



- **Classification of bone tumors:**

- **Primary (mainly considered if patient is < 30 yrs):**
 - ✓ Benign.
 - ✓ Intermediate.
 - ✓ Malignant.
- **Secondary (metastasis; mainly considered if patient is > 30yrs):**
 - ✓ The most common bone malignancy.

- **Tissue of origin (reduced list):**

- Bone-forming tumors.
- Cartilage-forming tumors.
- Bone marrow tumors.
- Vascular tumors.
- Other connective tissue tumors.
- Others.

Tissue of origin	Benign	Malignant
Bone	Osteoma	Osteosarcoma
Cartilage	Chondroma	Chondrosarcoma
Fibrous	Fibroma	Fibrosarcoma
Others	Giant cell tumors	Ewing's sarcoma

- **Differences between benign and malignant tumors:**

	Benign	Malignant
Age	Young	Different
Course	Slow	Progressive
Pathological fractures	Rare	More common
Metastasis	No	Yes
G.condition	Normal	Affected

- **Management:**

- **Diagnosis:**
 - ✓ History.
 - ✓ Physical examination.
 - ✓ Investigations:
 - ❖ *Laboratory.*
 - ❖ *Imaging:*
 - + Plain radiographs: gold-standard for bone tumors.
 - + CT
 - + MRI
 - + Isotope bone scans.
 - + Angiographs.
 - ✓ All of the components above will be confirmed by biopsy:
 - ❖ *Definition:* to obtain adequate tissue for diagnosis and grading.
 - ❖ Use the shortest possible way to reach the bone tumor.
 - ❖ Biopsy site (closed or open) should be respectable.
 - ❖ *Technique:*
 - + Consultation with other colleagues.
 - + Anesthesia.
 - + Tourniquet.
 - + Longitudinal incision.
 - + Gentle handling.
 - + Homeostasis.
 - + Sufficient tissue block.



- **Information which you will get from imaging and biopsy:**

- **From imaging: the extent of tumor:**
 - ✓ Intra-compartmental: (1)
 - ✓ Extra-compartmental: (2)
 - ✓ Metastasis: (+)
- **From biopsy: histological grading of the tumor:**
 - ✓ Low-grade: (A)
 - ✓ High-grade: (B)

- **Examples of benign tumors:**

- **Osteoid osteoma:**
 - ✓ Age: < 30 yrs.
 - ✓ Site: femur and tibia.
 - ✓ Characteristics: small, oval, dense and associated with severe pain which is relieved by aspirin.
 - ✓ Radiograph: central nidus in radiolucent zone surrounded by sclerosis.
 - ✓ Treatment: excision.

Coronal CT-scan showing osteoid osteoma of the femur



- **Chondroma:**

- ✓ Definition: benign cartilage-forming tumor.
- ✓ Site: more common in hands and feet.
- ✓ Characteristics: usually seen with pathological fractures.
- ✓ Treatment: observe, curettage or bone graft.



PERIOSTEAL CHONDROMA

This metaphyseal femoral lesion from a 25-year-old man has the characteristic radiographic appearance of a periosteal chondroma. The lytic mass appears confined to the cortex and sits within a cup formed by buttresses of reactive bone. The patient complained of pain and swelling for several months. (Fig. 53 from Fascicle 5, 2nd Series.) (Figures 81 and 82 are from the same patient.)



- **Osteochondroma (exostosis):**

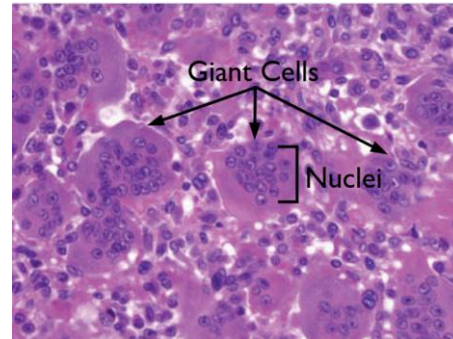
- ✓ Age: adolescence.
- ✓ Site: metaphysis.
- ✓ Characteristics: starts at the edge of the growth plate as cartilage and then ossifies.
- ✓ Treatment: excision if causes problems (Multiple exostosis: strict observation and watch for any malignant changes).



- **Examples of intermediate tumors:**

- **Giant cell tumor:**

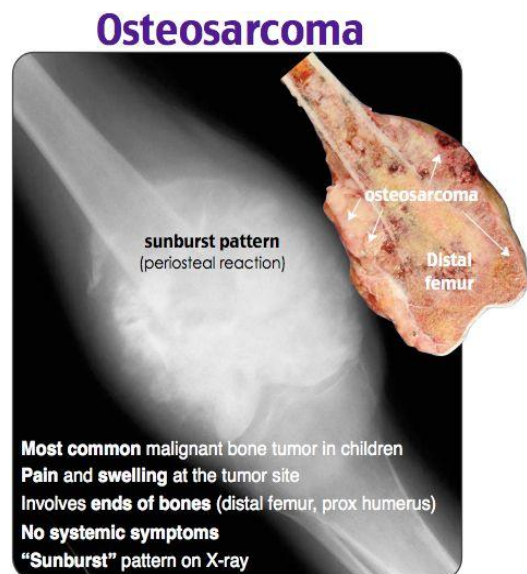
- ✓ Age: 20-40 yrs.
- ✓ Site: junction of metaphysis and epiphysis.
- ✓ Radiograph: soap-bubble appearance and thin adjacent cortex.
- ✓ Treatment: depends on the tumor being: benign, locally aggressive or malignant.



- **Examples of malignant tumors:**

- **Osteosarcoma:**

- ✓ Age: 2nd decade (males).
- ✓ Site: metaphysis of long bones.
- ✓ Characteristics: most common primary malignant bone tumor (20%). Trauma may bring attention to the lesion.
- ✓ Radiograph:
 - ❖ *Sunburst appearance*: extension with ossification.
 - ❖ *Codman's triangle*: subperiosteal.
- ✓ Treatment: aims to control the tumor and prevent recurrence and metastasis. It is achieved by surgery and chemotherapy (which will be given in cycles starting before surgery). Types of surgery:



Most common malignant bone tumor in children
Pain and swelling at the tumor site
Involves **ends of bones** (distal femur, prox humerus)
No systemic symptoms
"Sunburst" pattern on X-ray



- ❖ *Amputation.*
- ❖ *Limb-saving surgery:*
 - ✚ Resection (استئصال جزئي للعضو).
 - ✚ Reconstruction by prosthesis.

✓ Prognosis: survival rate is 70%.

- **Metastatic bone tumors:**

- They are the most common malignant bone tumors.
- Most patients show more than one site affected.
- **Bone-seeking cancers are:**
 - ✓ Thyroid.
 - ✓ Breast (most common cancer in females).
 - ✓ Lung.
 - ✓ Kidney.
 - ✓ Prostate (most common cancer in males).
- **Common sites for metastasis are:**
 - ✓ Spines (lumbar and thoracic).
 - ✓ Pelvis.
 - ✓ Proximal femur.
 - ✓ Ribs.
 - ✓ Skull.

Note: metastasis is uncommon distal to elbow and knee → if present → think of lung cancer.

