Spotters Cases in Radiology



HOW TO APPROACH THIS BOOK

Strategic Approach to Radiology Spotters book:

1. Familiarize with Key Anatomy: Before diving into the spotters, ensure you have a strong foundation in normal radiological anatomy. Use reference texts to brush up on common anatomical structures.

2. Initial Image Review: Start by looking at the image without glancing at the answer or explanation. Try to identify key structures, abnormalities, or pathologies based on your own understanding.

3. Form a Diagnosis: Based on the structures and features in the image, formulate a tentative diagnosis or identification of the abnormality.

4. Cross-Check with Explanations: After making your own diagnosis, compare it with the provided answers and explanations in the book. Focus on understanding the reasoning behind each diagnosis and the radiological signs.

5. Note Down Difficult Areas: Highlight or make notes of images or diagnoses you find challenging. Revisit these sections later for more in-depth study or revision.

6. Study in Themes: Organize your study by focusing on specific systems (e.g., musculoskeletal, neuro, thoracic imaging) or pathologies (e.g., fractures, tumors, congenital abnormalities) to reinforce learning within a particular context.

7. Repetition and Active Recall: Regularly revisit spotters you have already worked through. This will help reinforce the material and improve your recall speed, crucial for exam settings.

8. Group Discussions: Discuss the spotter images in study groups to gain different perspectives and approaches to identifying radiological signs. Teaching and explaining the cases to peers can further solidify your understanding.

9. Simulate Exam Conditions: Occasionally practice identifying spotters under timed conditions to simulate exam pressure. This will enhance your ability to work quickly and accurately in real-world scenarios.

10. Review Regularly: Consistently go over the images you found difficult, ensuring that over time, you become familiar with the patterns and features of common pathologies.

11. Integrate with Clinical Knowledge: Try to correlate the radiological findings with clinical symptoms, understanding how these images fit into the broader context of patient diagnosis and management.

This systematic approach will help you get the most out of the radiological spotters book and build a strong foundation for both exams and clinical practice.

Team Conceptual Radiology

PREFACE

Radiology has become an indispensable tool in modern medicine, allowing us to visualize the inner workings of the human body with remarkable clarity. For students, mastering radiological anatomy is essential, not only for diagnosing conditions but for understanding how structure relates to function. This book of "Radiological Spotters" by Conceptual Radiology is designed to facilitate that understanding through targeted, high-yield learning.

Radiological spotters are an excellent way to sharpen diagnostic skills, as they encourage quick, accurate recognition of key anatomical structures and common pathologies. The format of this book is particularly advantageous for students preparing for practical examinations or real-world clinical scenarios, where time and precision are crucial.

To use this book effectively, I recommend that you first study the images carefully without referring to the answers. Try to identify the key features and make a diagnosis based on your understanding of anatomy and pathology. This approach will train your eye to detect subtle abnormalities and build your confidence in interpreting images independently.

Next, cross-reference your answers with the provided explanations. Take the time to understand why certain features are important, and consider how similar conditions may present differently on various imaging modalities. Use this opportunity to consolidate your learning by revisiting topics that you find challenging.

Finally, regular revision is key. Radiology is a field where repetition solidifies knowledge. Use this book frequently, either alone or in study groups, to test your skills and track your progress.

Incorporating this text into your routine will not only prepare you for exams but also lay a strong foundation for your clinical practice.

I trust that this book will become a valuable resource in your journey to mastering radiological anatomy.

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MSK Spotters

SPOTTER - 1

History – Multiple swellings all over the body



Diagnosis; NF 1

Additional information:

- Diagnostic criteria of NF1 (2 or more of the following): > 6 cafe au lait spots evident during one year
- Two or more neurofibromas or one plexiform neurofibroma
- Optic nerve glioma
- Distinctive osseous lesion (such as sphenoid wing dysplasia or thinning of long bone cortex with or without pseudoarthrosis)
- ≥ 2 lisch nodules
- Axillary or inguinal freckling
- F/H ⊕

SPOTTER - 2

History – Right shoulder pain

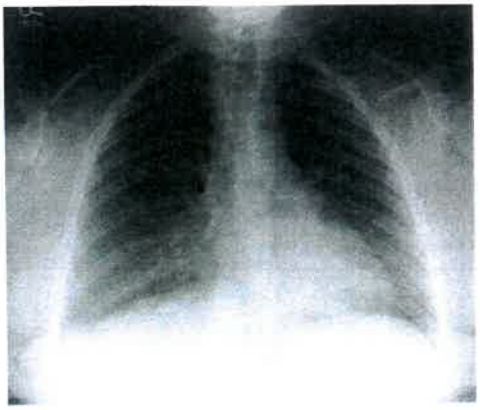


Diagnosis: Simple bone cyst with pathological fracture

Additional information:

- Central expansile lesion with fallen fragment Sign
- Aka Unicameral bone cyst
- Typically intramedullary, MC in proximal humerus
- Most commonly presents with pathological fracture
- Majority spontaneously regress

SPOTTER - 3



Cleidocranial Dysplasia

Additional information:

Dsyplastic clavicles noted on both sides

- Mutation in CBFA1 gene, AD inheritance or sporadic mutation
- Incomplete intramembranous ossification of midline skeletal structures including the clavicles, and defective development of the pubic bones, vertebral column, and long bones

SPOTTER - 4

History – Pain while walking right foot



Diagnosis: Freiberg's Infarction

Additional information:

- Sclerosis of head of 2nd metatarsal
- Most common in adolescent athletic females; M:F = 1:5
- Patient presents with localised forefoot plantar pain, especially on weight-bearing

SPOTTER - 5

History – Wrist pain



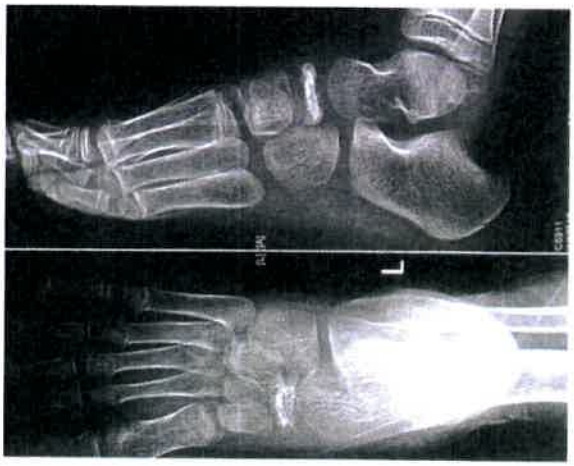
Diagnosis: Keinboch's : Lunate osteonecrosis

Additional information:

Associated with negatve ulnar variation

SPOTTER - 6

History – Ankle pain left side



Diagnosis: Kohler's disease: Avascular necrosis of navicular bone

Additional information:

- Navicular bone is flattened, sclerosed
  - Keinboch's disease – Lunate ostonecrosis
  - Kummel's disease – aseptic necrosis of ring epiphysis of vertebra

SPOTTER - 7

History – Right knee pain



Diagnosis: Osgood-Schlatter Disease

Additional information:

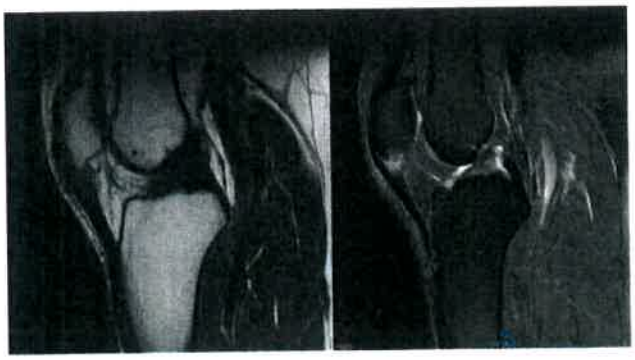
Opacified infrapatellar fat pad

Thickened, poorly defined patellar tendon

- Affects young males (10-15 years)
- Apophysitis of the tibial tubercle, due to repeated microtrauma at the site of patellar tendon insertion
- D/D: Infrapatellar bursitis, Jumper's knee

SPOTTER - 8

History – Right knee pain



Diagnosis: Sinding –Larsen-Johannsen syndrome

Additional information:

- SLJ syndrome = osteochondrosis involving the distal patellar pole at the insertion of the patellar tendon.
  - It results from persistent traction at the cartilaginous junction of the developing inferior pole of the patella.

SPOTTER - 9

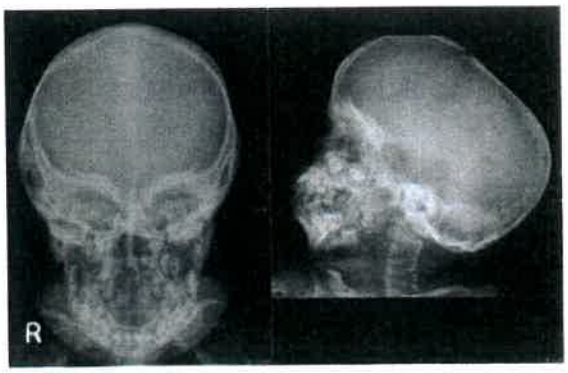


Diagnosis: Ainhum

Additional information:

- Autoamputation of a digit, usually the fifth toe
- Caused by a constricting fibrous band or groove
- May be associated with running barefoot
- Frequently B/L, rare before 30 or after 50

SPOTTER - 10



Diagnosis: Hurler's disease

Additional information:

- Frontal bossing, calvarial thickening

- Premature fusion of sagittal and lambdoid sutures
- Enlarged J shaped sella

SPOTTER - 11

History – Cervical pain



Diagnosis: Diffuse idiopathic skeletal hyperostosis (DISH) = Forestier disease

Additional information:

Resnick & Niwayama criteria:

1. Flowing osteophytes over >/= 4 contiguous thoracic vertebrae
2. Preserved IVD space without extensive degenerative intervertebral disease
3. Absence of facet and costovertebral joint ankylosis
4. Absence of sacroiliac joint erosion, sclerosis or fusion

SPOTTER - 12



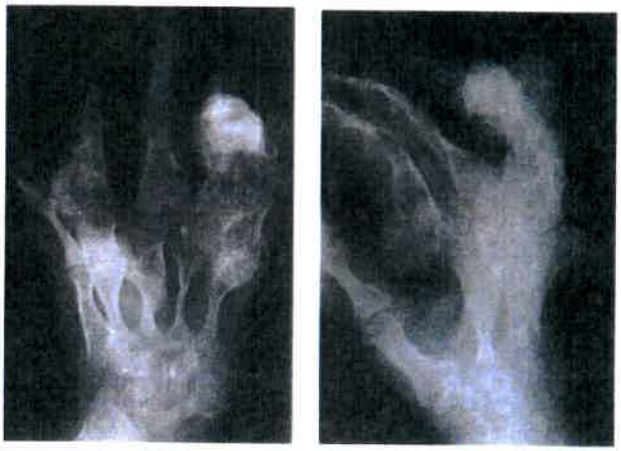
Diagnosis: Melorheostosis

Additional information:

Intramedullary subcortical wavy hyperostosis resembling candle wax drippings typically conforms to spinal sensory nerve dermatomal distribution, is highly characteristic of melorheostosis.

- Leri's disease
- Ectopic bone in soft tissue around joints between affected bones
- Unilateral; Asymmetric if bilateral
- Segmental/sclerotomal involvement
- Usually lower limbs

SPOTTER - 13



Diagnosis: Maffucci syndrome

Additional information:

Multiple enchondromatosis with soft-tissue hemangiomas

- Olliers disease is another enchondromatosis

SPOTTER - 14

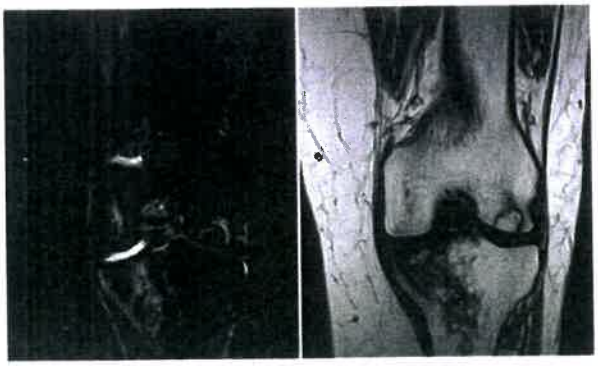


Diagnosis: Blount's disease (infantile tibia vara)

Additional information:

- Osteochondritis of media tibial condyle
- < 12 years of age
- Irregular defect of medial aspect of prox tibial metaphysis with

SPOTTER - 15



Diagnosis: Medullary osteonecrosis/bone infarct

Additional information:

- DOUBLE LINE sign on T2: hyperintense inner ring of granulation tissue and a hypointense outer ring of sclerosis
- Plain radiograph: serpentine sclerotic changes in medullary canal

SPOTTER - 16

History – Shoulder pain

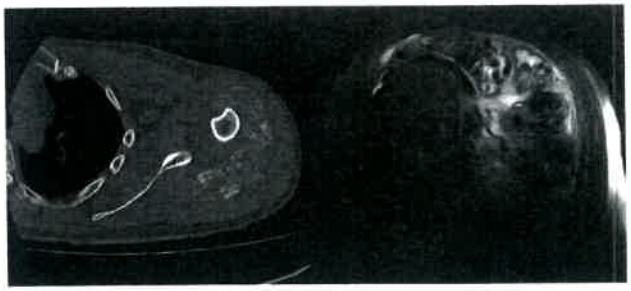


Diagnosis: Hydroxyapatite deposition disease (HADD)/ Milwaukee shoulder

Additional information:

- Destructive arthropathy associated with advanced rotator cuff tears and deposition of basic calcium phosphate crystals including hydroxyapatite crystals.
- Homogeneous, round-to-ovoid calcification in the soft tissue with well-defined or ill-defined margins.

SPOTTER - 17



Diagnosis: Tumoral calcinosis

Additional information

- Painless lumps adjacent to joints, MC: hips>elbow>shoulder
- Large amorphous cloud like periarticular soft tissue calcifications

- Ddx (soft tissue Ca2+)
  - Renal osteodystrophy
  - Heterotopic ossification
  - Metastatic Ca^{2+}
  - Milk-alkali syndrome
    - Hypervitaminosis D
    - Scleroderma
  - Dermatomyositis

SPOTTER -18



Diagnosis: Talocalcaneal coalition

Additional information:

- Talocalcaneal fusion, with bony bridging between the talus and the sustentaculum tali of the calcaneus showing C-sign
- AKA middle subtalar coalition

SPOTTER -19



Diagnosis: Osteopetrosis

Additional information:

- Generalized increased bone density
- Bone in bone/endobone appearance
- Sandwich vertebra
- Osteosclerosis + alternating radiolucent bands + metaphyseal widening
- Compact bony trabeculae

SPOTTER - 20



Diagnosis: Intraosseous lipoma

Additional information:

- A lytic lesion with a thin, sclerotic border and central calcification (especially within the calcaneus)
- MC in lower limbs (MC calcaneal lesion)
- Central calcification in a radiolucent lesion = Cockade sign (characteristic)
- CT/MRI are diagnostic

SPOTTER - 21



Diagnosis: Osteoid osteoma

Additional information:

The nidus is the radiolucent area on radiographs and the enhancing region on MRI.

- Radiolucent nidus with surrounding sclerosis is characteristic
- Patient has typical night pains relieved by NSAIDs
- Percutaneous CT guided RF ablation of nidus is

SPOTTER - 22



Diagnosis: Pigmented villonodular synovitis (PVNS)

Additional information:

- T2* weighted images show diffuse blooming because of the hemosiderin deposits, and generally have low signal intensity on Tl- and T2-weighted MR images.
- Now called as diffuse tenosynovial giant cell tumor
- Mono-articular, affects joints with large synovial surface (MC = Knee, f/b hip)

SPOTTER - 23



Slipped capital femoral epiphysis (SCFE)

Additional information:

Widening of the left proximal femoral physis, metaphyseal irregularity, and regional osteopenia, posteromedial displacement of femoral epiphyses

- Most common cause of limp in adolescents
- High incidence in black, overweight, pubertal males
- 75% U/L, 25% B/L

SPOTTER - 24



Diagnosis: Torus fracture

Additional information:

Incomplete fracture of the shaft of a long bone, characteristic bulging of the cortex, usually seen in children, frequently involving the distal radial metaphysis

Incomplete #s in children since greater bone resilience

- Torus fracture = buckling of cortex on compressive side
- Greenstick fracture = opposite of torus, on tension side of cortex, with cortical interception

SPOTTER - 25

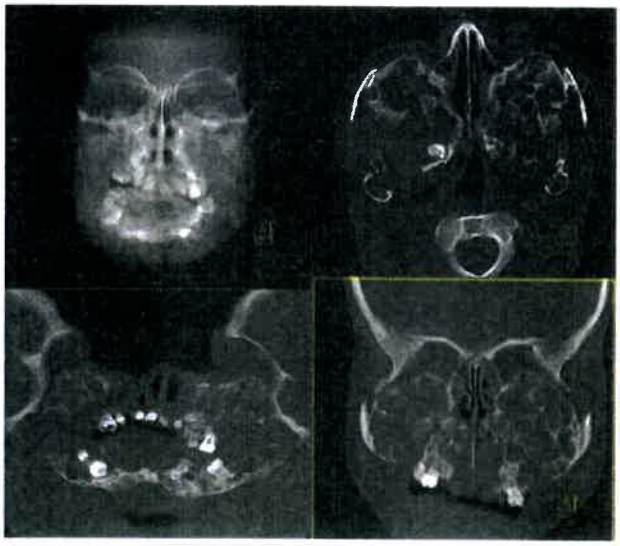


Diagnosis: Osteochondroma

Additional information

- Osteochondromas have continuous medullary canal with parent bone (cf. exostosis)
- Arise from metaphyseal region, grow away from the joint
- Multiple osteochondromas = Hereditary multiple exostoses

SPOTTER - 26



Diagnosis: Cherubism

Additional information:

- Variant of fibrous dysplasia
- Clinically - B/L symmetric fullness of jaw region
- Radiographs - lucent expanded regions within the maxilla and mandible, with soap-bubble appearances
- Histologically indistinguishable from giant cell granulomas

SPOTTER - 27

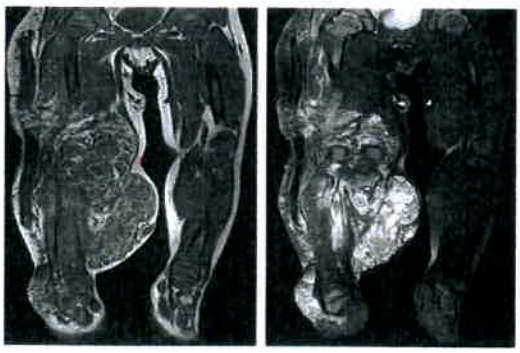


Diagnosis: Erosive Osteoarthritis:

Additional information:

- Distribution: PIP/DIP/1st CMC
- Postmenopausal female, F:M = 12:1
- RF & ANA negative, ESR/CRP = normal/minimally elevated
- Characteristic 'gull-wing' sign due to central erosions

SPOTTER - 28



Diagnosis: Klippel-Trenauney syndrome

Additional information:

- Triad of venous malformations, cutaneous capillary malformations, and limb overgrowth
- Capillary malformations involve enlarged limb (95% cases lower limbs) : port wine naevi
- Varicose veins with persistent lateral marginal vein

SPOTTER - 29



Diagnosis: KLIPPEL-FEIL Syndrome

Additional information:

- Fusion of cervical vertebrae - short neck with reduced mobility
- Low hairline
- Sprengel's shoulder, omovertebral bar
- Torticollis; atrophy of facial musculature;
- Associations: spina bifida, rib lesions

SPOTTER - 30



Diagnosis: Hemophilic Arthropathy

Additional information:

- Intercondylar notch widening
- Squaring of patella
- Severe secondary osteoarthritis
- Dense joint effusion
- DD: JRA

SPOTTER - 31

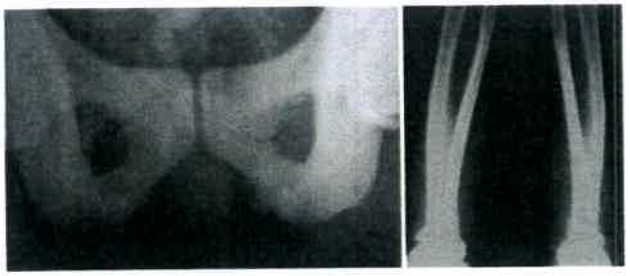


Diagnosis - Bizarre parosteal osteochondromatous proliferation (BPOP)

Additional information:

- Aka Nora lesion
- Benign exophytic osteochondral lesions typically seen in the hands and feet
- Lack of medullary involvement is characteristic
- D/D- sessile Osteochondroma, parosteal osteosarcoma

SPOTTER - 32

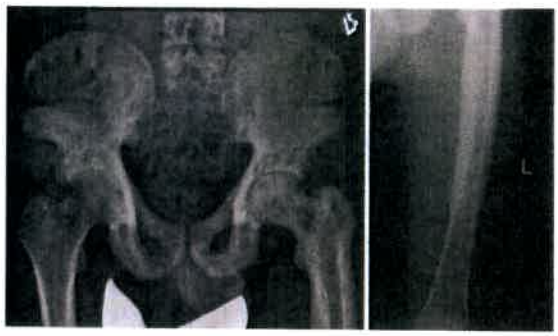


Diagnosis: Fluorosis

Additional information:

- Osteosclerosis, trabecular blurring and compact bone thickening
- Interosseous membrane ossification
- OPLL and ossification of other spinous ligaments

SPOTTER - 33



Diagnosis: Paget's disease- mixed

Additional information:

- Multifocal lytic-sclerotic areas in bones
- Raised serum ALP and increased urine hydroxyproline levels
- Skull: Tam o' Schanter sign, osteoporosis circumscripta, cotton wool appearance, diploic widening
- Spine: Picture frame vertebra, squaring of vertebra, ivory vertebra, fish vertebra

SPOTTER - 34

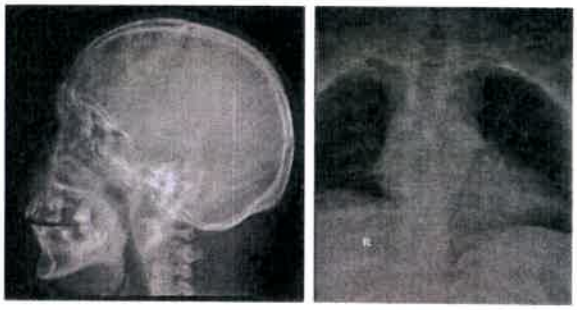


Diagnosis: Osteosarcoma

Additional information:

- Expansile bone-forming lesion
- "Cloud-like" calcified matrix
- Sunburst periosteal reaction
- Soft tissue mass

SPOTTER - 35



Diagnosis: Multiple myeloma

Additional information:

Common primary malignant neoplasm in adults

- Disseminated/solitary form with predilection to axial skeleton
- Generalised osteoporosis, punched-out lytic lesions, minimal periosteal reaction
- Also involve mandible (to diff from metastases)

SPOTTER - 36



Diagnosis: Osteochondritis dissecans

Additional information:

Osteochondrosis dissecans/Osteochondral fracture

- Aseptic fragmentation & separation of an osteochondral portion of articular surface
- Adolescents
- MC in knee - medial condyle - lateral aspect
- Humeral head, elbow (capitulum), talus
- Joint "mouse" - osteochondritic fragment

SPOTTER - 37



Diagnosis: Neuroblastoma metastasis : sutural diastasis

Additional information:

- Spiculated periorbital bone mass, typically involving the roof or lateral wall/sphenoid wings
- "Hair on end" spiculated periostitis of orbits and skull usually associated with bone destruction
- Sutural separation: non-uniform sutural separation with indistinct suture margins
- Cranial metastases are nearly always extradural (may mimic epidural or subdural haematoma)

SPOTTER - 38

History – FAVA – Fibroadipose vascular anomaly



Additional information:

Fibroadipose vascular anomaly (FAVA) is an intramuscular vascular anomaly consisting of phlebectasia (dilatation of veins) and fibrofatty replacement of muscle which was first described in 2014. It is in the "provisionally unclassified" category of the ISSVA classification of vascular anomalies.

SPOTTER - 39



Diagnosis: PFFD (proximal focal femoral deficiency)

Additional information:

- Developmental anomaly where proximal femoral epiphysis does not develop
- Distal femur seen articulating with acetabulum

SPOTTER - 40



Diagnosis B/L Avascular necrosis

Additional information:

- Etio: Corticosteroid therapy, smoking, DM, alcoholism, Sickle cell disease, HIV, hyperlipidemia
- Flattening and sclerosis of femoral head, subchondral fracture
- Double line sign on T2 weighted images

SPOTTER - 41



Diagnosis: Maduramycosis

Additional information:

Target sign / ring in dot sign

- Central hypointensity is because of fungal hyphae with surrounding granulation tissue

SPOTTER - 42

History – Rickets



Additional information:

- Cupped and frayed metaphyses
- Wide physes (increased osteoid)
- Long bone bowing
- Decreased bone density

SPOTTER - 43



Diagnosis: Mucoid degeneration of ACL

Additional information:

- Celery stalk appearance
- Normal variant

SPOTTER - 44



Diagnosis: Pyknodysostosis

Additional information:

- ↑bone density
- Acroosteolysis
- Medial end of clavicle eroded – cleidocranial dysplasia
- D/D – osteopetrosis – sandwich bone (bone within bone appearance)