Bone Tumor

وزراة التعليم العالي والبحث العلمي
كلية المعارف الجامعة
قسم المختبرات الطبية

Histopathology
المرحلة الرابعة

Bone Tumor

- When cells divide abnormally and uncontrollably, they can form a mass or lump of tissue. This lump is called a tumor. Bone tumors form in the bones. As the tumor grows, abnormal tissue can displace healthy tissue. Tumors can either be benign or malignant.

Benign tumors aren’t cancerous. While benign bone tumors typically stay in place and are unlikely to be fatal, they’re still abnormal cells and may require treatment. Benign tumors can grow and could compress your healthy bone tissue and cause future issues.

Malignant tumors are cancers. Malignant bone tumors can cause cancer to spread throughout the body.

- **Bone cancer** can begin in any bone in the body, but it most commonly affects the pelvis or the long bones in the arms and legs. Bone cancer is rare, making up less than 1 percent of all cancers. Noncancerous bone tumors are much more common than cancerous ones.
- The term "bone cancer" doesn't include cancers that begin elsewhere in the body and spread (metastasize) to the bone. Instead, those cancers are named for where they began, such as breast cancer that has metastasized to the bone.

Benign bone tumors include osteochondroma, giant-cell tumors, osteoid osteoma, and osteoblastomas.

Malignant bone tumors include osteosarcoma, Ewing sarcoma, and chondrosarcoma

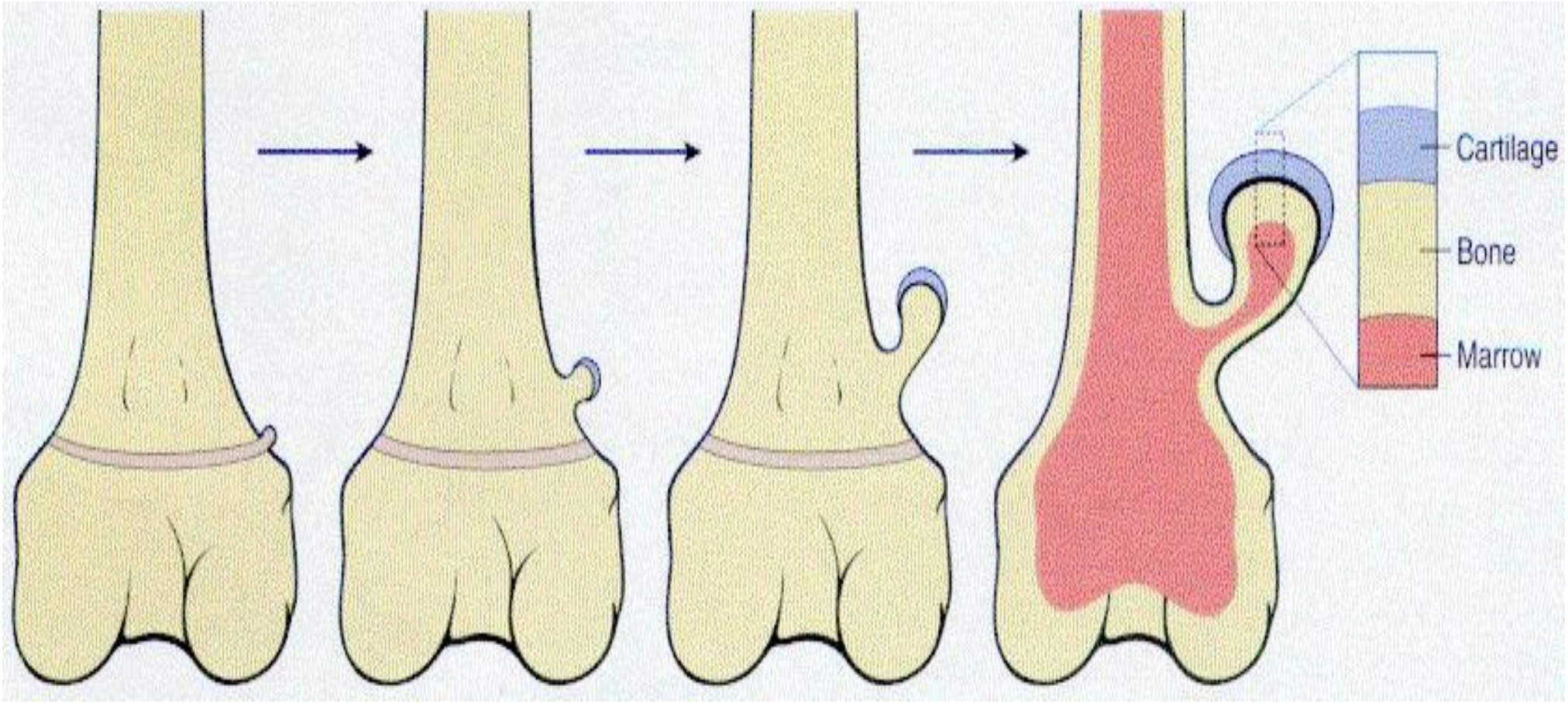
Signs and symptoms of bone cancer include:

- Bone pain
- Swelling and tenderness near the affected area
- Weakened bone, leading to fracture
- Fatigue
- weight loss

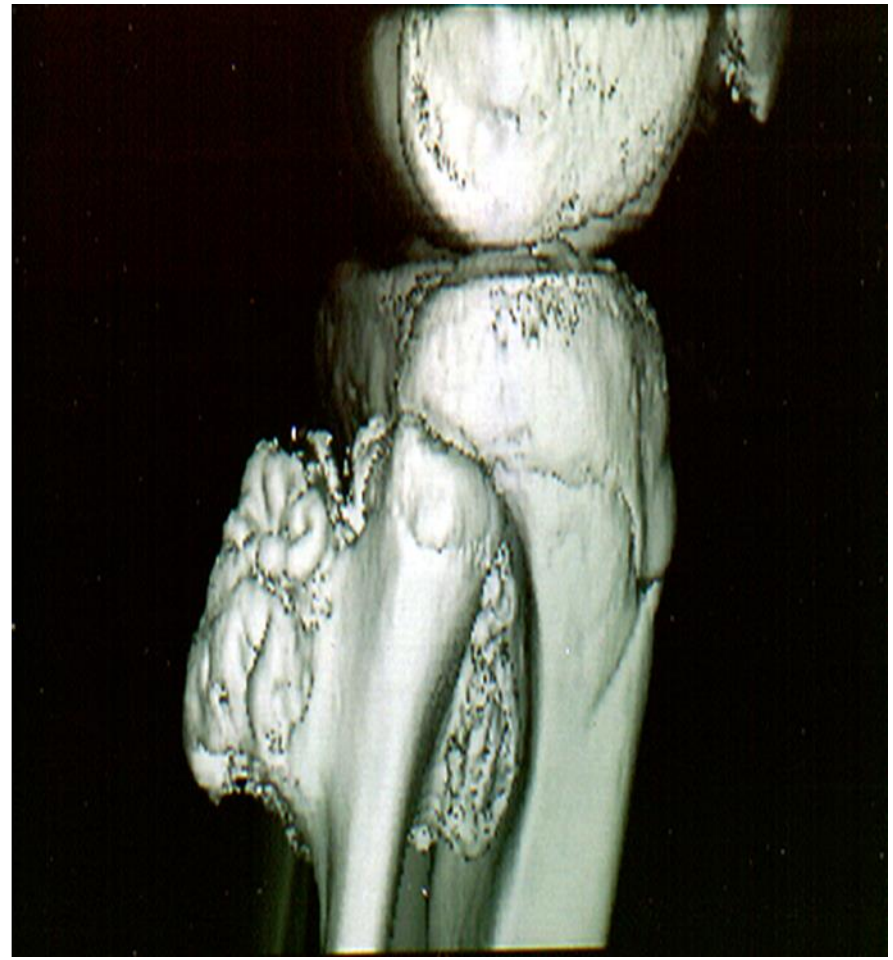
Types of benign bone tumors

- **Osteochondromas**

- Benign tumors are more common than malignant ones. This type accounts for between 35 and 40 percent of all benign bone tumors.
- These tumors form near the actively growing ends of long bones, such as arm or leg bones. Specifically, these tumors tend to affect the lower end of the thigh bone (femur), the upper end of the lower leg bone (tibia), and the upper end of the upper arm bone (humerus).
- These tumors are made of bone and cartilage. Osteochondromasis has been considered to be an abnormality of growth. A child may develop a single osteochondroma or many of them.



- **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.**



Giant cell tumors

- Giant cell tumors grow aggressively. They occur in adults. They’re found in the rounded end of the bone and not in the growth plate. These are very rare tumors.

Enchondroma

- An enchondroma is a cartilage cyst that grows inside the bone marrow. When they occur, they begin in children and persist as adults. Enchondromas occur in the hands and feet as well as the long bones of the arm and thigh.

Fibrous dysplasia

- Fibrous dysplasia is a gene mutation that makes bones fibrous and fracture.

Aneurysmal bone cyst

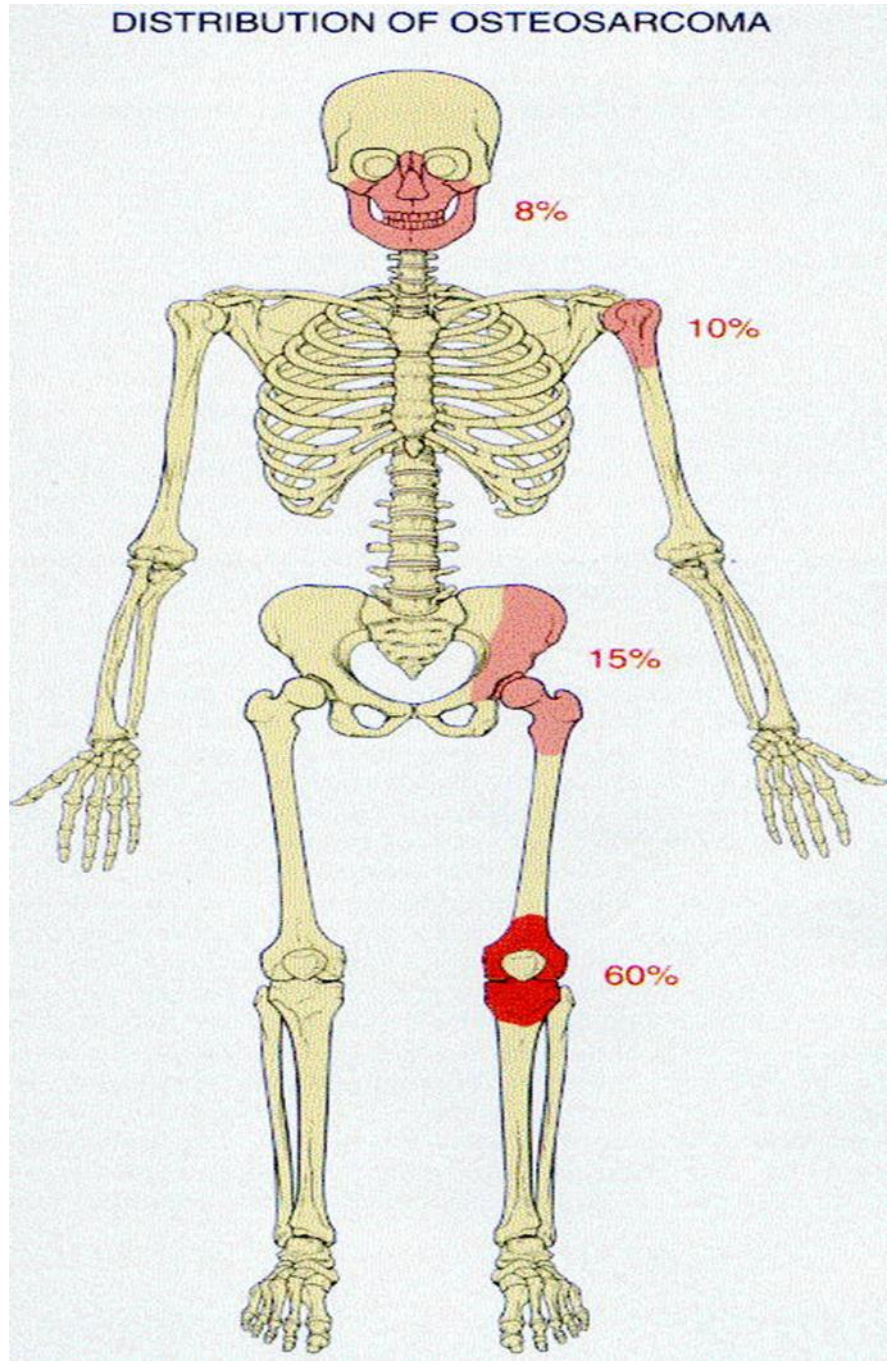
- An aneurysmal bone cyst is an abnormality of blood vessels that begins in the bone marrow. It can grow rapidly and can be particularly destructive because it affects growth plates.

Types of malignant bone tumors

- Several types of cancer produce malignant bone tumors. Primary bone cancer means that the cancer originated in the bones.
- primary bone cancer accounts for less than 1 percent of all types of cancer.
- The three most common forms of primary bone cancers are osteosarcoma, Ewing sarcoma family of tumors, and chondrosarcoma.

Osteosarcoma

- **Osteosarcoma**, which occurs mostly in children and adolescents, is the second most common type of bone cancer. This usually develops around the hip, shoulder, or knee. This tumor grows rapidly and tends to spread to other parts of the body.
- The most common sites for this tumor to spread are areas where the bones are most actively growing (growth plates), the lower end of the thighbone, and the upper end of the lower leg bone. Osteosarcoma is also sometimes known as osteogenic sarcoma.


DISTRIBUTION OF OSTEOSARCOMA
8%
10%
15%
60%

- **Ewing sarcoma:** Named for the doctor who first described this type of bone cancer, Ewing sarcoma includes many different tumors that have similar qualities and are believed to begin in the same types of cells. These tumors can form in the bones and in surrounding soft tissues. Ewing sarcoma most commonly grows in the hips, ribs, and shoulder blades, or on long bones such as the legs.

Chondrosarcoma

- Middle-aged people and older adults are more likely than other age groups to develop chondrosarcoma. This type of bone cancer usually develops in the hips, shoulders, and pelvis.

- **Chordoma:** This rare tumor begins in the bones of the spine usually at the base of the spine or the base of the skull. Like chondrosarcoma, chordoma occurs most often in older adults. Men are more likely than women to develop this type of bone cancer.

bone cancer staging:

Staging is determined by the size and location of the tumor, and whether or not cancer has spread to other areas. Primary bone cancer is categorized into four stages:

- **Stage 1:** The tumor is low-grade, and the cancer cells are still localized.
- **Stage 2:** The cancer cells are still localized, but the tumor is high-grade.
- **Stage 3:** The tumor is high-grade and cancer has spread to other areas within the same bone.
- **Stage 4:** Cancer has spread from the bone to other areas of the body, such as the lungs or liver.

Secondary bone cancer

- The term “secondary bone cancer” means that the cancer started somewhere else in the body and then spread to the bone. It usually affects older adults. The types of cancer most likely to spread to your bones are:
- kidney
- breast
- prostate
- lung (particularly osteosarcoma)
- thyroid gland

Multiple myeloma

- The most common type of secondary bone cancer is called multiple myeloma.

  This bone cancer shows up as tumors in the bone marrow. Multiple myeloma most commonly affects older adults.

causes of bone tumors

- The causes of bone tumors aren’t known. A few possible causes are genetics, radiation treatment, and injuries to the bones. Osteosarcoma has been linked to radiation treatment (particularly high doses of radiation) and other anticancer drugs, especially in children. However, a direct cause hasn’t been identified.

The tumors often occur when parts of the body are growing rapidly.

People who had bone fractures repaired with metal implants are also more likely to develop osteosarcoma later.