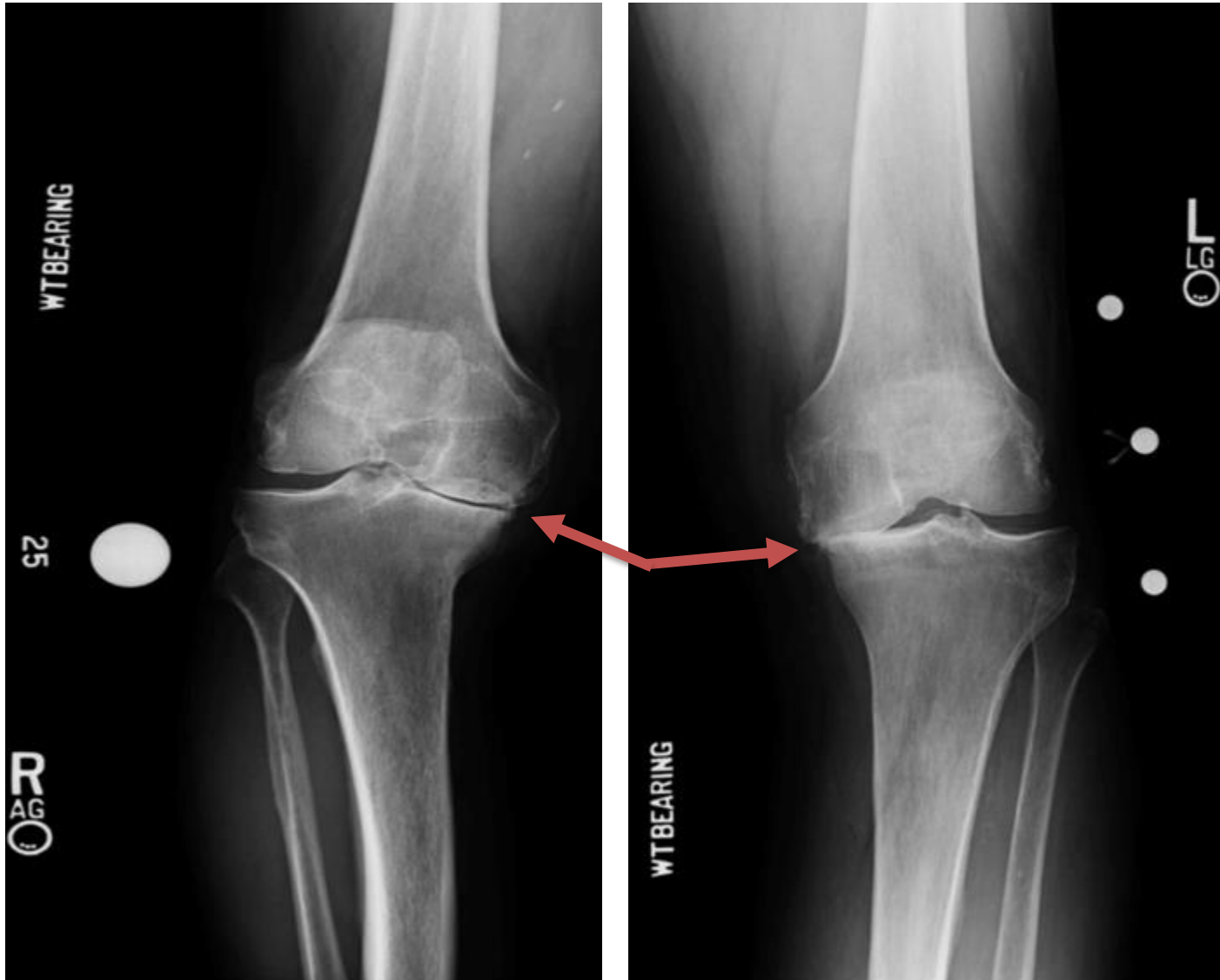


CLASSIFICATION	Normal	① Doubtful	② Mild	③ Moderate	④ Severe
DESCRIPTION	No features of OA	Minute osteophyte: doubtful significance	Definite osteophyte: normal joint space	Moderate joint space reduction	Joint space greatly reduced: subchondral sclerosis

Varus Knee OA



Varus Knee OA



Valgus Knee OA

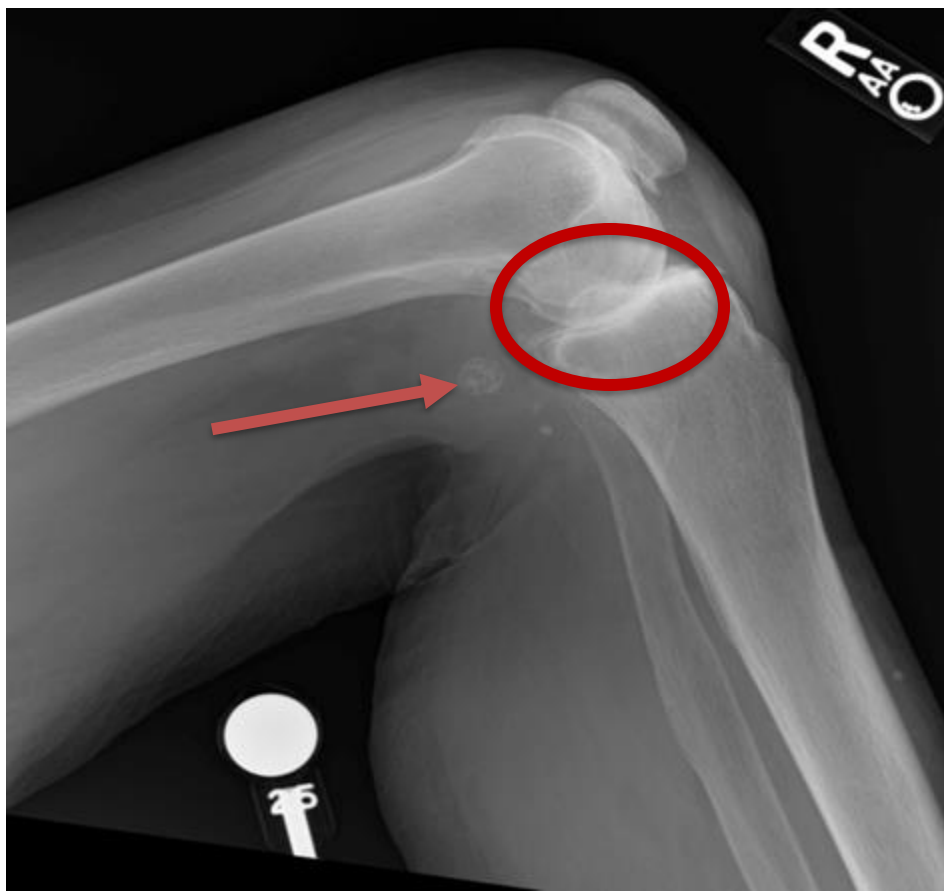
Loss of
lateral joint
space

“Knock
kneed”

Best seen in
PA flexion

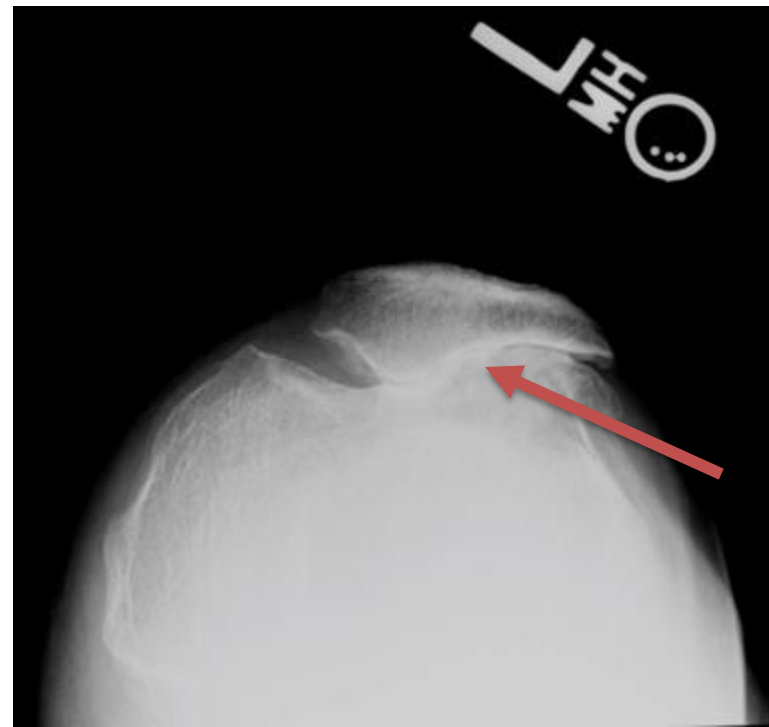


Valgus Knee OA



Patellofemoral Knee OA

- Loss of joint **space** under the kneecap
- Sharply **shaped** triangular patella
- Lateral patellar tracking/tilting



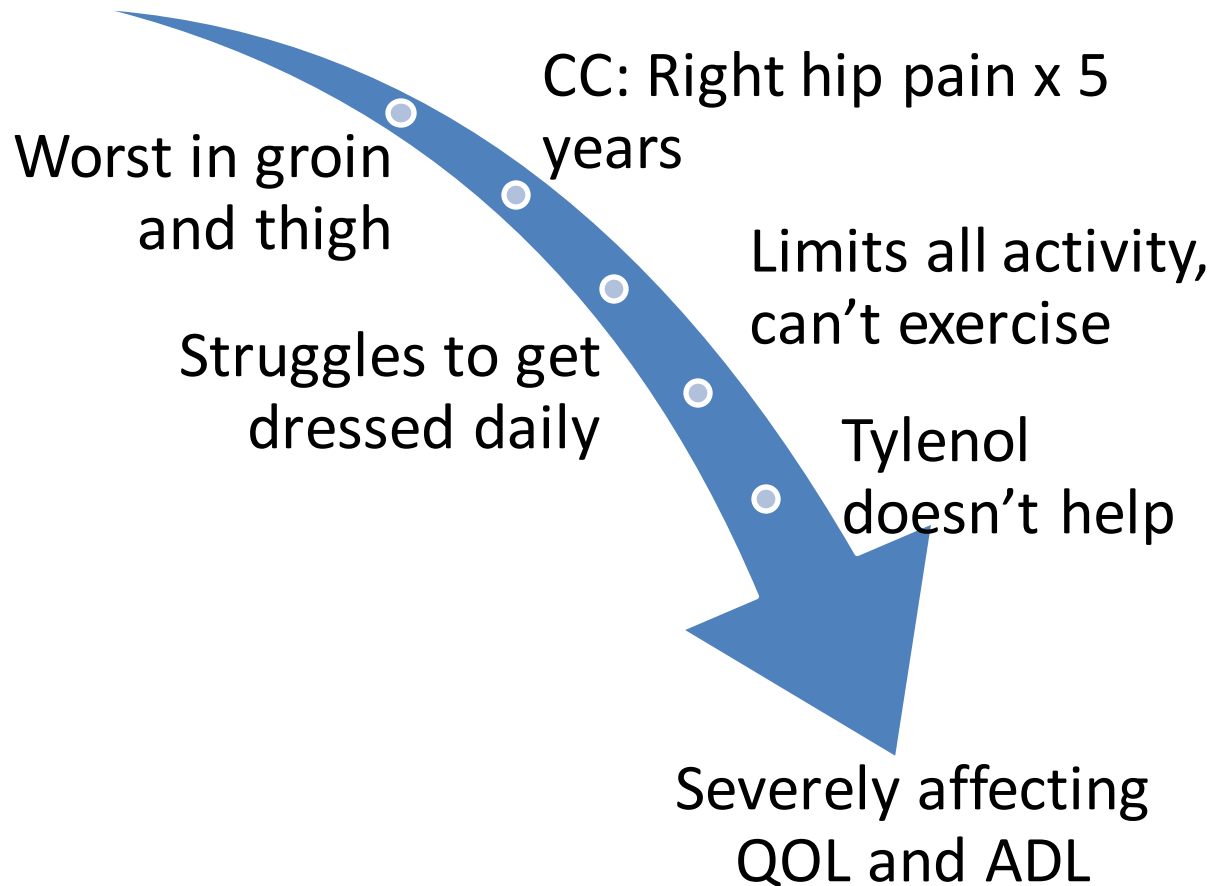


**KEEP
CALM
AND
BREATHE
DEEPLY**

PRACTICE TIME!

Case 1

81 y/o pt



Case 1



Case 2

62
y/o

“Pulled
groin”
last
year

Ibuprofen
doesn’t
help like it
used to

Trying
to do
HEP,
hard to
stretch

Right
hip
pain x
1 year

Had
normal
x-rays

PT
helped
some

Case 2

2023



2024



Case 3

52 y/o

Left hip
pain

Started
after a
gym
workout

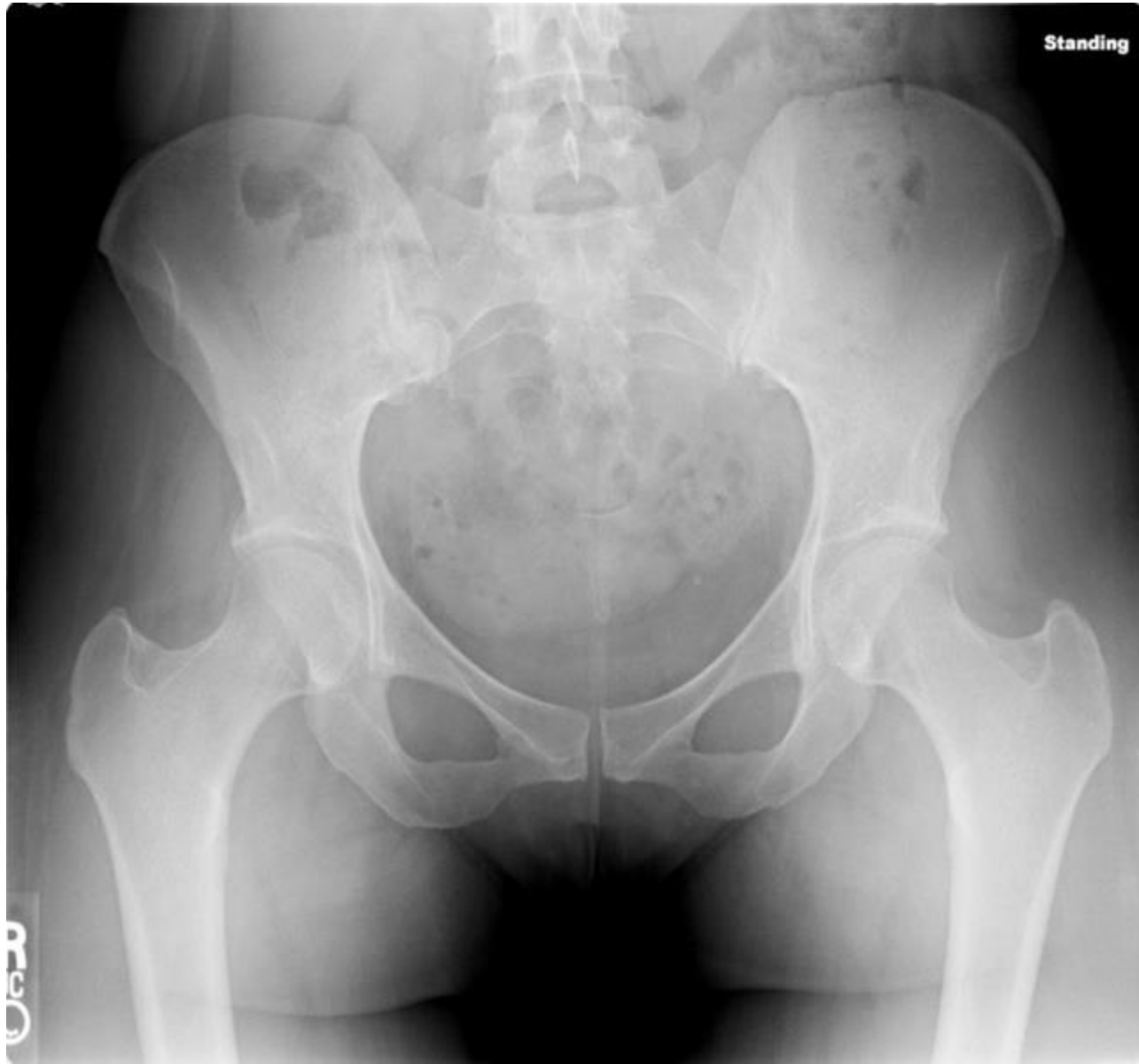
Lower
back and
hip pain

Radiates
to
posterior
thigh

Sharp,
shooting,
electrical
pain

Never
had
anything
like this
before

Case 3



Case 4

48 y/o
female

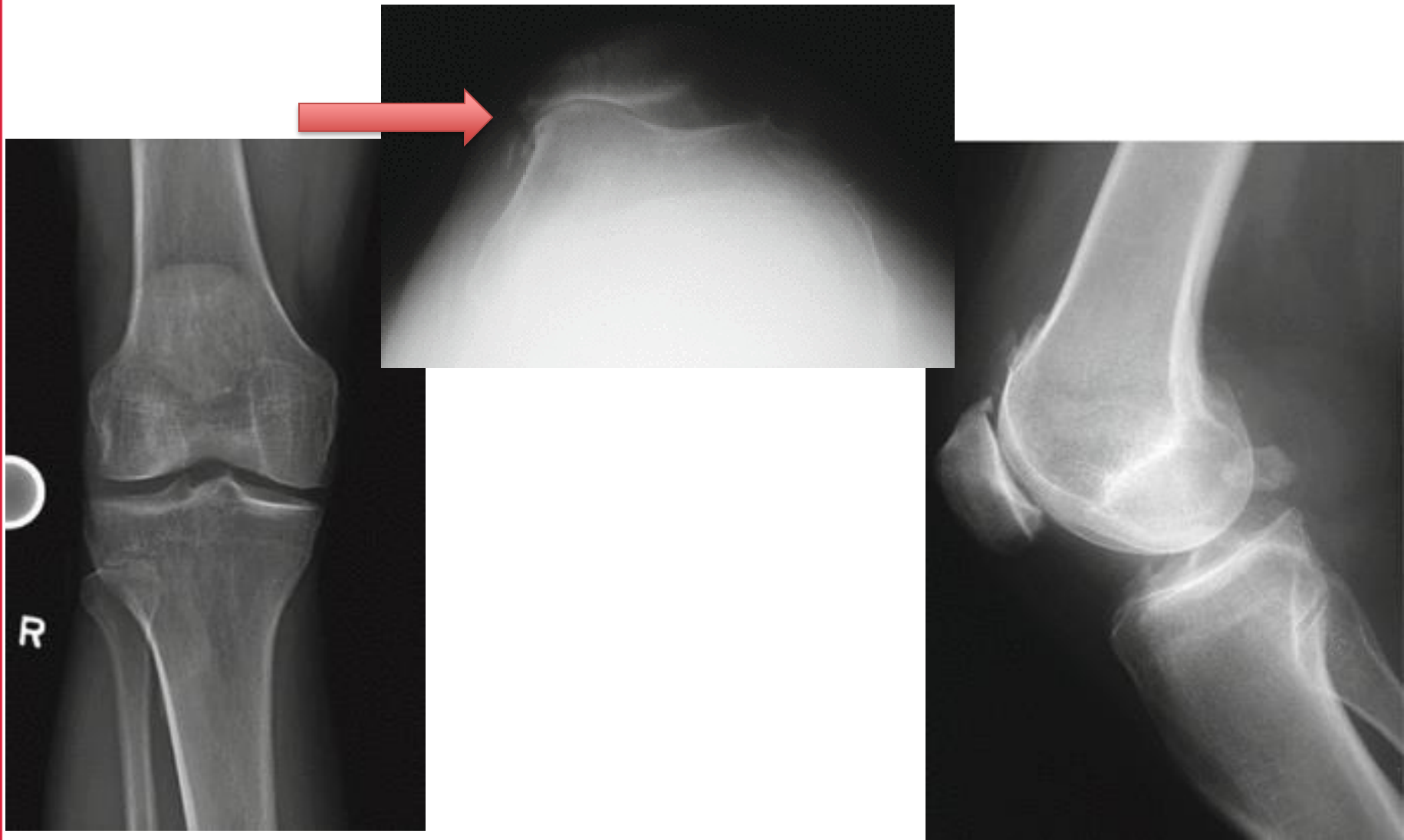
Right
anterior
knee pain

Since
teenage
years

Worst sitting,
stairs, squats,
lunges

Crunching,
grinding,
swelling

Case 4



62 y/o with B
knee pain

Case 5

Each side
different

Left: aching,
medial pain
worst with
walking

Right: sharp,
lateral pain with
stairs, feels
unstable

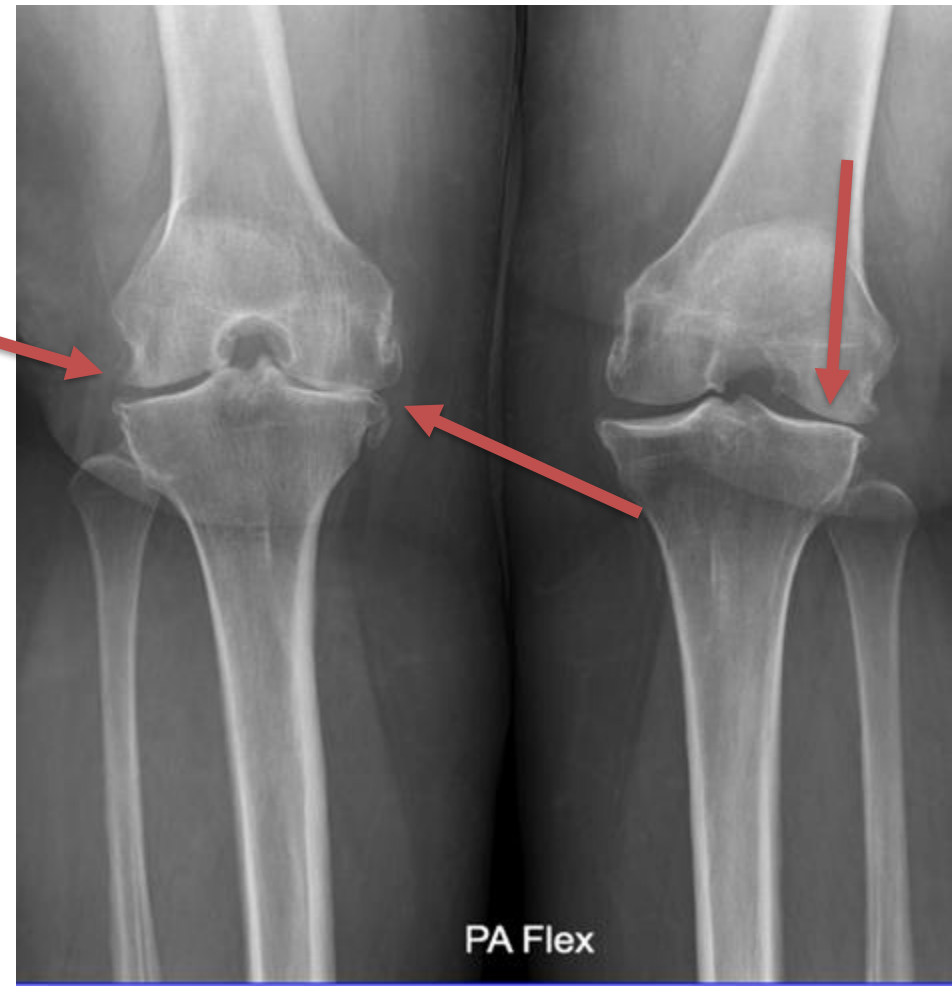
“Wobbly” and
walking like a
Weeble

Case 5



Windswept Knee OA

- Each knee has a different compartment wear pattern




Pearls

Pain, stiffness, locomotor restriction



AM stiffness < 30 min, activity pain better with rest, no systemic symptoms



Knee pain symptoms vary by affected compartment



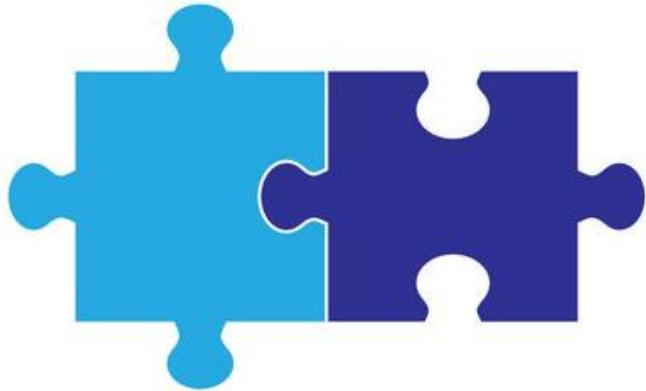
Hip pain localizes to groin and anterior thigh



Hip mobility affects flexion and rotation

Pearls

Shape



Space





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jgargiulo@umaryland.edu