

# 1

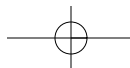
## Musculoskeletal Radiology

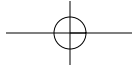
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*Includes plain film diagnosis in all areas of the musculoskeletal system plus any related special or imaging procedures, including CT, interventional techniques, and MRI.*

### GENERAL CASE CATEGORIES

1. General including Metabolic
2. Congenital
3. Tumors
4. Arthritis





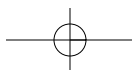
## General

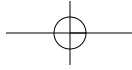
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### BASILAR INVAGINATION

#### PF ROACH

- Paget disease
- Fibrous dysplasia
- Rickets
- Osteogenesis imperfecta, Osteomalacia
- Achondroplasia
- Cleidocranial dysplasia
- Hyperparathyroidism, Hurler syndrome

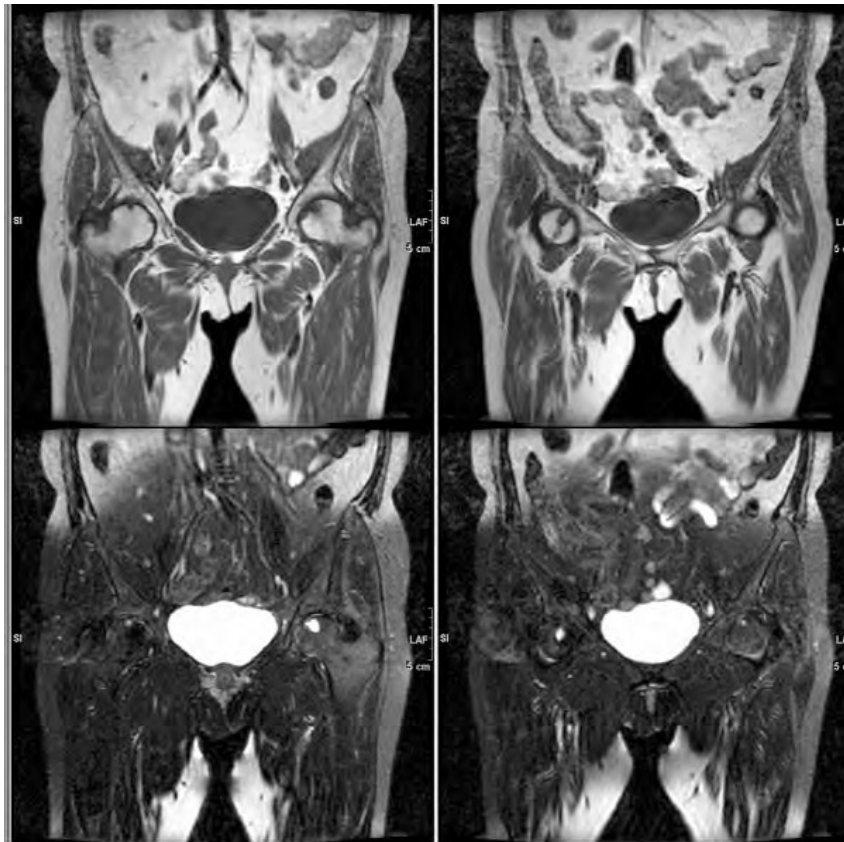


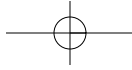


## SUBCHONDRAL CYSTS

### COORS

- CPPD
- Osteoarthritis
- Osteonecrosis
- Rheumatoid arthritis
- Synovial-based tumors

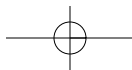


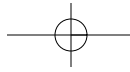


## ACETABULAR PROTRUSION

### PROTrusio

- Paget disease
- Rheumatoid arthritis
- Osteomalacia
- Trauma

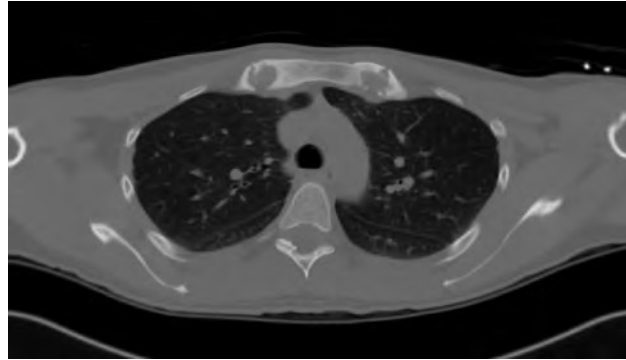




## STERNOCLAVICULAR SCLEROSIS

### STOP

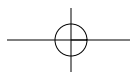
- SAPHO syndrome
- Traumatic osteolysis
- Osteomyelitis/Osteosarcoma
- Pagets

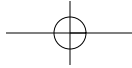


## DISTAL CLAVICLE EROSION

### SHIRT

- Scleroderma
- Hyperparathyroidism
- Infection
- Rheumatoid arthritis
- Traumatic osteolysis





## SCLEROSIS-GENERALIZED

**R.S.M.O.P.M.M.P.F. (Regular sex mnemonic)**

- Renal osteodystrophy
- Sickle cell disease
- Myelofibrosis
- Osteopetrosis
- Pyknodysostosis
- Mastocytosis
- Metastasis
- Pagets
- Fluorosis

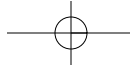


## OSTEONECROSIS

### ASEPTIC

- Anemias
- Sickle cell disease/SLE
- ETOH/Exogenous steroids
- Pancreatitis
- Trauma
- Infection
- Caisson's disease

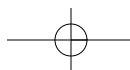


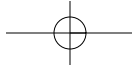


## ACRO-OSTEOLYSIS

### PINCH FO

- Psoriasis
- Infection
- Neuropathic
- Collagen vascular disease
- Hyperparathyroidism
- Familial (Hadju Cheney)
- Other—polyvinyl alcohol

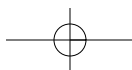
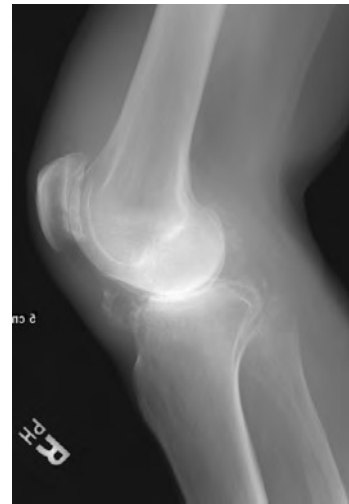




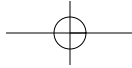
## CHONDRAL CALCIFICATION

### HOGWASH

- H**yperparathyroidism
- O**chronosis
- G**out
- W**ilson's Disease
- A**rthritis
- P**seudogout
- H**emochromatosis





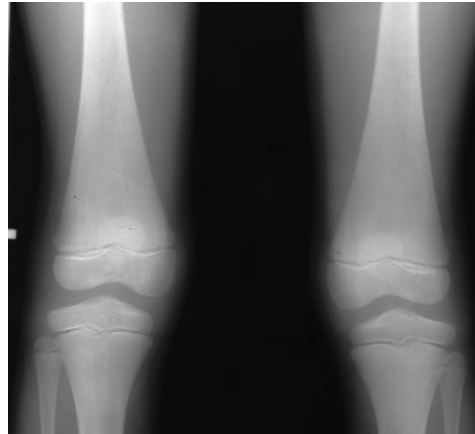


# Congenital

## ERLYMEYER FLASK

### CHONGO

- Craniometaphyseal dysplasia
- Hemoglobinopathies
- Osteopetrosis
- Niemenn Pick
- Gaucher's Disease
- Other



## METAPHYSEAL BANDS

### DENSE

#### LINES

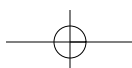
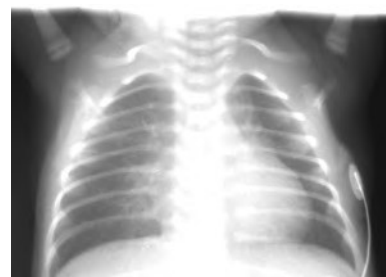
- Lead poisoning
- Infantile growth arrest
- Normal, 3 yr
- LEukemia treated
- Syphillis

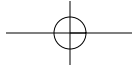


### LUCENT

#### NORMAL TENDER LOVING CARE

- Normal (neonates)
- TORCH
- Leukemia
- Chronic illness



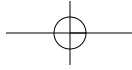


## GRACILE BONES

### NIMROD

- Neurofibromatosis
- Immobilization
- Muscular dystrophy
- Rheumatoid arthritis
- Osteogenesis imperfecta
- Dysplasias





## MADELUNG DEFORMITY

### HITDOC

- Hurler syndrome
- Infection
- Trauma
- Dyschondrosteosis
- Osteochondroma
- Congenital–Turner’s syndrome

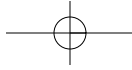


## SHORT METACARPALS

### BIC PEN

- Basal Cell Nevus syndrome
- Idiopathic
- Chromosomal–Turner’s syndrome
- Pseudohypoparathyroidism/PseudoPseudo-hypoparathyroidism





# Tumors

## DIAPHYSEAL LESIONS IN GENERAL

### CEMENT

- Cysts
- Enchondroma
- Metastasis
- Eosinophilic granuloma (EG)
- Non-ossifying fibroma (NOF)
- TB/infections

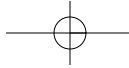


## CORTICAL LESION

### MOFOS

- Metastasis
- Osteomyelitis
- Fibrosarcoma
- Osteoid osteoma
- Stress fracture





## ILIAC WING LESIONS

- Fibrous dysplasia
- Unicameral bone cyst
- Chondrosarcoma
- Mets/Myeloma/Plasmacytoma
- Ewings



## VERTEBRA PLANA

### IMELT

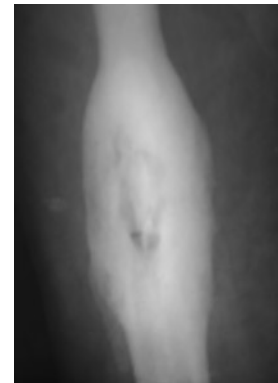
- Infection
- Mets/Myeloma
- EG
- Lymphoma/Leukemia
- Trauma



## BONY SEQUESTRUM

### LIFE

- Lymphoma
- Infection
- Fibrosarcoma
- EG

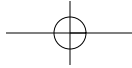


## RIB LESION

### FAME

- Fibrous dysplasia
- ABC
- Metastatic/Myeloma/Lymphoma
- EG/Enchondroma





## EPIPHYSEAL LESIONS

### CIGS

- Chondroblastoma
- Infection
- Giant cell tumor/Granuloma (EG)
- Subchondral cyst



## FOCAL SCLEROTIC LESION

### HOME LIFE

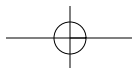
- Healed NOF
- Osteoma
- Metastasis
- Ewing's sarcoma
- Lymphoma
- Infection/Infarct
- Fibrous dysplasia
- Enchondroma

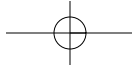


## PERMEATIVE LESIONS

### FIRE

- Fibrosarcoma (Desmoid/MFH)
- Infection
- Round cell tumors
- EG
- Mets/Myeloma

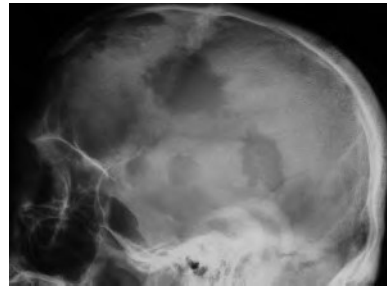




## SKULL LESION

### MEL TORME

- Metastasis
- EG
- Lymphoma
- TB
- Osteomyelitis
- Radiation
- Mets
- Epidermoid



## TIBIAL LESION

### FOAM

- Fibrous dysplasia
- Osteofibrous dysplasia
- Adamantinoma
- Metastasis

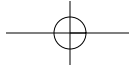


## POSTERIOR VERTEBRAL BODY LESION

### GO TAPE

- Giant cell tumor
- Osteoblastoma
- TB
- ABC
- Paget disease
- EG





## CALCANEAL LESION

### BIG G

- Bone cyst-unicameral
- Intraosseous lipoma
- Ganglion
- Giant cell tumor



## FINGER TIP LESION

### GEMS

- Glomus tumor
- Epidermoid/Enchondroma
- Metastasis (lung almost exclusively)
- Sarcoid



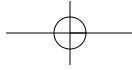
## SOFT TISSUE CALCIFICATION/OSSIFICATION

### My GHOSTS

- Myositis ossificans
- Gout
- Hyperparathyroidism
- Ochronosis
- Scleroderma/connective tissue disease
- Tumoral calcinosis
- Sarcoma (synovial cell)







## SACRAL LESION

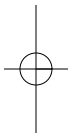
### CAN

Chondrosarcoma/Chordoma

ABC/GCT

Neurofibromatosis

And always Mets/Myeloma/Lymphoma



## FLUID-FLUID LEVEL

### HOT MASS

Hemangioma

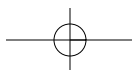
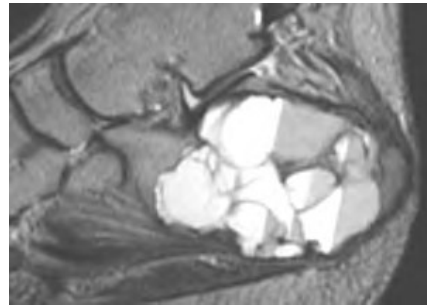
Telangiectatic osteosarcoma

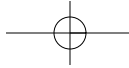
Metastasis

ABC/GCT

Synovial cell

Sarcoma





# Arthritis

## INFLAMMATORY ARTHRITIS

### 1. RF+

#### *Rheumatoid Arthritis*

-Symmetric

#### *SLE*

-Subluxation/nonerosive

#### *Scleroderma*

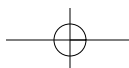
-DIP, PIP erosions

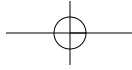
-Soft tissue  $Ca^{2+}$

-Acroosteolysis

#### *Dermatomyositis*

-Soft tissue  $Ca^{2+}$





**2. RF-**

***Ankylosing Spondylitis***

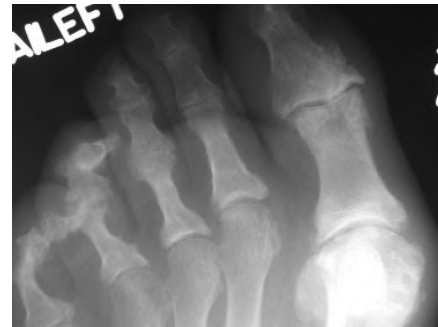
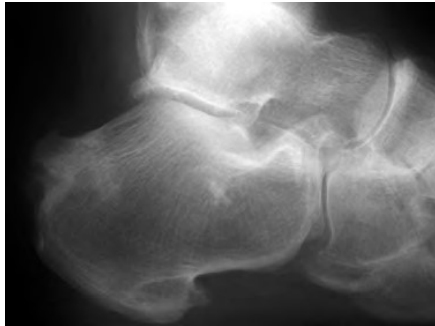
-SI joint involvement



***Reiters***

-Foot > Hand

-Bony Proliferation



***Psoriasis***

-Erosive

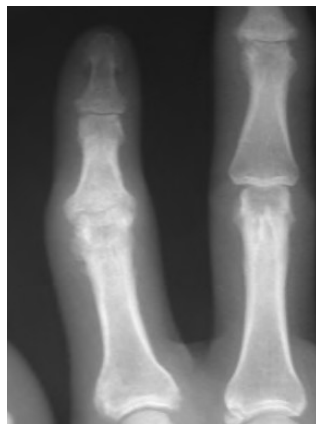
-Bony proliferation

-Asymmetric

-Sausage digit

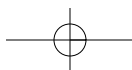
-Ivory phalanx

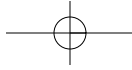
-Pencil in cup



***Inflammatory Bowel Disease (IBD)***

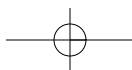
-Arthritis with IBD

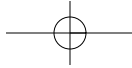




### 3. EROSIVE OA

-Dip Joints



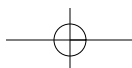


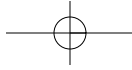
## CRYSTAL ARTHRITIS

### 1. DEPOSITION

#### *Gout*

- Marginal erosions
- Overhanging edges
- Preserved joint space

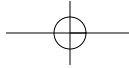




**CPPD**

- ChondroCa<sup>2+</sup>
- Cysts
- 2nd and 3rd MCP
- SLAC
- TFCCa<sup>2+</sup>





## 2. OTHER

*Hemochromatosis*

*Acromegaly*

*Other*

Ochronosis

-Disc calcification

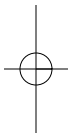
Multicentric reticular histiocytosis

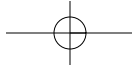
-Symmetric

-No osteopenia

Infection

-Crosses Joint Space

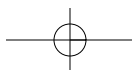




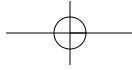
## OH MY GOD LESIONS

**VERY BIZARRE LOOKING GENERALIZED  
LESIONS THAT YOU HAVE NO IDEA  
WHAT IT IS, THINK OF:**

- Paget disease
- Fibrous dysplasia
- Neurofibromatosis
- Charcot joints





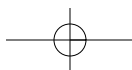
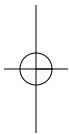


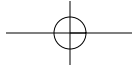
# Metabolic

## OSTEOPENIA

### GENERALIZED

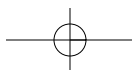
- Senile osteoporosis
- Osteomalacia
- Endocrine abnormalities
  - Cushings (too much)
  - Hypogonadism (too little)
- Anemia/Myelofibrosis/Gauchers
  - Bone marrow
- Congenital
  - Osteogenesis imperfecta
- Hyperparathyroidism

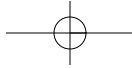




**FOCAL**

- Reflex sympathetic dystrophy (complex regional pain syndrome)
- Disuse
- Transient osteoporosis
- Migratory osteoporosis

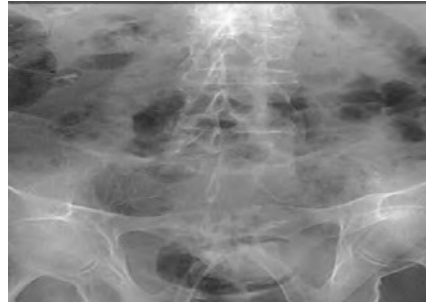




## SPINE

### CALCIFICATION OF THE ANNULUS FIBROSUS

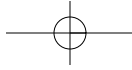
- Ankylosing spondylitis
  - Disks unremarkable
- Ochronosis
  - Disks calcified
  - Abn SI joints



### OSTEOPHYTES

- DISH
  - Disks unremarkable
  - Normal SI joints





**SYNDESMOPHYTES**

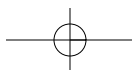
- Psoriasis
- Reiters

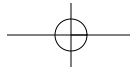
**MARGINAL OSTEOPHYTES**

- Spondylosis or degenerative



**OSTEOPHYTOSIS**





## ARTHRITIS BASICS AND ARTHRITIS BY LOCATION

**ABCDS** Alignment  
 Bone  
 Cartilage/calcifications  
 Distribution  
 Soft tissues

### **Wrist**

1st CMC, TFC—CPPD  
 Radiocarpal joint—osteoarthritis  
 CMC—gout (marginal erosions)

### **Hand**

#### **DIP + PIP**

Osteoarthritis  
 –Osteophytes  
 –No erosions  
 Erosive osteoarthritis  
 –Osteophytes  
 –Erosions  
 –Females  
 Psoriasis/Reiters  
 –No osteophytes  
 –Erosions

#### **MCP + PIP**

Rheumatoid  
 –Erosions  
 –No osteophytes  
 –Osteopenia  
 Psoriasis/Reiters  
 –Erosion  
 –Bony proliferation

#### **MCP**

Inflammatory  
 –Erosions  
 CPPD/hemochromatosis  
 –Osteophytes

### **Foot**

#### **MTP JOINTS**

RA  
 Gout  
 OA  
 Neuropathic

#### **MIDDLE/HINDFOOT**

RA  
 Osteoarthritis

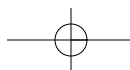
### **Hip**

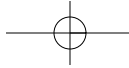
#### **BONY PROLIFERATION**

OA  
 –Superolateral migration  
 Ankylosing spondylitis  
 –Axial migration  
 –SI joint involvement symmetric  
 Psoriasis/Reiters  
 –Axial migration  
 –SI joint involvement asymmetric  
 CPPD  
 –Chondrocalcinosis

#### **NO . PROLIFERATION**

RA  
 –Acetabular protrusio  
 –Osteopenia





***Knee***

**COMPLETE JOINT INVOLVEMENT**

**RA**

- No bony proliferation
- Osteopenia
- Cyst formation

**JRA/hemophilia**

- Wide femoral notch
- High density effusion

**Psoriasis/Reiter's**

- Asymmetric
- Bony proliferation

**MEDIAL INVOLVEMENT**

Osteoarthritis

**PATELLOFEMORAL INVOLVEMENT**

CPPD

***Shoulder***

**GLENOHUMERAL JOINT**

**CPPD**

- vs osteoarthritis-not a weight-bearing joint

**ACROMIOCLAVICULAR JOINT**

Rotator cuff tear

- Glenohumeral joint spared

**TOTAL JOINT INVOLVEMENT**

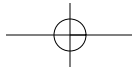
Rheumatoid

- Symmetric

**NORMAL JOINT SPACE**

Hydroxyapatite crystal deposition disease





## NAMES TO KNOW

### UPPER EXTREMITY

Mallet Finger  
 Bennett's  
 Rolando  
 Gamekeeper  
 Boxer's  
 Colle's  
 Smith's  
 Chauffer's (Hutchinson's)  
 Barton's  
 Rev. Barton's  
 Nightstick  
 Monteggia  
 Galeazzi  
 Hill Sach's  
 Bankart

### LOCATION OF INJURY

Dorsal Base DP  
 1st MC base, intraarticular  
 Communitied  
 1st PP ulnar  
 5th MC  
 Distal radius  
 Reverse colles  
 Radial styloid  
 Dorsal rim  
 Anterior rim  
 Ulnar shaft isolated  
 Ulna and radial + dislocation (elbow)  
 Ulna and radial + dislocation (wrist)  
 Humeral head  
 Glenoid

### LOWER EXTREMITY

Jones  
 Lisfranc  
 Choparts  
  
 Maisonneuve  
  
 Tillaux  
 Wagstaffe-Lefort

### LOCATION OF INJURY

5th MT base  
 2-5 MT  
 Talonavicular and calcaneocuboid  
 dislocation  
 Pronation external rotation injury-  
 proximal fibula  
 Anterior tibial tubercle  
 Fibular avulsion

### SPINE

Jefferson  
 Hangman  
 Clay Shovelers  
 Lefort I  
 Lefort II  
 Lefort III

### LOCATION OF INJURY

C1 lateral masses  
 C2 pars Fx  
 Posterior elements  
 Through maxilla  
 Nasal—inferior orbital rims  
 Nasal—orbis



