Primary bone cancer can occur at any age and have the same incidence as bacterial meningitis with 560 new diagnoses each year in the UK.

Clinical Presentations
- Bone pain
- **Worse at night**
- Constant or intermittent
- Resistant to analgesia
- May increase in intensity
- **Atypical bony or soft tissue swelling / masses**
- **Pathological fractures**
- Mobility issues – unexplained limp, joint stiffness, reduced ROM
- Easy bruising
- Inflammation and tenderness over the bone
- Systemic symptoms (most commonly fatigue)

Investigations
- Plain X-ray is the first line investigation (normal X-ray does NOT rule out primary bone cancer)
- If pain is persistent consider MRI if X-ray is clean
- Bloods: ESR, ALP, LDH, FBC, U&E, Ca²⁺
- If 40+yrs, CT Chest, Abdo, Pelvis to rule out a source of metastatic bone cancer
- Biopsy is the diagnostic investigation

Risk Factors
- Previous radiotherapy
- Previous primary bone cancer
- Paget’s disease of bone
- Childhood cancer
- Germline abnormalities
- Benign bone lesions

Radiological Features
- Bone destruction
- New bone formation
- Soft tissue swelling
- Periosteal elevation

NICE Guidelines Red Flag Symptom
### The three most common types of primary bone cancer are:

<table>
<thead>
<tr>
<th>Chondrosarcoma</th>
<th>Osteosarcoma</th>
<th>Ewing sarcoma</th>
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<tr>
<td>Most common in adulthood</td>
<td>Most common in children and young adults</td>
<td>Second most common in children and young adults</td>
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<tr>
<td>Malignant mass of chondrocytes</td>
<td>Malignant mass of osteoblasts</td>
<td>Malignant mass of neural crest cells</td>
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<tr>
<td>Can arise from chondromas</td>
<td>Biphasic incidence peak: 15-19 years old, 70-89 years old</td>
<td>Highest incidence: 10-20 years old</td>
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<td>Highest incidence: 30-60 years old</td>
<td>Common sites: long bones, especially around the knee</td>
<td>9x more common in Caucasians vs Black African or Chinese origin</td>
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<td>Locally aggressive</td>
<td>Typical radiology: sunray spiculation, Codman triangle</td>
<td>Common sites: long bones, pelvis, ribs, vertebrae</td>
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<tr>
<td>Common sites: long bones, pelvis and ribs</td>
<td>Tx: surgery, chemotherapy</td>
<td>ALWAYS high grade</td>
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<tr>
<td>Typical radiology: popcorn calcification</td>
<td>Tx: excision only (chemotherapy and radiotherapy resistant)</td>
<td>Typical radiology: onion ring sign</td>
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### Other types:

- Chordoma (occurs at the base and length of the spine and base of the skull)
- Spindle Cell Sarcoma of the Bone
- Adamantinoma
- Angiosarcoma of the bone
- Giant Cell Tumour of the Bone (benign but locally aggressive)

### General Epidemiology

- More common in males
- Common sites: long bones
- Prognosis: better if younger and no metastases

### Management

- Neoadjuvant and adjuvant chemo in most primary bone cancers (except Chondrosarcoma)
- Radiotherapy (in Ewing sarcoma predominantly)
- Surgery in most cases of primary bone cancer depending on location

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*For more information visit bcrt.org.uk/awareness*

Produced by the Bone Cancer Research Trust and Medical Students from the University of Sheffield.

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