MusculoSkeletal Tumors

Reference: apley.4th edition
It is not always easy to tell whether a bone tumour is benign or malignant, but rapid growth, warmth, tenderness and an ill-defined edge suggest malignancy. m.c benign is lipoma.
Benign Tumor

1- Non-ossifying fibroma (fibrous cortical defect
2- Fibrous dysplasia
3- osteoid osteoma
4- Chondroma (Enchondroma)
5- Osteochondroma (Cartilagecapped exostosis)
6- chondroblastoma
7- chondromyxoid fibroma
8- simple Bone cyst
9- aneurysmal Bone cyst
10- Giant cell tumor
11- lipoma
9.3 Non-ossifying fibroma (a) The x-ray always shows a cortical defect, although in some projection planes this looks deceptively like a medullary ‘cyst’ (b). The bone may fracture through the weakened area (c).

Treatment
• **Non-ossifying fibroma (fibrous cortical defect)** This, the commonest benign lesion of bone, is a developmental defect in which a nest of fibrous tissue appears within the bone and persists for some years before ossifying. It is asymptomatic and is almost always encountered in children as an incidental finding on x-ray. The usual sites are the metaphyses of long bones; occasionally there are multiple lesions.

• **X-rays** The appearance is unmistakable. There is a more or less oval radiolucent area in or adjacent to the cortex. Although it looks cystic on x-ray, it is a solid lesion consisting of unremarkable fibrous tissue. As the bone grows the defect becomes less obvious and it eventually heals spontaneously. However, it sometimes enlarges and there may be a pathological fracture
9.4 Fibrous dysplasia  (a) The large cyst-like lesion in the proximal femur has resulted in a so-called shepherd’s crook deformity. (b) X-ray showing the typical ground-glass appearance of fibrous dysplasia in the tibia.
Fibrous dysplasia is a developmental disorder in which areas of trabecular bone are replaced by fibrous tissue, osteoid and woven bone. At operation the lesional tissue has a coarse, gritty feel, due to the specks of immature bone. The condition may affect one bone (monostotic), one limb (monomelic) or many bones (polyostotic). Malignant transformation to fibrosarcoma occurs in 5–10% of patients with polyostotic lesions, but only rarely in monostotic lesions.
• **Clinical features** Small, single lesions are **asymptomatic**. Large, monostotic lesions may cause **pain and bone deformity**, or **pathological fracture**.

• **X-rays** Cyst-like areas in the metaphysis or shaft have a hazy (so-called ground-glass) appearance. The weight-bearing bones may be bent, and one of the classic features is the ‘shepherd’s crook’ deformity of the proximal femur.

• **Pathology** The histological picture is of cellular fibrous tissue with patches of woven bone and scattered giant cells.

• **Treatment** Small lesions need **no treatment**. Those that are **large and painful or threatening to fracture** (or have fractured) can be **curetted and grafted**, but there is a strong tendency for the abnormality to recur. **Deformities may need correction by suitably designed osteotomies**
osteoid osteoma This is consisting of osteoid and newly formed bone. It is small (usually less than 1 cm), round or oval in shape. It is usually in aged under 30 years, and over one-half of the cases occur in the femur or tibia. The leading symptom is pain, usually relieved by aspirin but not by rest.

X-rays The important feature is a tiny radiolucent area, the so-called ‘nidus’. In the diaphysis the nidus is surrounded by dense bone and the cortex is thickened.

Treatment The only effective treatment is complete removal of the nidus.
Osteoid osteoma

(a) Typical x-ray appearance: a small lucent cavity with a dense central nidus, and reactive bone thickening around it.
(b) Histology shows sheets of pink-staining osteoid in a fibrovascular stroma. Giant cells and osteoblasts are prominent.
(a) looks like a cyst, it is in fact a solid but radiolucent tumour with central patches of calcification – a typical feature of chondroma. The lesion in (b) was treated by curettage and bone grafting.
• **Chondroma (Enchondroma)** Islands of cartilage may persist in the metaphyses of bones formed by endochondral ossification; there is often a central area of degeneration and calcification.

• **Clinical features** Chondromas are asymptomatic. They are at any age (mostly in young people) and in any bone preformed in cartilage.

• **X-rays** appears as a central, radiolucent near the bone end. Appearance of tiny flecks of calcification within the lucent area.

• **Treatment** If the tumour is painful or is enlarging, or if it presents as a pathological fracture removed as by curettage; the defect is filled with bone graft.
• Osteochondroma (Cartilage capped exostosis) the commonest ‘tumours’ of bone, is a developmental lesion at edge of the physeal plate and develops by endochondral ossification into a bony protuberance still covered by the cap of cartilage. The commonest sites are the fast-growing ends of long bones and the crest of the ilium. Multiple lesions may develop as part of a heritable disorder – hereditary multiple exostosis –. There is a small risk of malignant transformation. This is seen most often with pelvic exostoses.

• Clinical features a teenager or young adult when the lump is first discovered. The exostosis may go on enlarging up to the end of the normal growth period for that bone.

• X-rays well-defined bony protuberance (exostosis).

• Treatment If the tumour causes symptoms it should be excised; if, bigger or painful then operation is urgent.

9.7 Osteochondroma (a) A young girl presented with this lump on her leg. It felt bony hard. (b) X-ray examination showed the typical features of a large cartilage-capped exostosis; of course the cartilage cap does not show on x-ray unless it is calcified. (c) Histological section of an exostosis with its dark stained cartilage cap.
• **chondroBlastoma** This **rare tumour** of immature cartilage cells, appear primarily in the **epiphysis**, usually of the **proximal humerus, femur or tibia**.

• **symptom**: aching and tenderness adjacent to the joint.

• **x-ray** appearance is of a **well-demarcated radiolucent area** in the **epiphysis**.

• **Treatment** In children the **risk of damage to the physis** makes it **risky to remove the lesion**. there is a high risk of recurrence after incomplete removal
• **chondromyxoid fibroma** benign cartilaginous lesions, mainly in **adolescents** and **young adults**. More common in the **lower limb**. Patients seldom complain and the lesion is usually **discovered by accident or after a pathological fracture**.

• **x-ray:** ovoid cyst in the **metaphysis**. However, it is a **solid tumour of mixed cartilage, fibrous and myxomatous tissues**. Where feasible, the lesion should be excised but often one can do no more than a **thorough curettage** – **followed** by autogenous **bone grafting**.
• **simple Bone cyst** a true solitary. It appears during childhood, **most commonly** in the **proximal humerus or femur**. It is **not** a tumour, tends to **heal spontaneously** and is seldom in adults. discovered after a pathological fracture or as an incidental finding on x-ray.

• **X-rays** large bubble inside the bone. It may **occupy** the entire **metaphysis** but it does **not extend beyond the physeal plate**
Treatment ‘Active’ cysts, by aspiration of fluid and injection of 80–160 mg of methylprednisolone to stop further enlargement and promote healing of the cyst. If the cyst goes on enlarging, or if there is a pathological fracture, the cavity should be curetted and then packed with bone chips.
aneurysmal Bone cyst  Pathology This is a cystic tumour-like lesion which occurs chiefly in the spine and the metaphyses of long bones, usually affecting young adults. It may expand the bone and cause marked thinning of the cortex. When the cyst is opened it is found to contain clotted blood.

- **Histologically** the membrane consists of fibrous tissue with vascular spaces, deposits of haemosiderin and multinucleated giant cells. There is no risk of malignant transformation.

- **X-rays** In a growing tubular bone the cyst in the metaphysis and may resemble a simple cyst. In adults it can be mistaken for a giant-cell tumour but, unlike the latter

- **Treatment** cyst thoroughly curetted and then packed with bone grafts.
giant-cell tumour appears after the end of bone growth, most commonly in the distal femur, proximal tibia, proximal humerus and distal radius. The tumour has a reddish, fleshy appearance;

- Aggressive lesions have a poorly-defined ‘floor’ and appear to extend into the surrounding bone.
- Histologically: abundance of multinucleated giant cells scattered on a background of stromal cells with little or no visible intercellular tissue
- Clinical features pain at the end of a long bone; sometimes slight swelling. Pathological fracture in 10–15% of cases.
- x-ray as a ‘cystic’ (i.e. radiolucent) at the end of a long bone., it always extends right up to the subchondral bone plate.. CT scans and MRI will reveal the extent of the tumour, both within the bone and beyond. Biopsy is essential.
- Treatment by thorough curettage and ‘stripping’. More aggressive tumours, and recurrent lesions treated by excision followed by bone grafting or prosthetic replacement.
Multiple myeloma
Multiple Myeloma is a malignant B-cell lymphoproliferative disorder of the marrow, with plasma cells predominating. The effects on bone are due to marrow cell proliferation and increased osteoclastic activity, resulting in osteoporosis and the appearance of discrete lytic lesions throughout the skeleton (myelomatosis). A particularly large colony of plasma cells may form what appears to be a solitary tumour (plasmacytoma) so the m.m begin as plasmacytoma and it can progress to m.m or just a plasmacytoma which treated by radio+chemotherapy ... Clinical features The patient, typically aged 45–65 years, presents with weakness, backache, bone pain or a pathological fracture. Hypercalcaemia may cause thirst, polyuria and abdominal pain. Associated features of the marrow cell disorder are plasma protein abnormalities, increased blood viscosity and anaemia. Bone resorption leads to hypercalcaemia in about one-third of cases. Late secondary features are due to renal dysfunction and spinal cord or root compression caused by vertebral collapse. The prognosis is poor, with a median survival of 2 or 3 years if m.m occurr. but nowaday it has a good prognosis If stay as plasmacytoma
• **X-rays** osteoporosis;. The ‘classical’ lesions are multiple punched-out defects in the skull, pelvis and proximal femur, a crushed vertebra, or a solitary lytic tumour in a large-bone metaphysis.

• **Investigations** **Mild anaemia** is common, and **high ESR**. raised **creatinine** level and hypercalcaemia. Over one-half the patients have **Bence–Jones protein in their urine**, and serum protein abnormal band. A sternal marrow puncture may show plasmacytosis, with typical ‘myeloma’ cells.

• **Diagnosis** If the only x-ray change is **osteoporosis +lytic lesions**.
Paraproteinaemia is a feature of other (benign) gammopathies diagnosis.

Treatment for #pain control and, #treatment of pathological fractures. correction of fluid balance and #treatment for hypercalcaemia. 1-Limb fractures are best managed by internal fixation and packing of cavities with methylmethacrylate cement (to staunch the profuse bleeding). treated by oncologist by chemo+radiotherapy and the orthopedic treat the symptoms produced +pathological fracture.
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Thank u