Differential Diagnoses in Musculoskeletal Disease

DDX In MSK
I see a disclaimer in your future*

*These differentials are not intended to be all inclusive.
Consult a textbook for all-inclusive differentials.
They are designed as an aid to remembering a few of the most important causes for each of the findings shown.
## Diffuse Increase in Bone Density

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1° malignancy – none</td>
</tr>
<tr>
<td>2</td>
<td>2° malignancy - metastases</td>
</tr>
<tr>
<td>3</td>
<td>Non-malignant disease - Paget’s Disease</td>
</tr>
<tr>
<td>4</td>
<td>Myelosclerosis, e.g. Sickle Cell Anemia</td>
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<tr>
<td>5</td>
<td>Fluorosis</td>
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<tr>
<td>6</td>
<td>Mastocytosis</td>
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<tr>
<td>7</td>
<td>Osteopetrosis</td>
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<td>8</td>
<td>Hypervitaminosis D</td>
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</table>
# Diffuse Decrease in Bone Density

1. Osteoporosis  
   a. Multiple myeloma  
   b. Steroid administration  
2. Osteomalacia  
3. Hyperparathyroidism  
4. Immobilization  
5. Osteogenesis imperfecta
Focal Sclerotic Lesion(s)

A. Primary malignancy
   1. Osteosarcoma

B. Secondary malignancy
   1. Metastases
   2. Lymphoma

C. Non-malignant
   1. Paget’s Disease
   2. Bone island(s)
   3. Healed fracture(s)
   4. Bone infarct(s)
   5. Osteoid osteoma
Focal lytic lesion

A. 1° malignancy
   1. Myeloma

B. 2° malignancy
   1. Metastases

C. Non-malignant
   1. Eosinophilic granuloma
   2. Brown tumors
Round Cell Lesions

1. Lymphoma and leukemia
2. Ewing’s sarcoma
3. Multiple myeloma
4. Osteomyelitis
5. Neuroblastoma
<table>
<thead>
<tr>
<th></th>
<th>1° malignancy – Plasmacytoma</th>
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</thead>
<tbody>
<tr>
<td>2.</td>
<td>2° malignancy - Mets</td>
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<tr>
<td>3.</td>
<td>Non-malignant – Aneurysmal bone cyst</td>
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<tr>
<td>4.</td>
<td>GCT</td>
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<tr>
<td>5.</td>
<td>Fibrous dysplasia</td>
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<tr>
<td>6.</td>
<td>Brown tumor</td>
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<tr>
<td>7.</td>
<td>Enchondroma</td>
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</tbody>
</table>
## Expansile Lesion of Rib

<p>| 1. 1° malignancy – Plasmacytoma |
| 2. 2° malignancy – Mets |
| 3. Non-malignant – Fibrous dysplasia |
| 4. Chondrosarcoma |
| 5. Enchondroma |
| 6. Eosinophilic granuloma |
| 7. Neurofibromatosis |</p>
<table>
<thead>
<tr>
<th>Blowout Lesion</th>
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<tbody>
<tr>
<td>1. Metastases, esp. kidney, thyroid, lung</td>
</tr>
<tr>
<td>2. Giant Cell Tumor</td>
</tr>
<tr>
<td>3. Plasmacytoma</td>
</tr>
<tr>
<td>4. Chondrosarcoma</td>
</tr>
</tbody>
</table>
# Soap-bubbly Lesion

| 1. | 1° Malignancy - Plasmacytoma |
|    | 1. Chondrosarcoma |
| 2. | 2° Malignancy - Mets |
| 3. | Non-malignant - Fibrous dysplasia |
| 4. | GCT |
| 5. | ABC |
| 6. | Chondromyxoid fibroma |
| 7. | Enchondroma |
| 8. | EG |
Lesions with Associated Soft Tissue Masses

1. Multiple myeloma
2. Metastases
3. Osteomyelitis
4. Primary malignancies of bone
   1. Osteosarcoma
   2. Chondrosarcoma
   3. Fibrosarcoma
   4. Ewing’s sarcoma
Sclerotic Cortical lesions

1. Osteoid osteoma
2. Brodie’s abscess
3. Healing stress fracture
Short Thumb

1. Myositis ossificans progressiva
2. Fanconi’s syndrome
3. Holt-Oram Syndrome
Short 4th Metacarpal

1. Turner’s syndrome
2. Pseudohypoparathyroidism*
3. Pseudopseudohypoparathyroidism

*Short, obese, retarded, abnormal dentition, corneal opacities, hypocalcemia, hypophosphatemia
Clinodactyly
Inward curvature of 5th finger

1. Down’s syndrome
2. Cornelia de Lange syndrome*
3. Carpenter’s syndrome**

*Retarded, hirsutism, feeble cry, arched palate, small nose, brachycephalic skull
** Acrocephalopolysyndactyly = retardation, hypogonadism, PDA, polysyndactyly
Polydactyly

1. Isolated anomaly
2. Ellis-Van Creveld syndrome*
3. Carpenter’s syndrome**

*Chondroectodermal dysplasia = pointy teeth, brittle nails, scant hair, accelerated maturation, Wormian bones, shortening of all bones

** Acrocephalopolysyndactyly = retardation, hypogonadism, PDA, polysyndactyly
Syndactyly
Osseous c or s soft tissue fusion

1. Apert’s syndrome*
2. Carpenter’s syndrome
3. Down’s syndrome

*Hypertelorism, exophthalmus, underdeveloped sinuses, pseudarthroses, high palate
Erosion - Distal Clavicle

1. Rheumatoid Arthritis
2. Hyperparathyroidism
3. Scleroderma
4. Cleidocranial dysplasia
# Protrusio Acetabuli

1. Paget’s disease
2. RA
3. Osteomalacia
4. Osteoporosis
5. Mucopolysaccharidosis
<table>
<thead>
<tr>
<th></th>
<th>Condition</th>
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<tbody>
<tr>
<td>1</td>
<td>Thermal injury, burns, frostbite</td>
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<tr>
<td>2</td>
<td>Scleroderma</td>
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<tr>
<td>3</td>
<td>Hyperparathyroidism</td>
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<tr>
<td>4</td>
<td>Psoriasis</td>
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<tr>
<td>5</td>
<td>Raynaud’s disease</td>
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<td>6</td>
<td>PVC worker</td>
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Avascular Necrosis

1. Idiopathic (Legg-Calve-Perthe’s Disease)
2. Steroid administration
3. Sickle cell anemia
4. Arteritis - collagen-vascular disease
5. Trauma
6. Gaucher’s
7. Pancreatitis
8. Fat embolism
Hypertrophic Osteoarthropathy

1. Carcinoma of the lung
2. Mesothelioma
3. Chronic lung infection (TB)
4. Chronic liver disease, e.g. cirrhosis
5. Ulcerative colitis
Lesions That Affect The Spine

1. Osteoblastoma
2. Chordoma
3. Aneurysmal bone cysts
4. Metastases
Lesions That Affect The Pelvis

1. Chondrosarcoma
2. Plasmacytoma
3. Chordoma
Posterior Scalloping

1. Neurofibromatosis
2. Achondroplasia
3. Spinal cord tumor (ependymoma)
Anterior Scalloping

1. Aortic aneurysm
2. TB
3. Neurofibroma
Lucent Metaphyseal Bands

1. Normal
2. Leukemia
3. Neuroblastoma
4. TORCH infection
Dense Metaphyseal Bands

1. Normal
2. Lead poisoning
3. Treated leukemia
4. Healing rickets
Bone Within a Bone

1. Osteopetrosis
2. Paget’s disease
3. Thorotrast
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<tbody>
<tr>
<td>1.</td>
<td>Pseudogout</td>
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<td>2.</td>
<td>Gout</td>
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<td>DJD</td>
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<td>Hyperparathyroidism</td>
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<tr>
<td>5.</td>
<td>Hemochromatosis</td>
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<tr>
<td>6.</td>
<td>Wilson’s Disease</td>
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</tbody>
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## Ankylosis of SI Joints

1. Ankylosing spondylitis
2. Psoriasis
3. Reiter’s syndrome
4. Inflammatory bowel disease
5. TB
Intramedullary Calcification

1. Enchondroma
2. Bone infarct
3. Chondrosarcoma
Thinned Ribs (Ribbon-Ribs)

1. Neurofibromatosis
2. Osteogenesis imperfecta
3. Trisomy 18
4. Gorham’s Disease
Wide Ribs

1. Achondroplasia
2. Fibrous dysplasia
3. Rickets (rosary)
4. Marrow packing disorders
   1. Thalassemia
   2. Mucopolysaccharidosis, esp. Hunter’s and Hurler’s
   3. Gaucher’s disease
<table>
<thead>
<tr>
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<th>Lytic Lesion - Finger</th>
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<tbody>
<tr>
<td>1.</td>
<td>Enchondroma</td>
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<tr>
<td>2.</td>
<td>Epidermoid inclusion cyst</td>
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<td>3.</td>
<td>Glomus tumor</td>
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<td>4.</td>
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<td>GCT</td>
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<tr>
<td>6.</td>
<td>Met from lung, hepatoma</td>
</tr>
</tbody>
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## Wormian Bones

1. Normal
2. Hypothyroidism
3. Down’s Syndrome
4. Cleidocranial dysostosis
5. Osteogenesis imperfecta