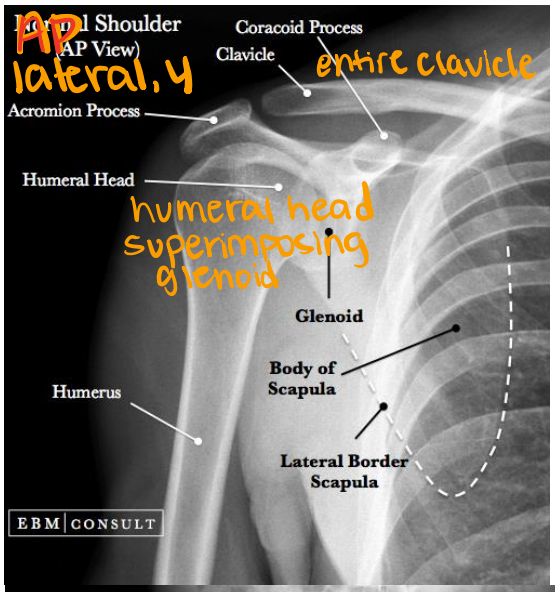
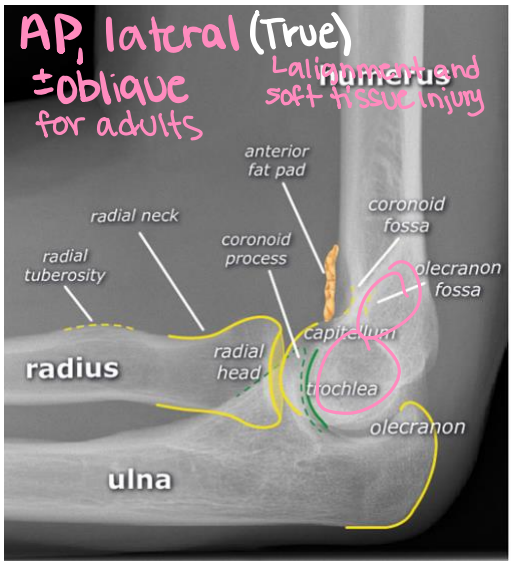
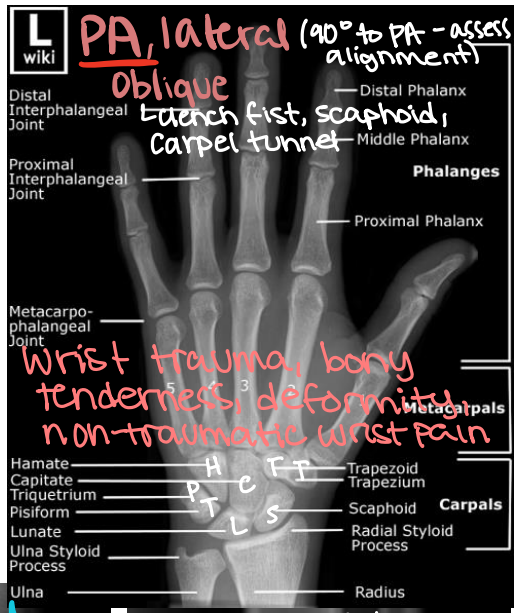
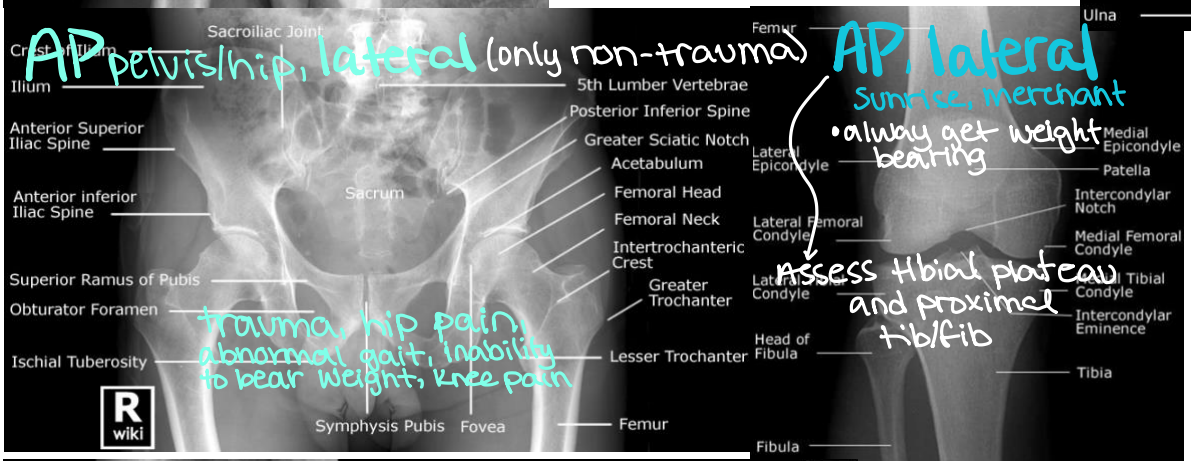
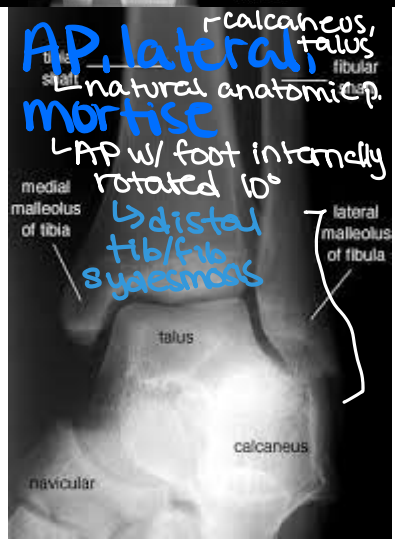
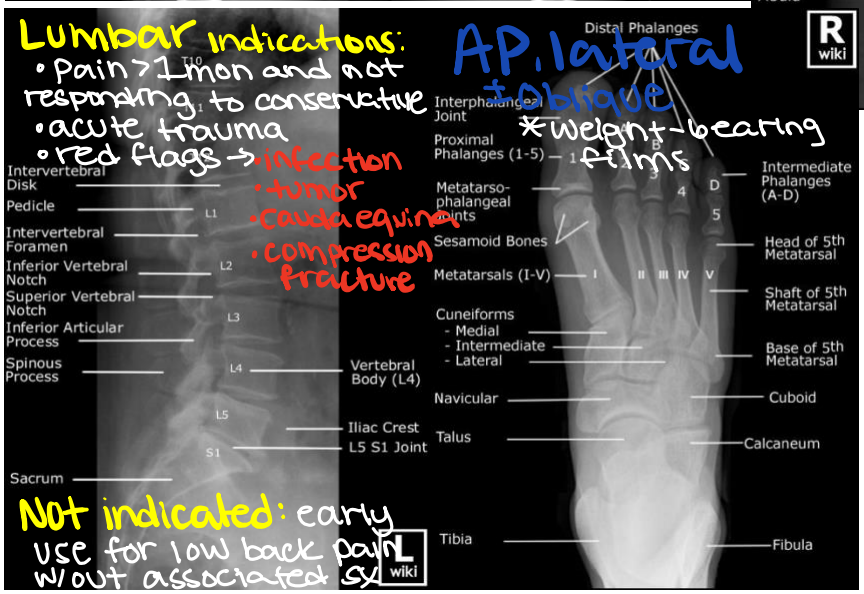


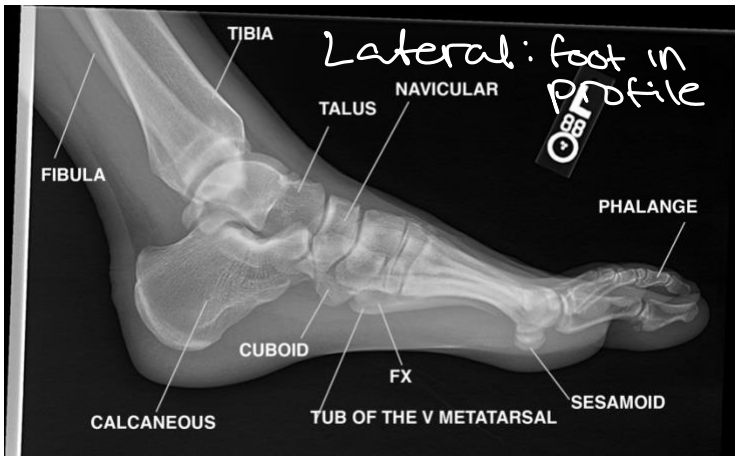












air

Soft tissue

fluid

bone

metal

radiolucent

- materials allow passage of x-ray

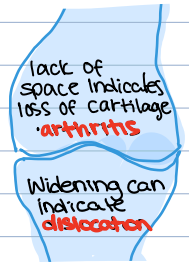
radiopaque

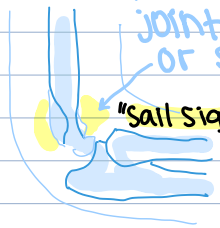
- materials prevent passage of x-ray leading to white shadow

A ALIGNMENT
anatomic relation between bones → altered by fractures and dislocations

A ADEQUACY
adequate # of views
- min 2 - AP, lateral
- 3 preferred

B BONES

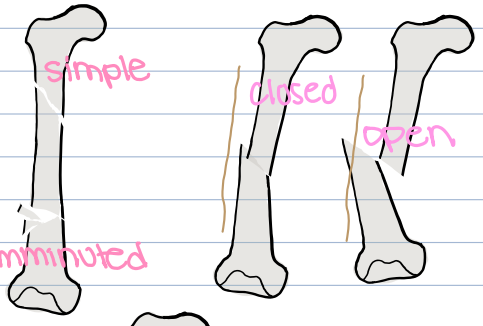

C CARTILAGE


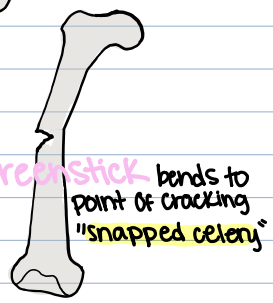
S SOFT TISSUE


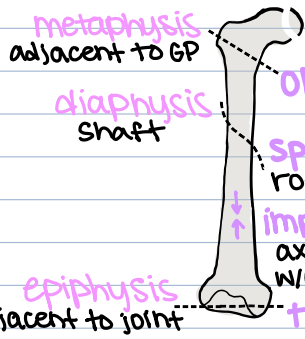
- can be indicative of fracture in peds

FRACTURES
disruption in continuity of all or part of bone cortex

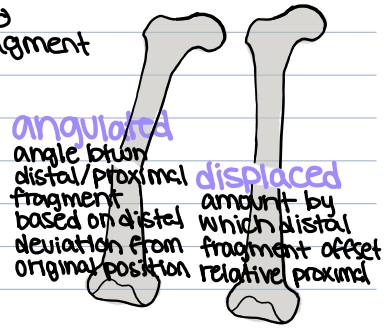
Fractures are commonly described using 5 parameters:
① # of fragments
② relationship to atmosphere
③ location
④ direction
⑤ relationship of fragments



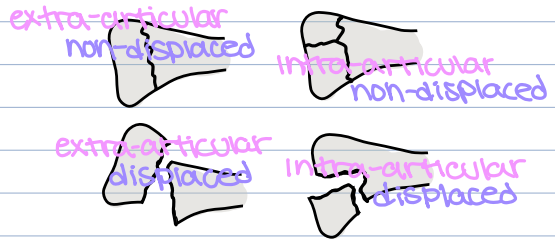


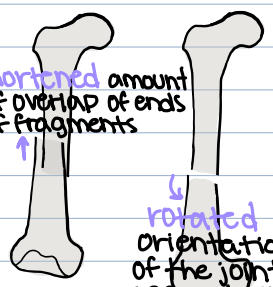


- avulsion tendon pulled away carrying bone fragment
- oblique
- spiral secondary to rotational force
- impacted compressive or axial force → fracture w/out displacement
- transverse



Joint involvement → intraarticular





SALTER HARRIS
epiphyseal plate →
+metaphysis +epiphysis +BOTH

- **S**lipped
- **A**bove joint
  - most common
  - good prognosis
  - "corner sign" - small metaphysical fragment
- **L**ower
- **T**hrough
- **R**ammed

poor prognosis →

- can lead to altered joint
- can lead to growth arrest

- crush fracture of epiphyseal plate
  - more significant trauma

mechanics

Ultrasound
high frequency sound waves to produce images within the body → gallbladder disease, breast lumps, genital/prostate issues, joint inflammation, blood flow problems, monitoring pregnancy, used to guide biopsy

Indications:
- joint effusion
- tendon or ligament injury
- arthrocentesis
- bursal aspiration/injection

Pros: inexpensive, readily available, examine multiple areas, procedures

Cons: user dependent, can't assess deep structures or entire joint.

X-ray
quick, painless tests to produce images of structures esp. bone → bone fractures, arthritis, osteoporosis, infections, breast cancer, swallowed items, digestive tract problems

OSTEOMYELITIS
- soft tissue/muscle swelling or effusion
  - ↳ after 10-14 days, periosteal thickening, cortical loss, sclerosis, bone resorption

ARTHRITIS
- osteophyte formation, subchondral sclerosis/cysts, joint space narrowing

CT ± contrast
series of x-rays to create cross-sections of inside of body (bones, vessels, tissue) → injury from trauma, bone fractures, tumors, cancers, vascular disease, heart disease, infection, guide biopsy

Indications:
- further evaluate fracture
- surgical planning
- evaluate tumors

Cons:
- expensive
- higher exposure to radiation
- limited by patient motion
- Ionizing radiation

MRI ± contrast
use of magnetic fields and radio waves to create images of organs/tissues → aneurisms, multiple sclerosis, stroke, spinal cord disorders, tumors, vessel issues, joint/tendon injury

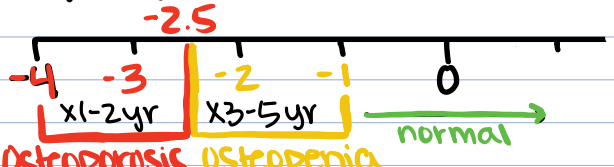
Indications:
- occult/unusual trauma
- articular imaging
- staging bone/ST tumors
- marrow diseases

Pros: good for ST and marrow
- bone edema contusion
- can delineate other causes of pain

Cons: not so good for bone
- limitations - time, expense

Dexa scan
dual-energy x-ray absorptiometry

Compares the patient's bone mineral density against:
1. an age-matched normal patient → Z-score (helpful for secondary, children, young adults, men<50)
2. a young, normal patient → T-score



If fracture, ↳ low bone density
severe osteoporosis

Screening indications:
- women >65 yo
- postmenopausal at ↑risk
  - hx of hip fracture, smoking, ↵ excessive alcohol use, ↓body weight

DEXA hip/lumbar spine