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, Ca\(^{2+}\)
- If 40+yrs, CT Chest, Abdo, Pelvis to rule out a source of metastatic bone cancer
- Biopsy is the diagnostic investigation

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

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

**NICE Guidelines Red Flag Symptom**
- If the results look negative or clear:
  - If symptoms persist, refer for further imaging including MRI via 2 week wait (adult) or within 48 hours (child).

**What to do if you suspect a primary bone cancer:**
- Refer for Plain X-ray via 2 week wait (adult) or within 48 hours (child).
- If the results look indicatory or suspicious for primary bone cancer: Refer directly to a specialist Bone Cancer Centre. For details on these, visit bcrt.org.uk/awareness
- If the results look negative or clear: If symptoms persist, refer for further imaging including MRI via 2 week wait (adult) or within 48 hours (child).
The three most common types of primary bone cancer are:

### Chondrosarcoma
- Most common in adulthood
- Malignant mass of chondrocytes
- Can arise from chondromas
- Highest incidence: 30-60 years old
- Locally aggressive
- Common sites: long bones, pelvis and ribs
- Typical radiology: popcorn calcification
- Tx: excision only (chemotherapy and radiotherapy resistant)

### Osteosarcoma
- Most common in children and young adults
- Malignant mass of osteoblasts
- Biphasic incidence peak: 15-19 years old, 70-89 years old
- Common sites: long bones, especially around the knee
- Typical radiology: sunray spiculation, Codman triangle
- Tx: surgery, chemotherapy

### Ewing sarcoma
- Second most common in children and young adults
- Malignant mass of neural crest cells
- Highest incidence: 10-20 years old
- 9x more common in Caucasians vs Black African or Chinese origin
- Common sites: long bones, pelvis, ribs, vertebrae
- ALWAYS high grade
- Typical radiology: onion ring sign
- Tx: chemotherapy, surgery, radiotherapy

### 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

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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