Brant and Helms
Musculoskeletal Radiology Checklist and Pearls
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OVERALL SEARCH PATTERN FOR RADIOGRAPHS (will come in handy on the MSK rotations and in the ED):

1. Assess for fracture or dislocation:
    -Follow the bony cortex to look for fracture lines; each joint has different fractures and even fracture classification systems.
        -Hands/wrist: look at the alignment for metacarpals and wrist bones to one another and to the radius/ulna on the 3 given views
        -Elbow: assess anterior and posterior fat pad; follow the anterior humeral and radiocapitellar lines
        -Shoulder: anterior is much more common than posterior dislocation (anterior if the humerus lies under the coracoid process); assess the clavicle
        -Pelvis: follow the ileopectineal, ilioischial, acetabular roof, anterior rim, posterior rim, and teardrop lines; for the femur, look closely at the femoral neck for subtle fractures
        -Knees: Look for patellar joint effusion or lipohemarthrosis (fat-fluid layering), assess the tibial plateau
        -Ankle/foot: check the ankle mortise to make sure it's intact; don't confuse accessory ossicles for fractures; look at the Lisfranc joints in the foot
        -Spine: Assess alignment, look at the 3 columns for classification, assess vertebral body height to determine compression, learn to differentiate degeneration from pathology
    -You CANNOT EXCLUDE A FRACTURE ON ONE VIEW; need to have at least two orthogonal views.
    -If there is a fracture, does the fracture line extend intra-articular?
    -For long bone fractures:
        -It can be a transverse, oblique, spiral, or comminuted fracture
        -Describe the angulation: you can use either 1) apex of the fracture or 2) direction of the distal fragment relative to the proximal fragment
    -Core Radiology is a great resource as well as the trauma chapters in the books recommended on the Resident Guide. Also, Bharti Khurana (ED radiology attending) has worked with residents and fellows on many Radiographics papers, which are amazing resources to learn about fractures and classification systems which orthopedic surgeons use. Search "khurana radiographics" on Google to find them.

2. Assess the hardware (if any):
    -Loosening: look for a thin radiolucent region around the hardware
    -Fracture: Look at the hardware to see if there is break in the pieces; again, have to look on multiple views.
    -Overall, focus on the purpose of the device so use terms such as "arthroplasty" or "surgical fixation screw/rod/plate/pin."
        -Shoulder: can also have a "reverse arthroplasty"
        -Hips: can also have a "cephalomedullary rod" or "dynamic hip screw"
        -Spine: use terms like "anterior fusion" or "posterior fusion." Look for intervertebral disc spacers or 'cage' devices in multi-level fusions.
    -There is a lot of different hardware that surgeons use and new devices come out all the time. Here are a couple recent articles: "New and Improved Orthopedic Hardware for the 21st Century: Part 1, Upper Extremity" and "Part 2, Lower Extremity and Axial Skeleton."

3. Assess for arthropathy:
    -This is the basis for the book “Arthritis in Black and White”
    -Core Radiology has a good search mnemonic: ABCDEs
        Alignment
        Bone Mineral Density, Bone Creation
        Cartilage, Calcification
        Distribution
        Erosions
        Soft tissue swelling
    -Overall, you are looking at the patterns of presentation, which are somewhat unique for each arthropathy
    -It can help to make a chart to sort through them. Look at pictures more than the text so that you can familiarize yourself with patterns
    -Besides Core Radiology and Arthritis in BW, here are a couple other resources: “Radiographic Evaluation of Arthritis: Degenerative Joint Disease and Variations” and “Radiographic Evaluation of Arthritis: Inflammatory Conditions.” Both are RSNA publications.

4. Assess for lesions:
    -Include benign and malignant
    -Look in the surrounding muscles and fat as they can also have pathology
    -Core Radiology is a good resource and you can use the recommended textbooks in the Resident Guide to get more in depth information
    -Often CT and/or MRI will be the next step so always look at prior imaging to see when the diagnosis was first made. Sometimes you can find a correlate on early radiographs.

5. Additional assessment:
    -Certain systemic diseases manifest in the bones. For example, sickle cell, Paget’s, renal osteodystrophy, and hyperparathyroidism among others.
    -Again, look for the patterns that are unique to certain diseases.
    -Core Radiology is a good, first resource.

*Know your bones, especially the wrist and ankle
*CT and MRI builds on your knowledge base from radiographs so the better you know the anatomy now, the easier it will be to learn the other imaging modalities
*Know the different views that are need to evaluate each joint
    -“Aunt Minnie X-ray positioning manual” is an additional resource to learn them