Bone Pain

Disclaimer

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Red Flags

- Neoplastic disease – benign, primary, or metastatic
- Infection
- Fracture – traumatic and non-traumatic
- Non-accidental injury in children and older persons

Background – About Bone Pain

Bone pain can present a dilemma with many serious causes requiring laboratory, radiology, and scanning services to diagnose. Conditions such as sarcoma, myeloma, osteomyelitis, stress fracture, and osteoporotic fracture may all be diagnosed late.

Assessment

1. Take a careful **history**.

   **History**
   - Nature and quality of pain
     - Bone pain is a deep somatic pain and is often experienced as dull and poorly localised by the patient. This may help differentiate bone pain from pain arising from joints or soft tissue.
     - Bone pain that is unrelenting overnight can indicate infection or malignancy
   - Associated symptoms
     - sweats and fever
     - recent/recurrent infections
     - weight loss
     - neurological symptoms or radiculopathy
   - Ancestry and country of origin – certain ethnic groups have an increased prevalence of genetic factors associated with certain types of anaemia
   - Family or personal history of haematological conditions e.g., sickle cell anaemia, Lyme disease
   - Recent travel
   - Increase in activity or new exercise
   - History of recent trauma

2. Perform an **examination**.

   **Examination**
   - Look for deformity
   - Palpate and percuss areas of bone pain for tenderness. Confirm tenderness is bony and not from overlying soft tissue or neighbouring joint.
   - Haematological examination including:
     - lymph nodes and spleen for splenomegaly.
     - skin for bruising – note unexplained bruising in children may raise suspicion of non-accidental injury.
   - Peripheral signs of anaemia
   - Check for signs of infection e.g., fever, rash, erythema
   - Breast or prostate examination if concerned about bone metastases from primary underlying malignancy
   - Neurological examination of limbs if suspicion of spinal infection
3. Consider possible differential diagnoses:

- **Haematological malignancy**
  Bone pain in association with more common presenting symptoms of haematological malignancy including:
  - Fatigue, peripheral signs of anaemia
  - Increased bleeding or bruising
  - Repeated or persistent infections
  - Unexplained weight loss

- **Osteoporotic fractures without injury**
  - Occur typically in the hip, sacral, lumbar, or thoracic spine.
  - Often occur in an older patient presenting with continuing pain.

- **Osteomyelitis**
  - Can present at any age, acutely or with gradual onset of local bone pain, limp, loss of use of a limb, inconsistent fever, or malaise.
  - Children may present with signs e.g., fever or limp, but not symptoms of pain.
  - May occur deep to lower leg ulcers particularly in people with diabetes. CRP is nearly always elevated but white count, ESR, and plain radiology may be normal.

- **Stress fractures**
  - Occur in the metatarsal bones of athletes, those new to exercise, and the obese. There are stress fractures common in specific sports including spinal fractures in cricket bowlers and gymnasts.
  - Fracture may be caused by abnormal stress on normal bones and normal stress on abnormal bones (insufficiency).
  - Consider atypical fractures of the femur in patients on bisphosphonate or denosumab therapy.
  - Consider insufficiency stress fracture in anyone with bone pain not resolving promptly.
  - See images:
    - SPECT CT
    - Stress fracture metatarsal bone isotope scan

- **Paget’s disease**
  - Causes gradual onset of bone pain in older adults, usually not severe, and can be associated with arthritis, deformity, and fracture.
  - Alkaline phosphatase is frequently elevated with normal liver function.
  - Diagnosis is by plain radiology and bone isotope scan.

- **Growing pains** in children
  - Are bilateral, occur in a well child, and tend to occur in the late afternoon and evening. Pain may occasionally wake a sleeping child.
  - Pain is most commonly in the calf, behind the knee and anterior thighs.
  - Consider other causes e.g., tumours or infection, if:
    - any other symptoms, including limp, are present.
    - the pain is unilateral.
    - Daytime activity is limited.
  - Have a high index of suspicion for non-accidental injury.
4. Perform investigations as directed by the history:
   - **If red flags** are present, urgent referral may be more appropriate than further investigation in primary care, but if diagnosis is uncertain consider:
     - **Red flags**
       - Neoplastic disease – benign, primary, or metastatic
       - Infection
       - Fracture – traumatic and non-traumatic
       - Inflicted (non-accidental) injury in children and older persons
       - urgent **plain radiology**.
       - laboratory tests (may include FBE/ESR, CRP, LFT (especially ALP, GGT and ALT), PSA, serum protein electrophoresis, calcium, and phosphate).
   - Following negative plain radiology, the next investigation could include **bone isotope scan**, SPECT CT, or MRI.

### Management

Management will depend upon underlying cause.

1. If concerned about infection, refer early for infectious disease or orthopaedic advice via the emergency department.
2. If suspected spinal infection with neurological compromise, refer urgently to neurosurgery via the emergency department.
3. If suspected non-accidental injury in children, notify child protection and consider referral to emergency department or seek urgent advice from a paediatrician.
4. If concerned about neoplastic disease, seek urgent haematology or oncology advice.
5. If osteoporotic fracture, provide analgesia and
   - arrange orthopaedic referral for fracture management.
   - for continued management of osteoporosis, see the Osteoporosis pathway.
6. If Paget’s disease, arrange urgent or routine endocrinology referral.
7. If stress fractures are diagnosed, conservative management including analgesia, rest, and weight loss are appropriate. If required, consider physiotherapy or exercise physiology referral, and orthopaedic or podiatry referral.

### Referral

- If concerned about infection, refer early for infectious disease or orthopaedic advice via the emergency department.
- If suspected spinal infection with neurological compromise, refer urgently to neurosurgery via the emergency department.
- If suspected non-accidental injury in children, notify child protection and consider referral to emergency department or seek urgent advice from a paediatrician.
- If concerned about neoplastic disease, seek urgent haematology or oncology advice.
- If osteoporotic fracture, provide analgesia and for fracture management refer for orthopaedic referral.
- If Paget’s disease, arrange urgent or routine endocrinology referral.
- If required, consider physiotherapy or exercise physiology referral, and orthopaedic or podiatry referral.
Information

For health professionals

Further information

- Australian Family Physician (2012) – Paget Disease of Bone
- Australian Journal of General Practice – Overuse Injuries in the Athlete
- Cancer Council – Optimal Cancer Care Pathway for People With Acute Myeloid Leukaemia
- Diagnostic Imaging Pathways – Bone Pain

For patients

- Better Health Channel – Paget's Disease of Bone
- Osteoporosis Australia
- Raising Children Network – Growing Pains

Disclaimer

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