

Bone tumors

Lab & lecture

Bone tumors

- Bone tumors are classified into:
 - Primary bone tumors
 - Secondary bone tumors (Metastasis)
 - Most are classified according to the ***normal cell of origin*** and apparent pattern of differentiation
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Primary Bone Tumors

Bone-Forming tumors

- ❑ Osteoma
- ❑ Osteoid osteoma
- ❑ Osteosarcoma

Cartilage-Forming tumors

- ❑ Chondroma
- ❑ Osteochondroma
- ❑ Chondrosarcoma

other tumors

- Ewing's sarcoma
- ❑ Giant cell tumor of bone

Bone tumors

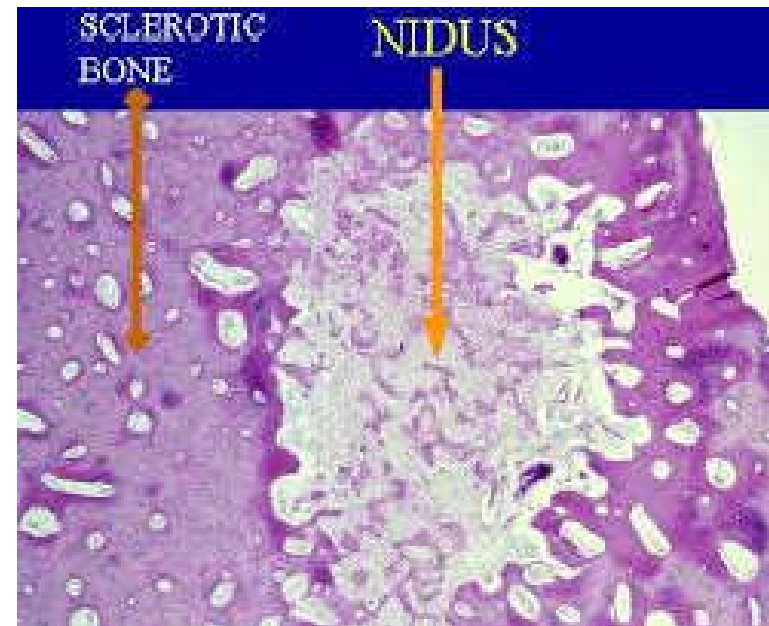
Benign tumors are more common than malignant ones.

Metastases to the bones are more common than primary malignant tumors. According to their cell of origin and histologic features, primary bone tumors can be classified as being composed of:

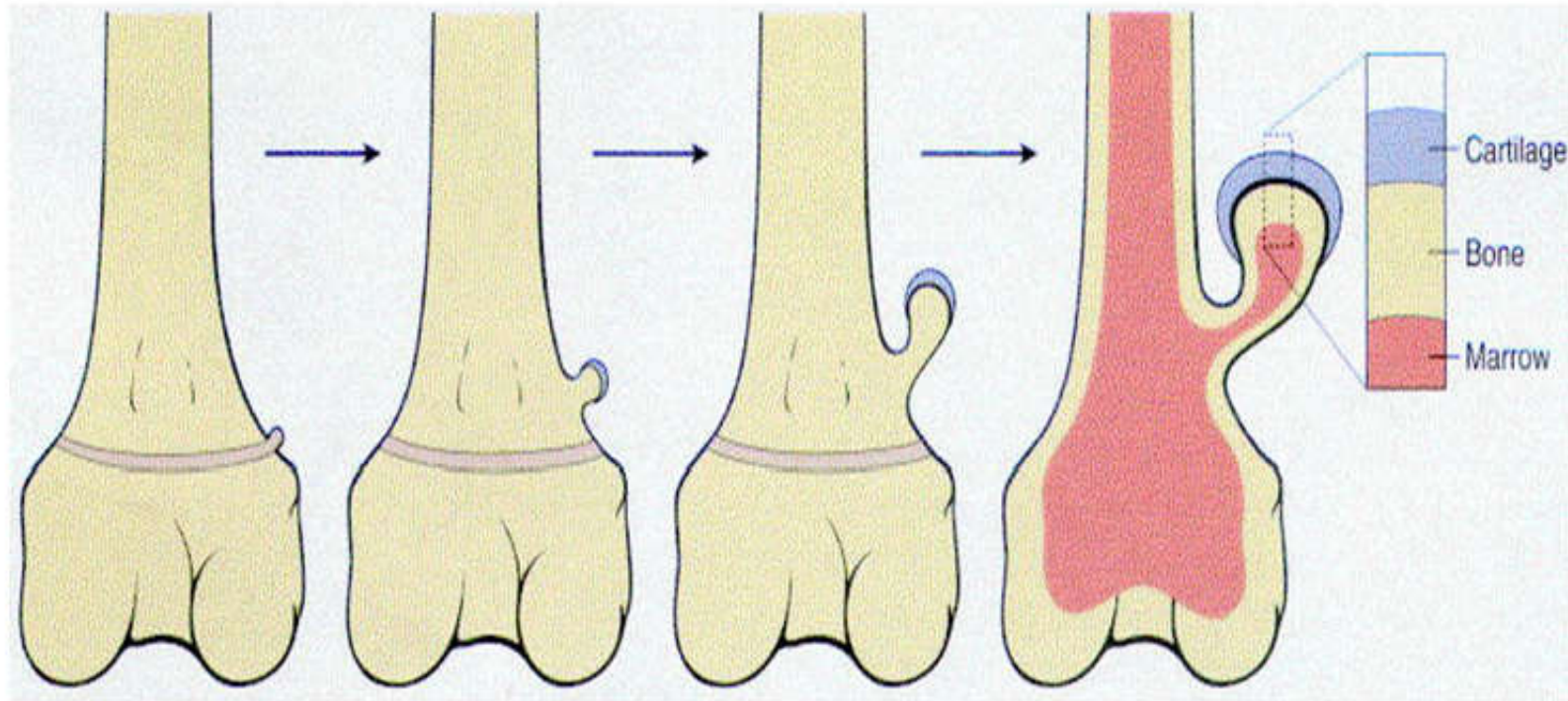
- ① **osteogenic tumors** (e.g., osteoma, osteosarcoma)
- ② **Chondrogenic tumors** (chordoma & chondrosarcoma etc)
- ③ **Osteoclastic tumors** (e.g., giant cell tumor)
- ④ **Fibroblastic tumors** (e.g., fibrosarcoma)
- ⑤ **Hematopoietic & lymphoid cells** (e.g., multiple myeloma, leukemia, & lymphoma)
- ⑥ **others** (e.g., Ewing sarcoma)

Osteoid osteoma

- Benign;
- affects diaphysis of long bones; often tibia or femur
- X-ray findings-central radiolucency surrounded by a sclerotic rim
- Pathology: brown nodule surrounded by dense sclerotic cortical bone



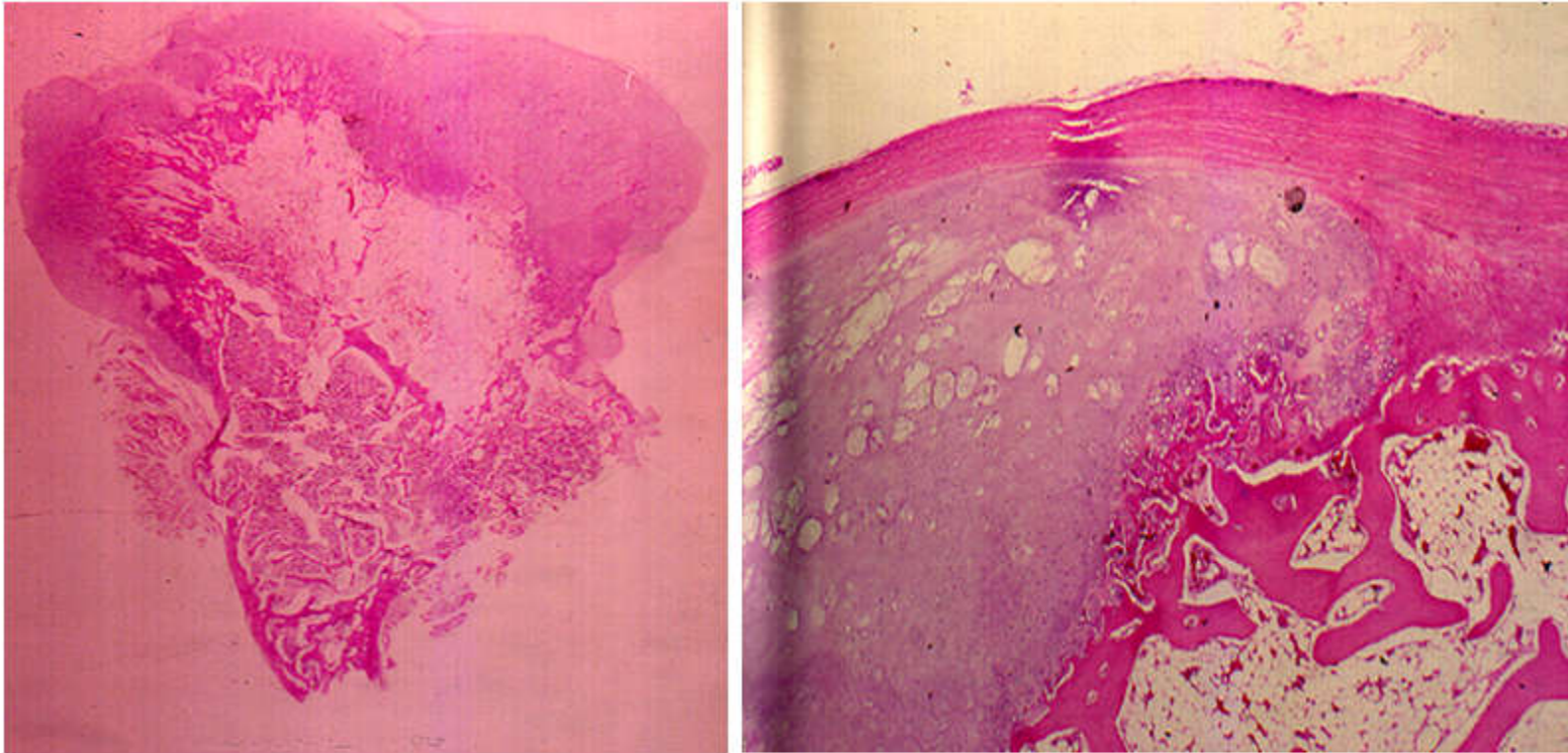
Osteochondroma



- Osteochondromas are mushroom shaped and range in size from 1 to 20 cm.
- The outer layer of the head of the osteochondroma is composed of benign hyaline cartilage varying in thickness
- Newly formed bone forms the inner portion of the head and stalk, with the stalk cortex merging with the cortex of the host bone.

Osteochondroma (exostosis)

Microscopic



The cap is benign hyaline cartilage, resembling disorganized growth plate undergoing endochondral ossification. Newly formed bone forms the inner portion of the head and stalk

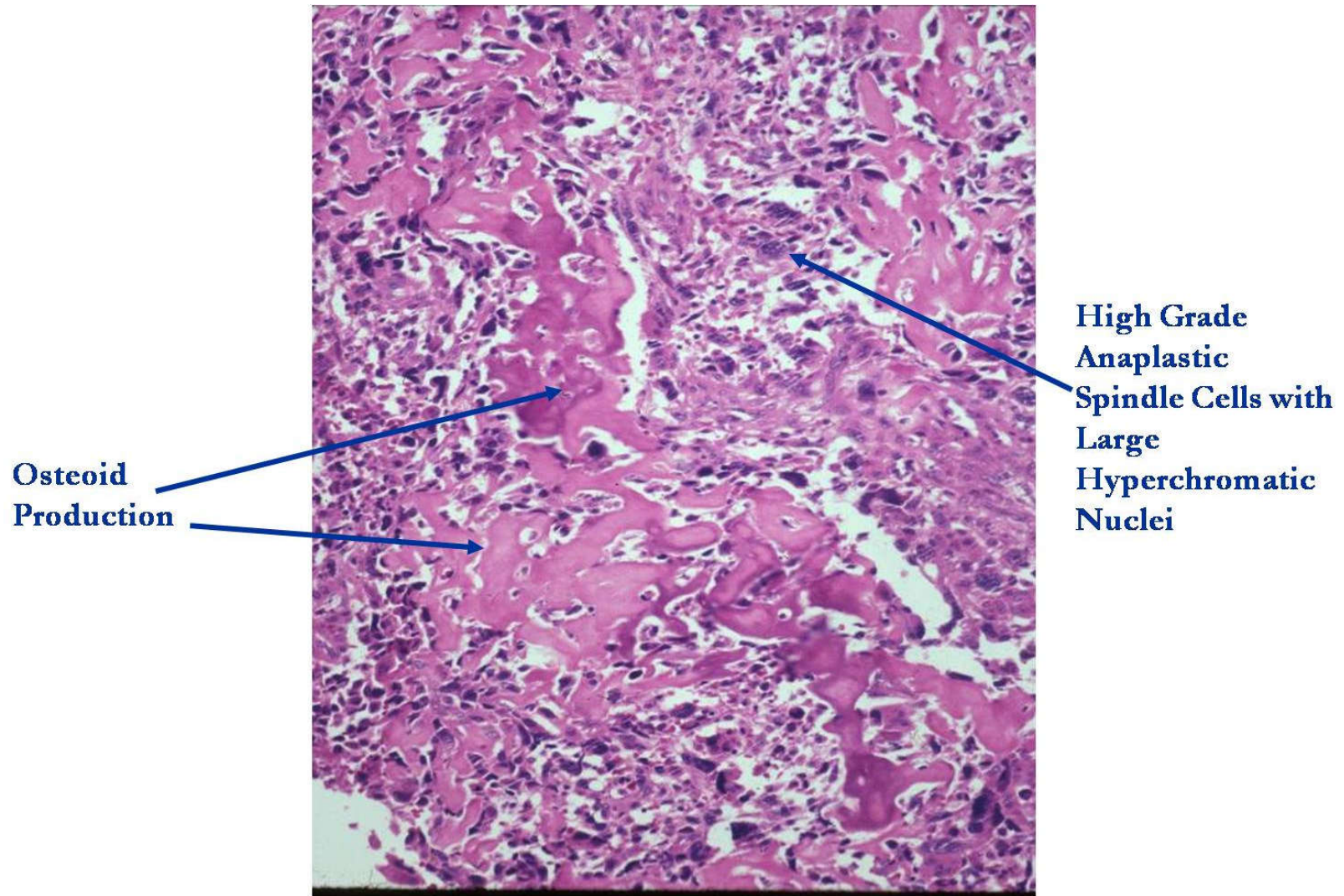
Osteosarcoma

- * Malignant bone-forming tumor.
- * **Peak incidence:** teenagers; less commonly in the elderly
- * **Site:** metaphysis of long bones, usually the distal femur or proximal tibia (region of the knee)
- * **Presents** as a pathologic fracture or bone pain with swelling
- * **X-ray:** show destructive mass with 'sunburst' appearance & lifting of the periosteum (Codman triangle)

most important facts about osteosarcoma

- The most common primary bone tumor
- Peak incidence in second decade of life
- Occurs preferentially in the metaphysis of long bones of the extremities around the knee joint
- Invades locally and metastasizes hematogenously
- Very malignant

osteosarcoma



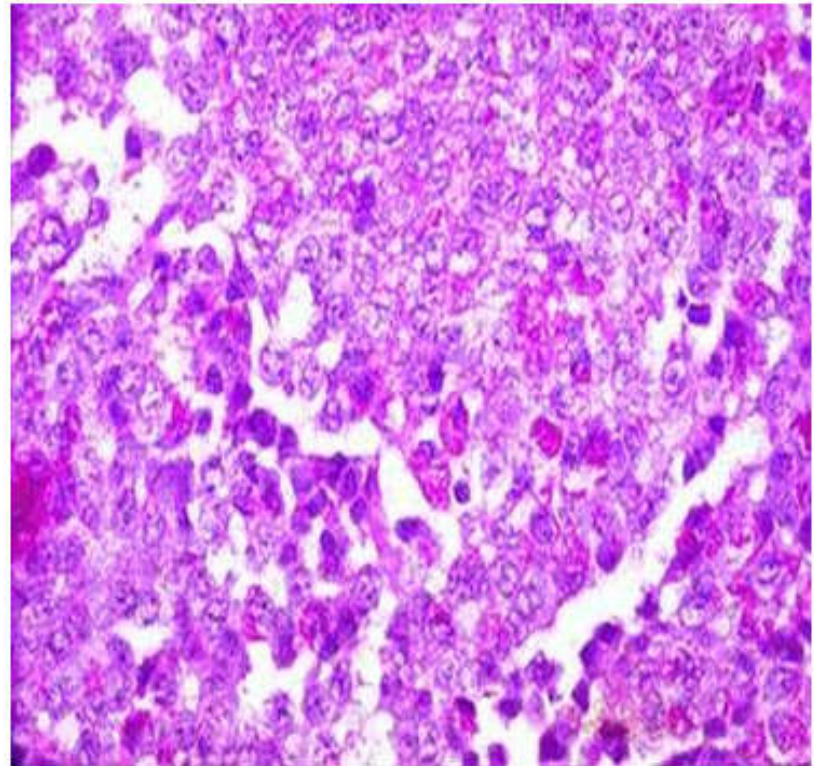
Chondrosarcoma

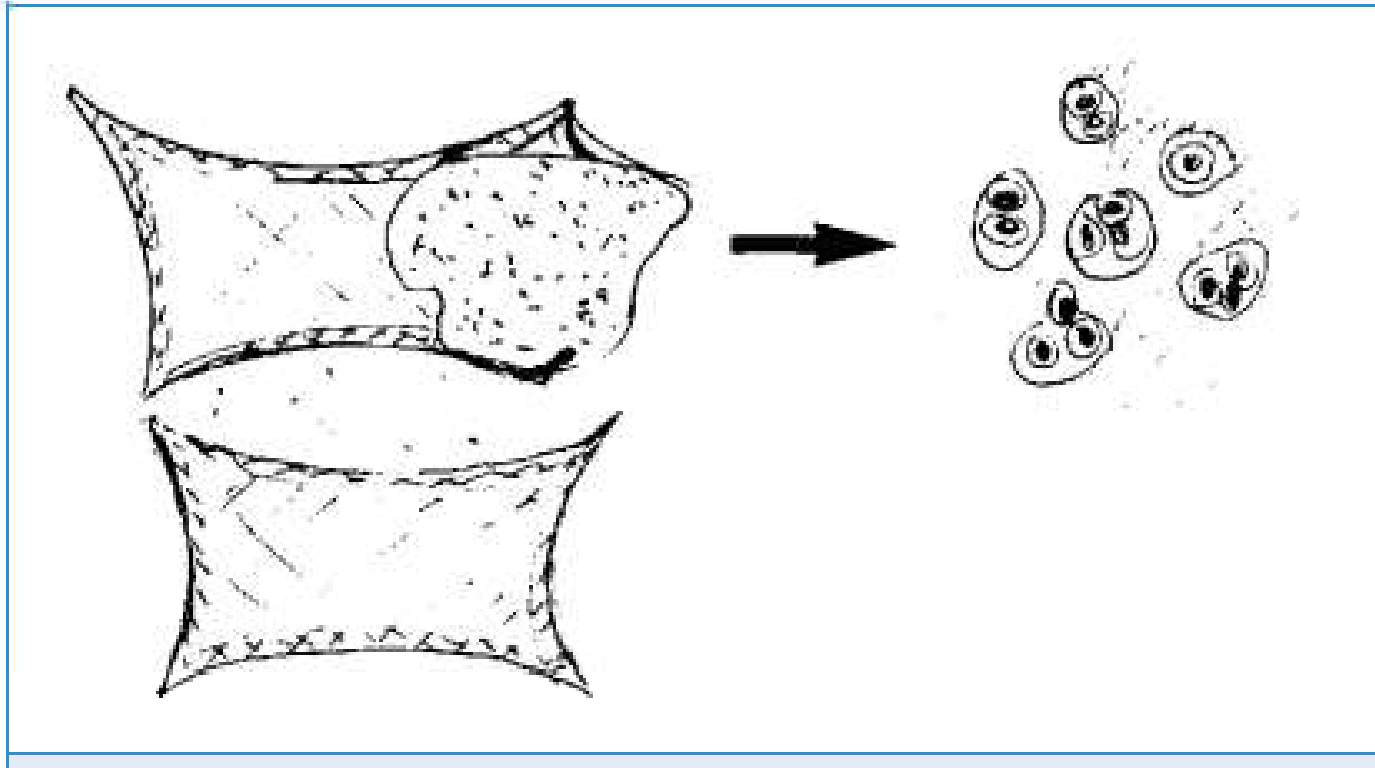
* Cartilage-forming tumor develop in the medullary cavity, expanding & eroding the cortical bone.

- Grossly, cartilage appears white, glistening, & gritty.
- Microscopically, it is composed of pleomorphic cells inside the lacunae surrounded by cartilaginous matrix.

Chondrosarcoma- Microscopic

composed of lobules of cartilage with anaplastic chondrocytes in the lacunae + focal enchondral ossification & calcification.



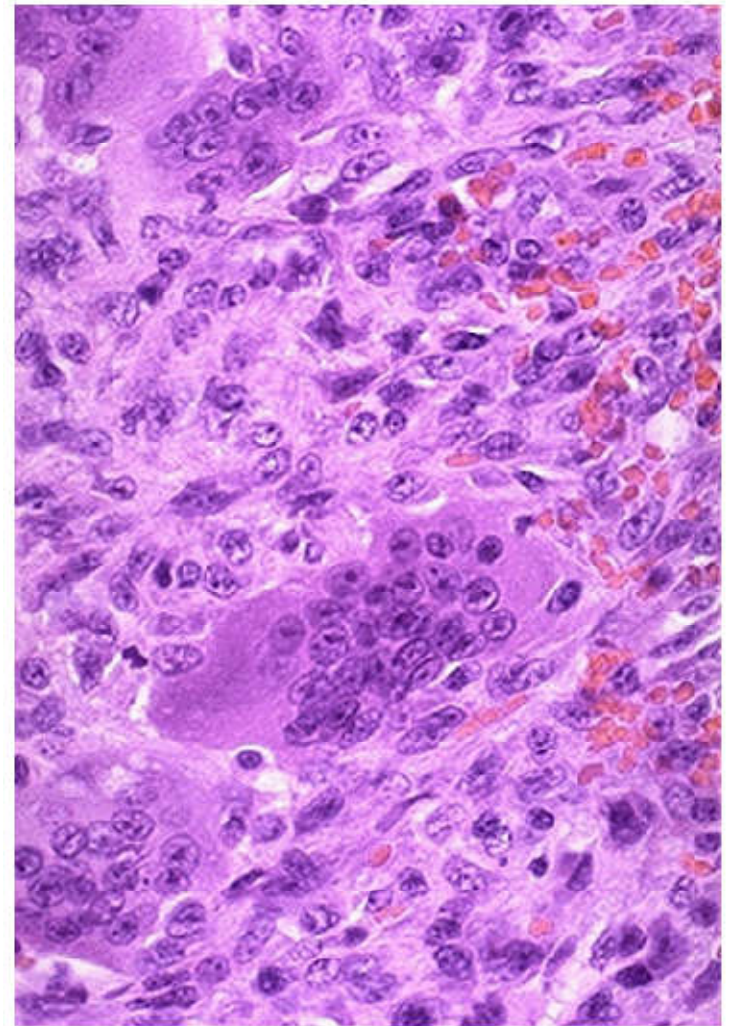


Chondrosarcoma of the vertebra. An expanding tumor erodes through the cortex of the vertebra.

The arrow indicates the histologic features of a well-differentiated chondrosarcoma: lacunae contain several neoplastic chondrocytes, which are pleomorphic & have enlarged nuclei.

Giant cell tumor

- **uncommon; Usually benign, locally aggressive**
- **affects ages 20- 50;**
- **arises in the epiphysis of long bones.**
- **Presents as bulky painful mass.**
- **X-ray: expanding area of radiolucency**
- **composed of Multinucleated giant cells in a background of sheets of mononuclear cells.**



Ewing sarcoma

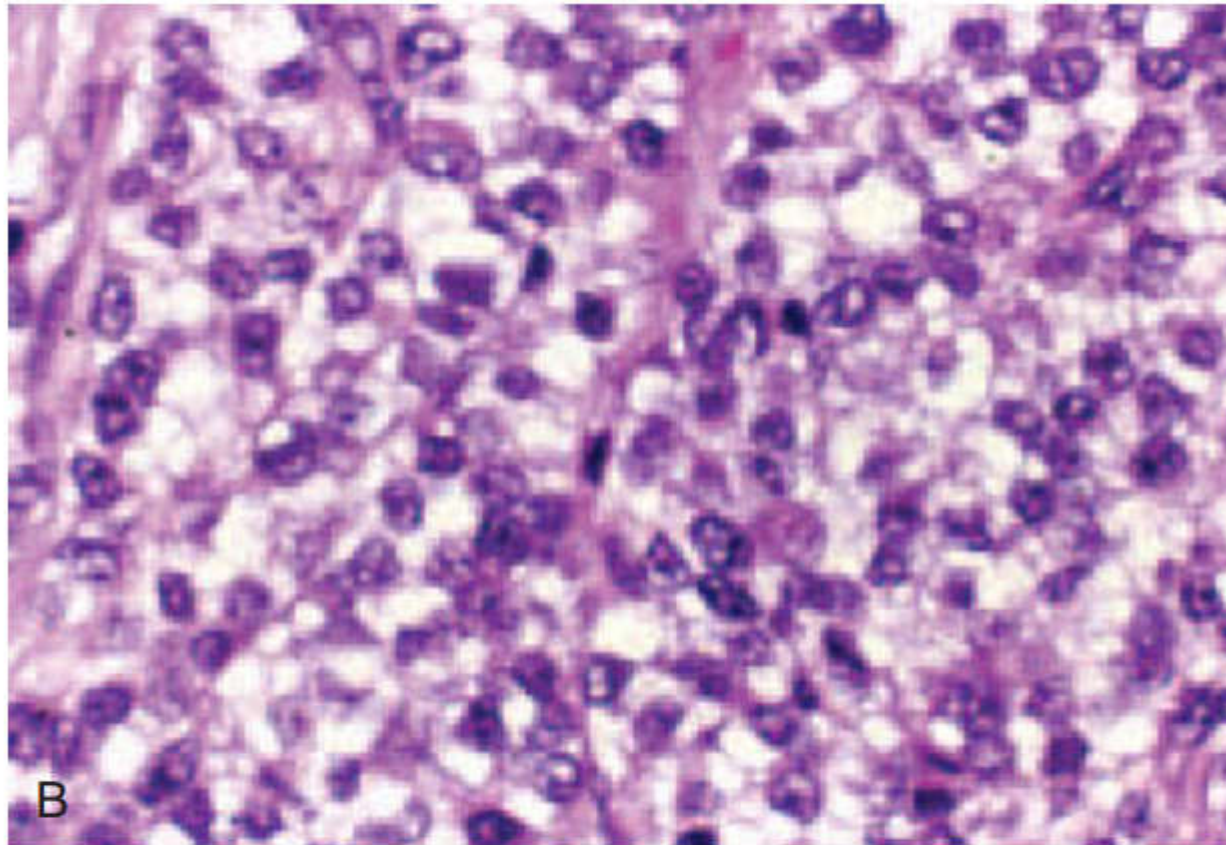
*** second most common tumor of bones in kids adolescents (after osteosarcoma).**

- Its peak incidence: 5- to 20-year-old age group.**

- often located in the diaphysis of long bones of limbs, but it may involve ribs & pelvic bones.**

- Metastases to the lungs, liver, brain, and other organs are common.**

Ewing sarcoma



Histologic section shows small, uniform cells with hyperchromatic nuclei and scant, vacuolated cytoplasm.