Essential primary screening of common and uncommon radiographic pathology of the hands and fingers

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Nothing to declare

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PURPOSE:
To help recognize common and especially more uncommon conditions that may present on initial investigation. Examples include pathology related to trauma, idiopathic, metabolic, infection, and benign and malignant tumours.

FORMAT:
1) Images are presented with pertinent findings.
2) Advancing the presentation will present a list of differential diagnoses.
3) Final diagnosis will appear after a delay of 5 second

NOTE:
All examples are original cases collected over a period of 30 years. Advanced age of some examples has resulted in less-than-optimal image quality.
- epiphyseal abnormality involving the distal phalanges
- subchondral cystic changes in the heads of the middle phalanges
- deformity sparing the thumb

Differential diagnosis: frostbite, thermal or electrical burns, and snake bite

**Diagnosis:**
**frostbite**

- frostbite can also appear as acro-osteolysis of the terminal phalanges
- deformity sparing the thumb is characteristic for frost bite
- subperiosteal resorption involving the middle phalanges
- erosion of the ulnar aspect of the distal left 2\textsuperscript{nd} metacarpal
- erosions of terminal phalanx with developing acro-osteolysis and brown tumour head and neck proximal phalanges 4\textsuperscript{th} left metacarpal

Differential diagnosis:
- hyperparathyroidism

Diagnosis:
hyperparathyroidism

- subperiosteal resorption is specific to hyperparathyroidism
- small corticated punched out lytic lesions
- permeative lace-like pattern in the phalanges
- no acro – osteolysis

Differential diagnosis:
- scleroderma, rheumatoid, sarcoidosis, and gout

Diagnosis:
sarcoidosis

- sarcoidosis usually involves distal portions of small bones of hands and feet
- most commonly involves phalanges heads
- diffuse sclerosis noted in phalanges
- appearance of melted wax sclerosis involves both the medullary and cortical bone distributed longitudinally
- note polyostotic involvement

Differential diagnosis:
- melerheostosis, osteogenesis imperfecta, fluorosis

Diagnosis: melerheostosis
- melted wax appearance is classical for melerheostosis
- not to be mistaken for osteogenic sarcoma in isolated lesion
- benign solitary sclerotic focus terminal phalynx 5th finger
- smooth margin without bone expansion

Differential diagnosis:
- solitary sclerotic ivory osteoma

Diagnosis:
solitary sclerotic ivory osteoma

- not to be confused with sclerotic metastatic disease
- remodeling of bone
- nonaggressive mild expansion of the metacarpals and phalanges
- cortical thinning

Differential diagnosis:
- polyostotic fibrous dysplasia, Paget’s disease (in older patient), sclerotic metastatic disease

**Diagnosis:**
polyostotic fibrous dysplasia

- polyostotic fibrous dysplasia is associated with McCune-Albright syndrome.
- destructive process involving the proximal interphalangeal joint index finger
- sclerosis and bony osteophytic overgrowth of the radial and dorsal margin of the distal middle phalanx
- no juxta articular osteoporosis or erosions.
- diffuse soft tissue swelling

Differential diagnosis:
- atypical infection, Charcot joint, and long standing destructive gout

Diagnosis:
Charcot joint
- typically a history of predisposing factors including diabetes or syringomyelia
- lytic process involving the middle phalanx including the cortical margins
- no involvement of the joint spaces
- diffuse soft tissue swelling without focal mass lesion

Differential diagnosis:
- histiocytosis X, leukemia, late tuberculosis dactylitis, lymphoma, metastatic disease, Ewings sarcoma

Diagnosis:
late tuberculosis dactylitis
- lytic destructive process
- loss of normal bony cortical margin
- pathological fracture involving the terminal phalanx

Differential diagnosis:
- osteomyelitis, metastatic disease, acro-osteolysis

Diagnosis:
osteomyelitis
Differential diagnosis:
- tuberculosis, telangiectatic osteogenic sarcoma,
  aggressive giant cell tumour, solitary plasmacytoma

- lytic aggressive lesion
- minimal expansion
- pathological fracture
MR T1 with IV gadolinium in coronal and sagittal plane confirming lytic lesion with peripheral enhancement and pathological fracture

CT confirmation of lytic aggressive lesion with pathological fracture

Axial T1 with IV gadolinium showing cystic component with peripheral enhancement

Diagnosis: tuberculosis
- geographical lytic lesion
- altered coarse trabecular pattern without expansion or destruction involving the middle and distal phalynx
- preservation of the disc space
- overlying serpigenous soft tissue lesion.

Differential diagnosis:
- enchondromas, gout, hemangiomas

Diagnosis:
intraosseous and soft tissue hemangiomas
- mildly expansile geographic lesion
- ring and arc pattern associated with endosteal scalloping and microfracture
- no destruction

Differential diagnosis:
- nonossifying fibroma, enchondroma, fibrous dysplasia, giant cell tumour

Diagnosis:
**enchondroma**

- given more lytic lesions, the differential diagnosis would also include ABC, brown tumours, and clear cell chondrosarcoma
- lytic lesion of the terminal phalynx
- irregular poorly-defined margins
- no significant expansion

Differential diagnosis:
- metastatic disease, infection, osteoid osteoma

Diagnosis:
unusual osteoid osteoma

- note that glomus tumours have a more well defined margin with more expansion and appear less aggressive
- expansile lesion of terminal phalanx without destruction

Differential diagnosis:
- enchondroma, giant cell tumour, epidermoid inclusion cyst, glomous tumour, foreign body granuloma

Advance slide for answer
- expansile solid enhancing lesion at the tip of the distal phalanx thumb.
- low signal on T1 bright on PD demonstrating diffuse enhancement on T1 with fat sat post gadolinium
- no destruction

Diagnosis:
epidermoid inclusion cyst
- bone forming lesion with spiculated peripheral margin abutting the parosteal region of the base and volar aspect of the middle phalanx little finger
- no involvement of the joint
- spiculated appearance suggests a more aggressive process

Differential diagnosis:
- bizarre parosteal process of the phalanx related to previous trauma, osteochondroma, parosteal osteogenic sarcoma

Diagnosis:
- parosteal osteogenic sarcoma
- rarely involves the fingers
- excentric destructive lesion
- chondroid matrix and irregular outer margin

Differential diagnosis:
- chondrosarcoma, osteogenic sarcoma, plasmacytoma metastatic disease, lymphoma

**Diagnosis:**
**chondrosarcoma**

- chondroid matrix is most suggestive of chondrosarcoma
Differential diagnosis:
- metastatic disease (commonly from lung carcinoma), Ewings sarcoma

Diagnosis: Ewings Sarcoma
- this is a very rare occurrence in the fingers

- destructive process involving the terminal phalynx
- multiple calcified loose bodies related to the metacarpal phalangeal joint of the thumb
- no joint space narrowing, bony erosions, or bony destruction

Differential Diagnosis:
- gout, synovial osteochondromatosis, tumoral calcinosis

Diagnosis:
- synovial osteochondromatosis

- very rare example of occurrence in fingers, and should not to be mistaken as a synovial sarcoma or osteogenic sarcoma.
- focal soft tissue lesion along the volar aspect middle phalynx
- resulting chronic nonaggressive erosion along the volar region of the phalynx with intra osseous extension

Differential diagnosis:
- enchondroma, fibrous dysplasia,
  xanthoma, nonossifying fibroma,
  brown tumour of hyperparathyroidism

Diagnosis:
- xanthoma
- xanthoma of tendon sheath with long standing benign erosion into bone