BONE TUMORS

Presenter

Anjani walia

Moderator

Ms. Milan,Lecturer,

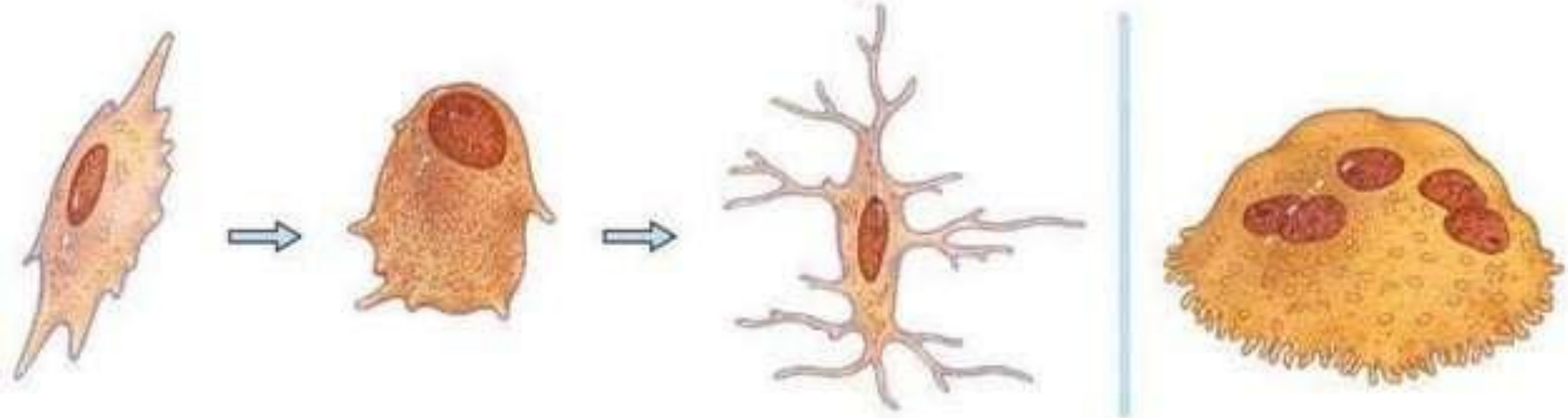
CON, AIIMS

OBJECTIVES

- Define normal anatomy & physiology of bone.
- Explain bone tumors & enlist the risk factors.
- Explain TNM classification of bone tumors
- Explain the types of bone tumors.
- Explain the clinical manifestations of bone tumors.
- Explain the diagnostic factors for bone tumors.
- Explain the management for bone tumors

BONE

- 206 bones
- Types of cells : osteoclasts, osteocytes & osteoblasts



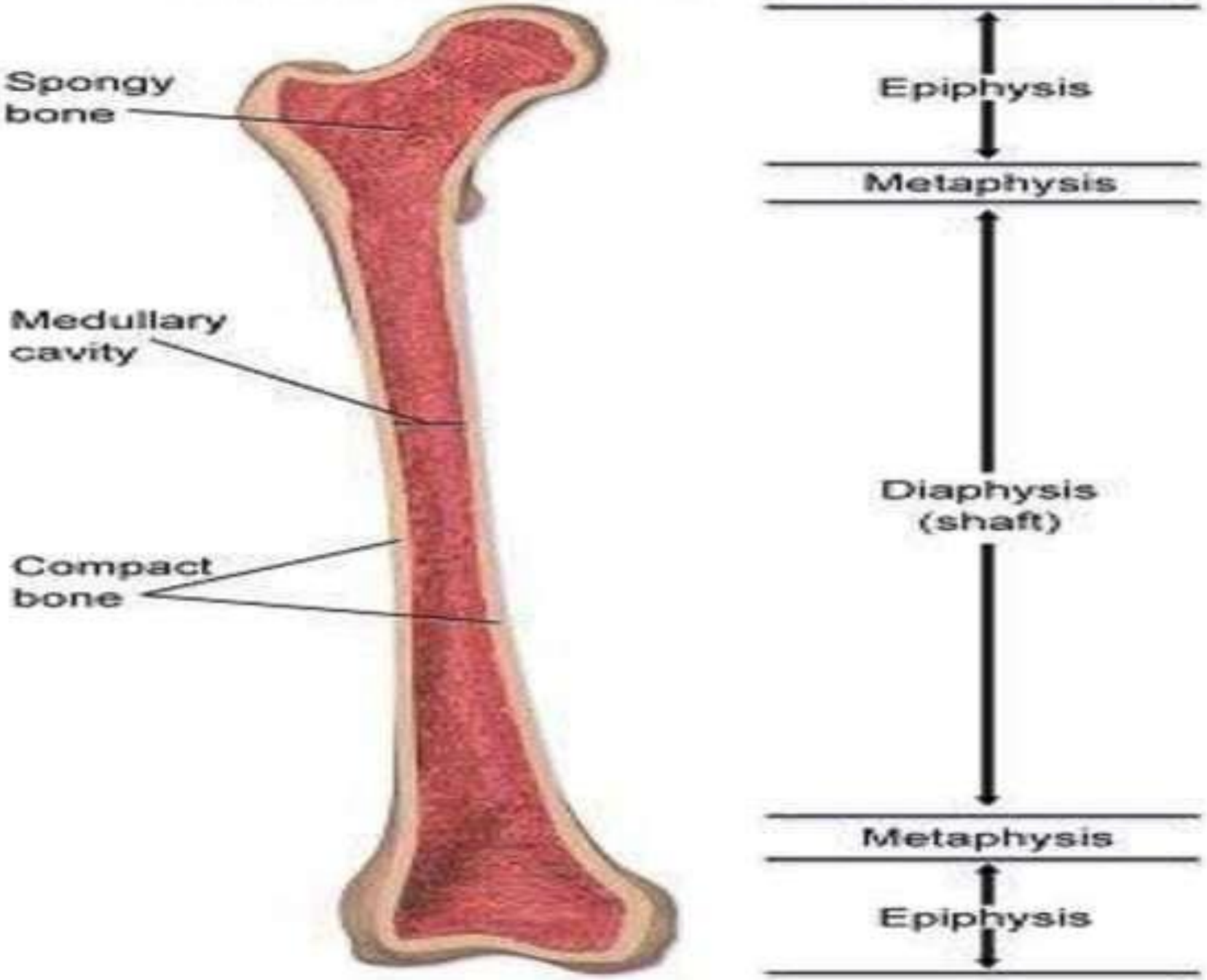
Osteogenic cell (develops into an osteoblast)

Osteoblast (forms bone matrix)

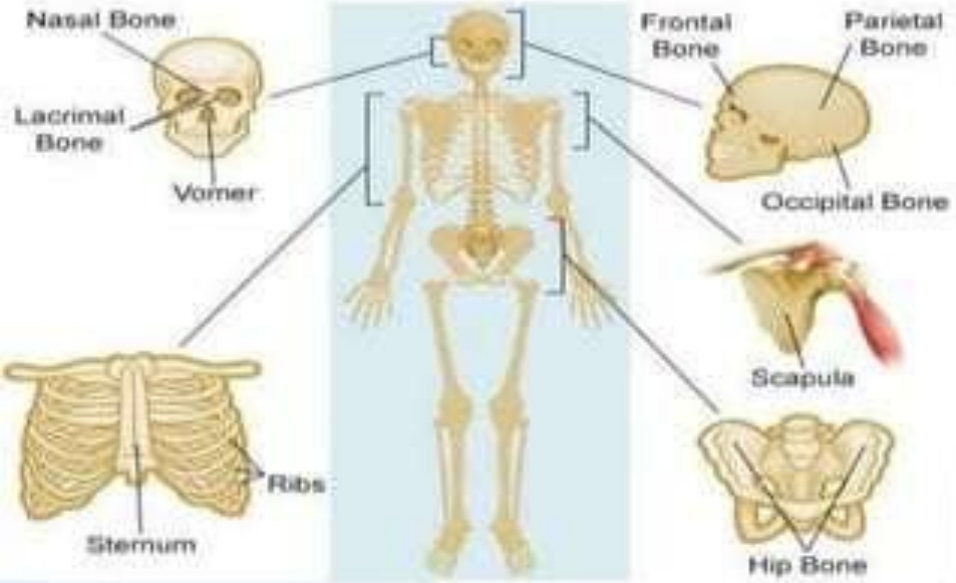
Osteocyte (maintains bone tissue)

Osteoclast (functions in resorption, the breakdown of bone matrix)

Structure of a Long Bone



Flat Bones in the Human Body



Irregular Bones

- Peculiarly shaped to provide support & protection
- Allows flexibility

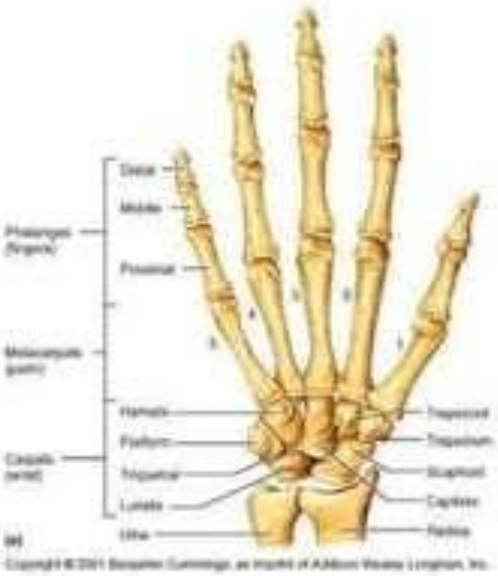
Vertebra

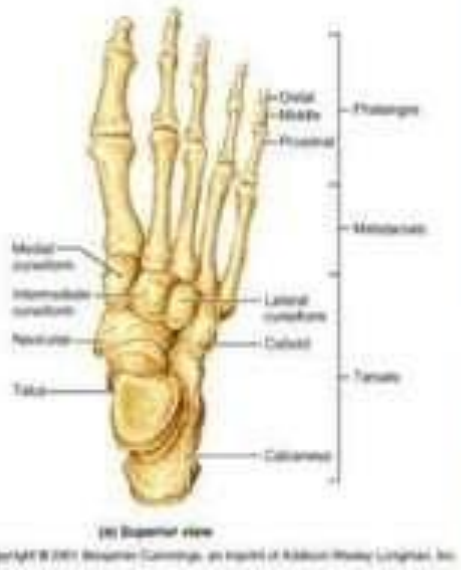
Ribs

Ear bones

Hip bones

Short Bones

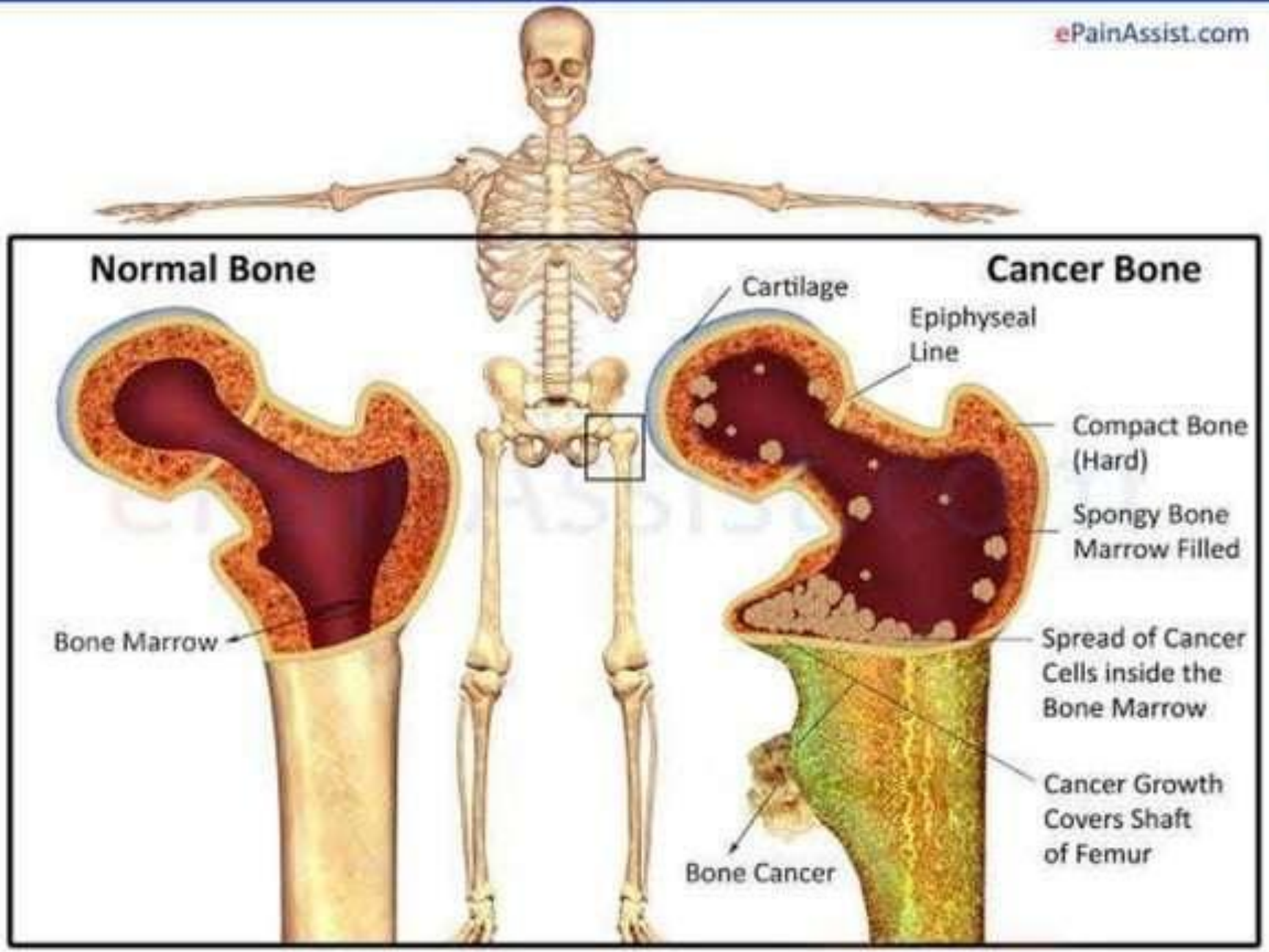




Introduction

- Bone tumors develop when cells within a bone divide uncontrollably, forming a lump or mass of abnormal tissue.

Bone Cancer


ePainAssist.com
Normal Bone
Cancer Bone
Cartilage
Epiphyseal Line
Compact Bone (Hard)
Spongy Bone Marrow Filled
Bone Marrow
Spread of Cancer Cells inside the Bone Marrow
Cancer Growth Covers Shaft of Femur
Bone Cancer

Risk factors

- Genetic disorders
  - Li-Fraumeni syndrome
  - Rothmund-Thomson syndrome
- Retinoblastoma
- Paget disease
- Radiation
- Bone marrow transplantation
- Injuries

- The Li-Fraumeni syndrome makes people much more likely to develop several types of cancer,including breast cancer, brain cancer, osteosarcoma, and other types of sarcoma.

- Most of those cases are caused by a mutation of the p53 tumor suppressor gene, but some are caused by mutations in the gene CHEK2.

- Rothmund-Thomson syndrome: Children with this syndrome are short, have skeletal problems, and rashes. They also are more likely to develop osteosarcoma. This syndrome is caused by abnormal changes in the gene REQL4.
- Injuries: People have wondered whether injury to a bone can cause cancer, but this has never been proven.

- Retinoblastoma is a rare eye cancer of children that can be hereditary. The inherited form of retinoblastoma is caused by a mutation of the RB1 gene.
- Those with this mutation also have an increased risk of developing bone or soft tissue sarcomas.
- Also, if radiation therapy is used to treat the retinoblastoma, the risk of osteosarcoma in the bones around the eye is even higher.

- Paget disease: seem to have a high risk of chordomas during childhood.
- Radiation: Bones that have been exposed to ionizing radiation may also have a higher risk of developing bone cancer.
- Bone marrow transplantation: Osteosarcoma has been reported in a few patients who have undergone bone marrow (stem cell) transplantation.

WHO CLASSIFICATION

- Cartilage tumors
- Osteogenic tumors
- Fibrogenic tumors
- Ewing sarcoma
- Fibrohystiocytic tumors
- Hematopoietic tumors
- GCT

- Notochordal tumor
- Vascular tumor
- Smooth muscle tumor
- Miscellaneous tumor
- Miscellaneous lesions
- Joint lesions

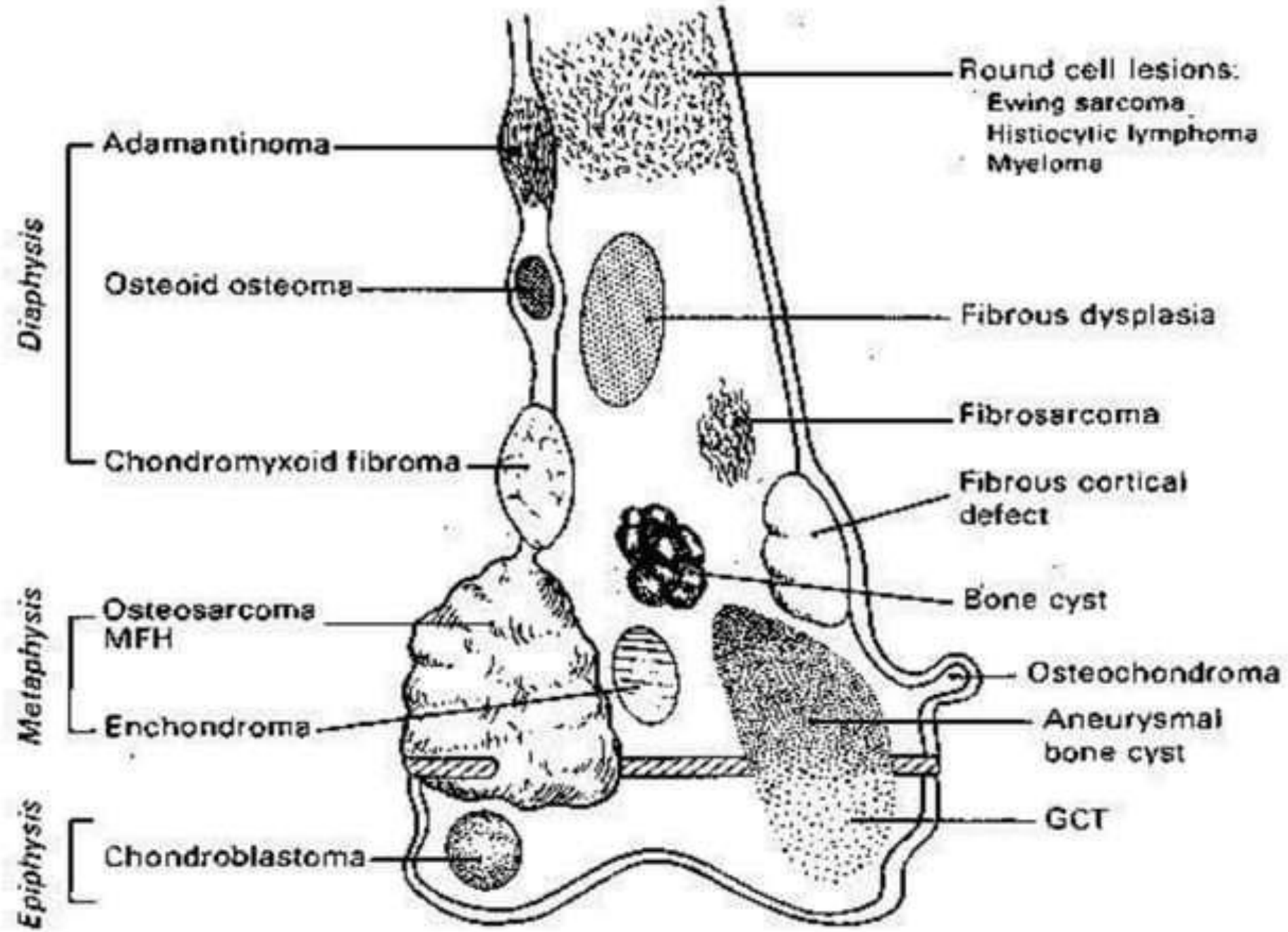
Types of bone tumors

BENIGN BONE TUMORS

MALIGNANT BONE TUMORS

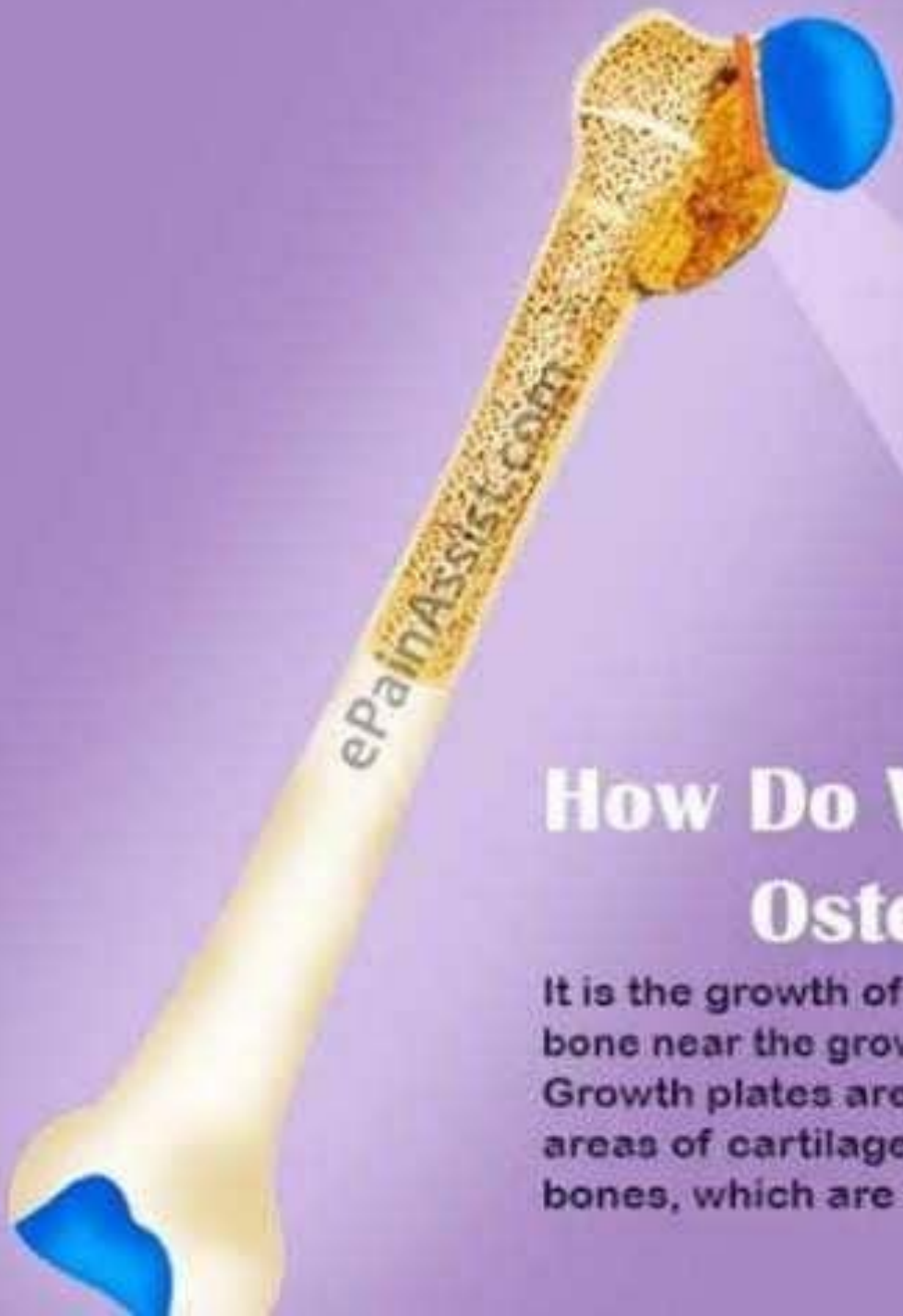
Some common types of benign bone tumors

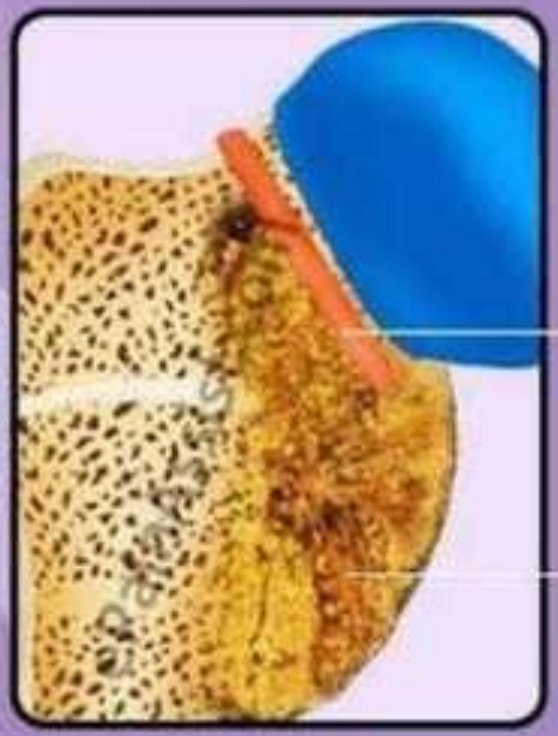
- Non-ossifying fibroma
- Unicameral (simple) bone cyst
- Osteochondroma
- Giant cell tumor
- Enchondroma
- Fibrous dysplasia
- Chondroblastoma
- Aneurysmal bone cyst
- Osteoid osteoma


Round cell lesions:
Ewing sarcoma
Histiocytic lymphoma
Myeloma
Adamantinoma
Osteoid osteoma
Fibrous dysplasia
Fibrosarcoma
Chondromyxoid fibroma
Fibrous cortical defect
Bone cyst
Osteosarcoma MFH
Osteochondroma
Enchondroma
Aneurysmal bone cyst
GCT
Chondroblastoma
Diaphysis
Metaphysis
Epiphysis

Primary Bone Tumors

- Osteochondroma: most common benign bone tumor.
- usually occurs as a large projection of bone at the end of long bones (at the knee or shoulder), developing during growth.
- It then become a static bony mass. In fewer than 1% of patients, the cartilage cap of ostochondroma may undergo malignant transformation after trauma & a chondrosarcoma or osteosarcoma may develop & metastasize.

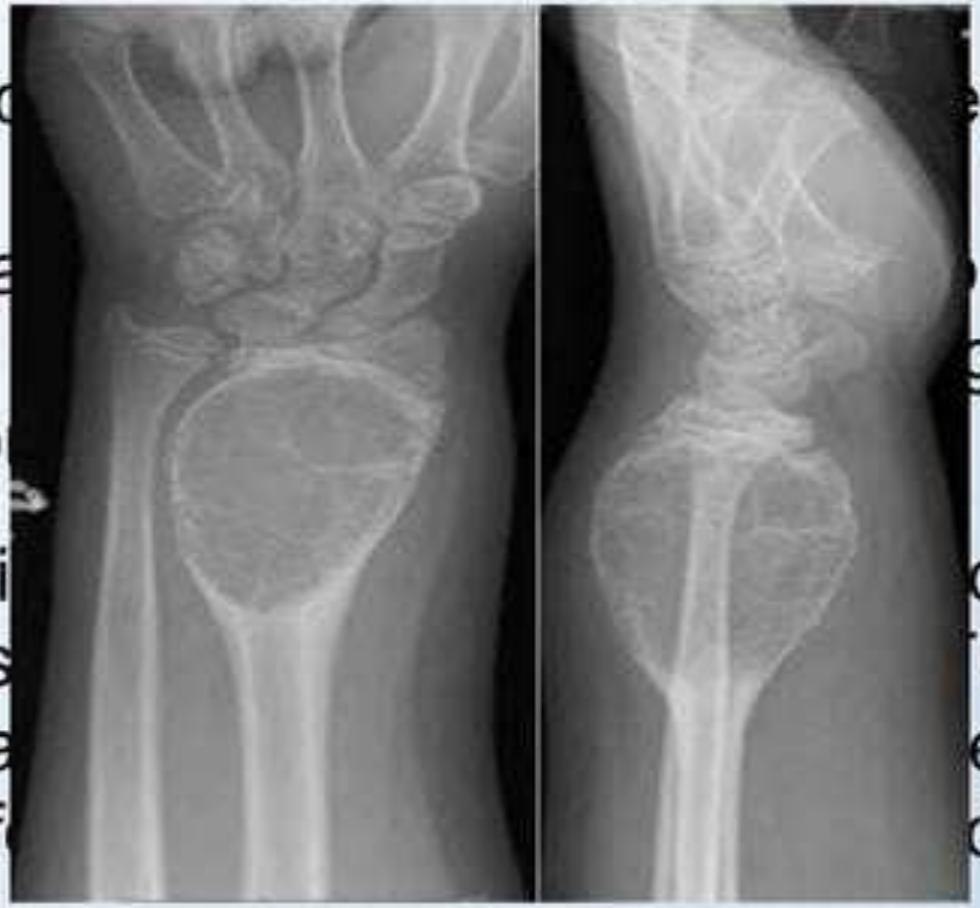




How Do We Define Osteochondroma?

It is the growth of a benign tumor at the surface of the bone near the growth plate in children and adolescents. Growth plates are present only in children and are areas of cartilage tissue, near the ends of long bones, which are in the developing stage.

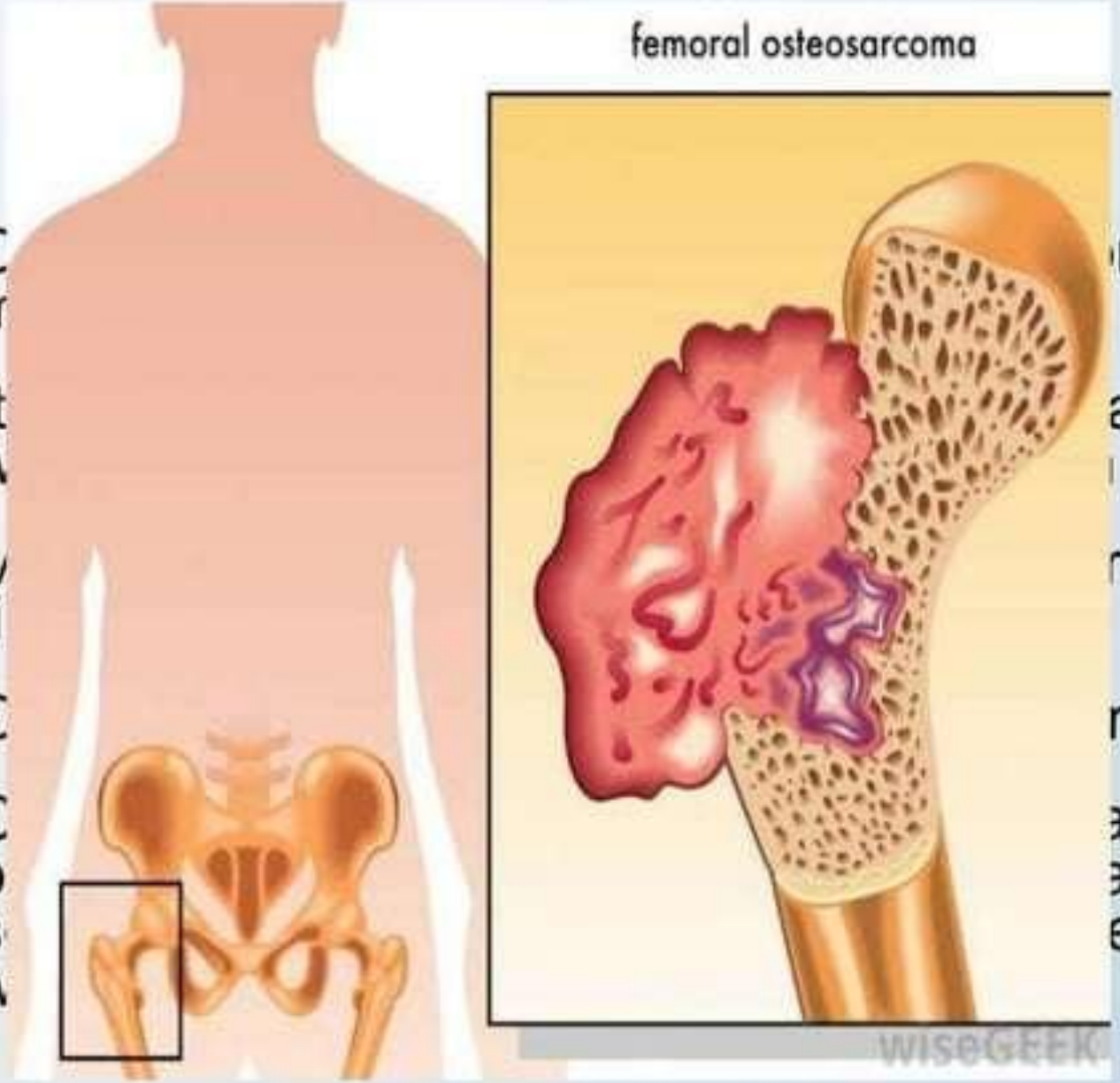
- Bone c esions within bone cysts a present with a g bones, verteb
- Osteoi or that occurs he neopla eactive bone f d by x-ray.



- Erichondroma : It is common tumor of hyaline cartilage that develops in hand, femur, tibia or humerus. Usually the only symptom is mild ache. Pathologic fractures may occur.
- Giant cell tumors (osteoclastomas): These are benign for long periods but may invade local tissue & cause destruction. They occur in young adults & are soft & hemorrhagic. Eventually, they may undergo malignant transformation

Malignant bone tumors

- Primary tumors
- Primary malignant musculoskeletal tumors are relatively rare & arise from supportive & connective tissue cells (sarcoma) & bone marrow elements (multiple myeloma). Bone tumor metastasis to lung is common.



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- Chondrosarcoma:
- malignant tumor composed of cartilage-producing cells.
- most often seen in patients between the ages of 40 and 70.
- Most cases occur around the hip, pelvis, or shoulder area.
- In most cases, surgery is the only treatment used for chondrosarcoma.

- Ewing's sarcoma: usually between the ages of 5 and 20. most common locations: upper and lower leg, pelvis, upper arm, and ribs.
- typically treated with chemotherapy and either surgery or radiation therapy. Most common risk factors are
  - Race/ethnicity: much more common among whites. Less common among Asian Americans and are extremely rare among African Americans.
  - Gender: slightly more common in males.
  - Age: can occur at any age, most common in teens and are less common among young adults and young children .Rare in older adults.

Secondary/metastatic tumors

- Tumors arising from elsewhere in the body may invade the bone & produce localized bone destruction or bone overgrowth.

Types of cancer that begin elsewhere and commonly spread to bone include:

- Breast
- Lung
- Thyroid
- Renal
- Prostate
- Metastatic tumor most commonly attack the skull, spine, pelvis, femur, humerus & often involve more than one bone (polyostotic).

Clinical manifestations

- cardinal symptoms: Pain, swelling and general discomfort
- limited mobility and spontaneous fracture may also be important features.
- Other symptoms :fever and night sweats.
- painless mass or obvious bone growth

- Varying degree of disability, weight loss, malaise.
- With spinal metastasis, spinal cord compression may occur.
- Neurologic deficit e.g. progressive pain, weakness, gait abnormality, paresthesia, paraplegia, urinary retention, loss of bowel or bladder control

Pain

- first & most common symptom.
- may initially occur intermittently and only at rest
- become more intense, disturb sleep at night, spread into the adjacent joint .
- A further intensification of pain is experienced as a persistent and piercing pain.
- becomes excruciating and intolerable, requiring opiate treatment.
- In case of pressure on nerve trunks or nerve plexuses, the patient may experience radiating pain.

Swelling

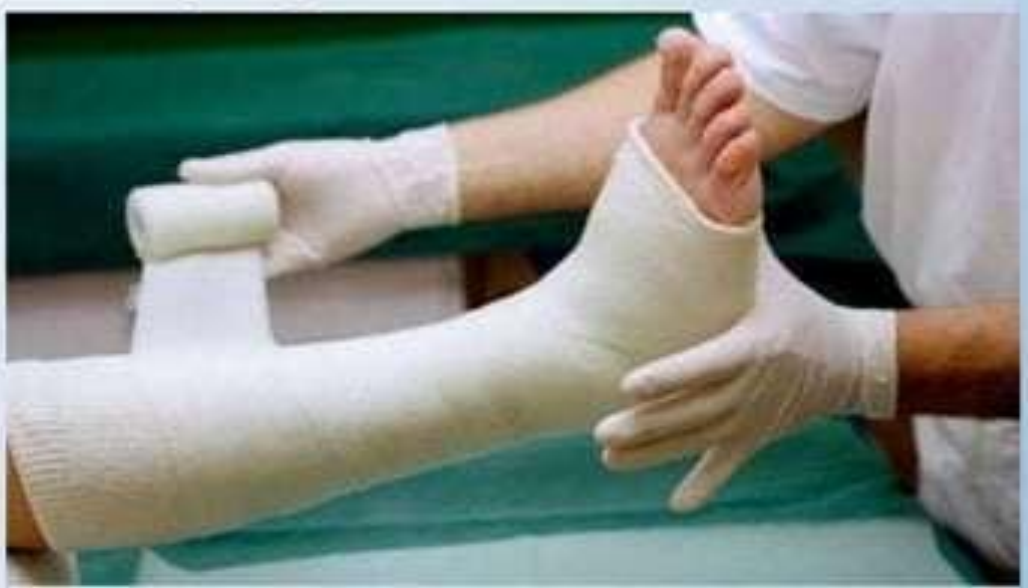
- very long duration, especially in benign neoplasms & cause no additional complaints.
- In malignant tumours, swelling develops more rapidly.
- may also cause skin changes, including tensed shining skin with prominent veins, livid colouring, hyperthermia, as well as striation of the skin and eventually, ulceration.
- The mobility of the skin & musculature above the tumour should also be assessed. The less the mobility, the more likely is this factor a criterion of malignancy.

Limitation of movement

- Mobility may be limited in cases of lesions close to the joint
- In tumours such as osteoblastoma, chrondroblastoma, giant cell tumours and all types of sarcomas.
- Occasionally it is not the tumour but reactive synovitis in the joint, especially in chondroblastoma, that causes limitation of movement and masks the true diagnosis.

Pathologic fracture

- Fracture is diagnosed early, as it causes the patient to seek attention immediately.
- It may occur with no prior symptoms at all, as is frequently the case in juvenile cysts and in some non-ossifying bone.



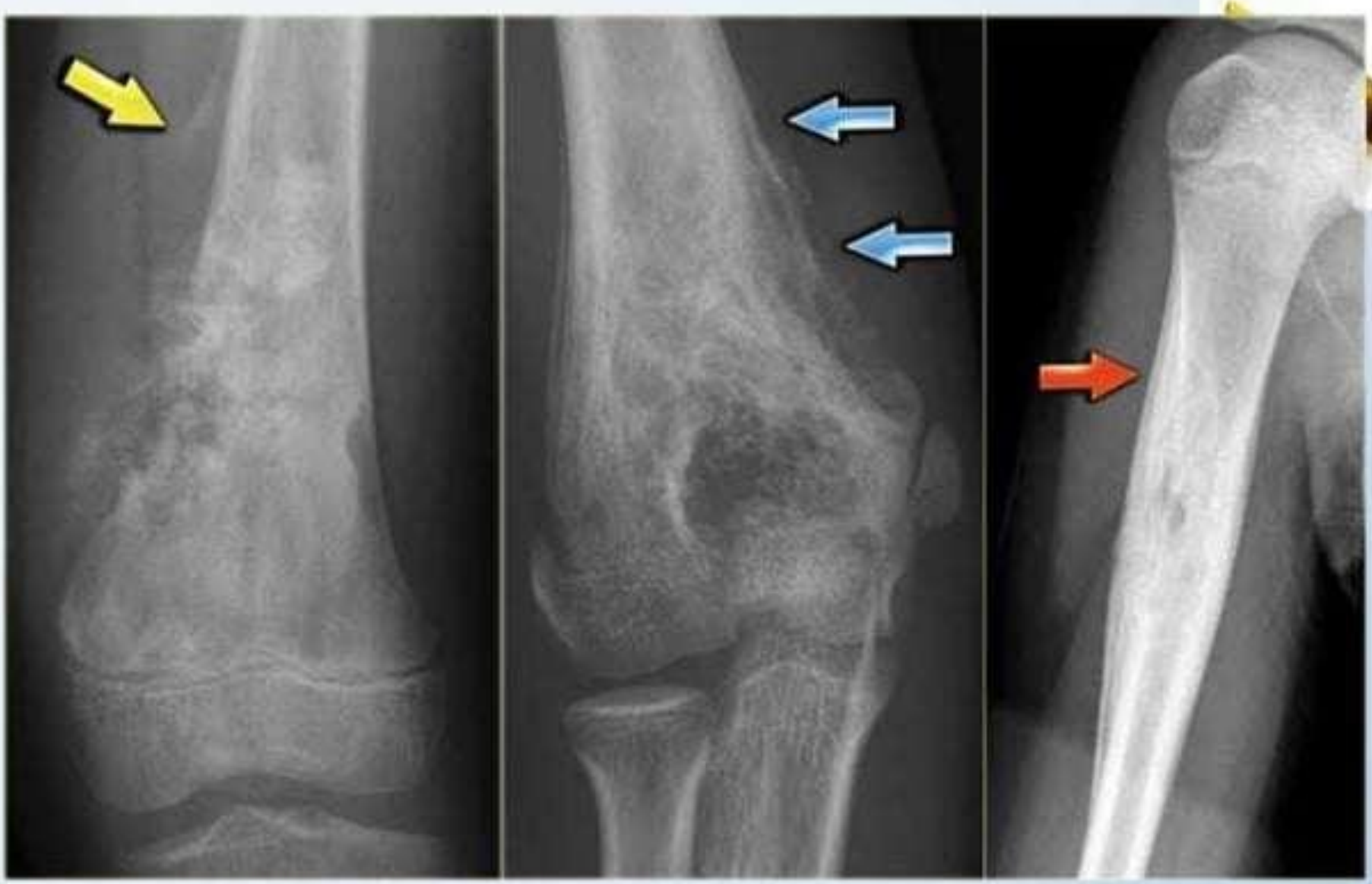
Assessment & diagnosis

- The differential diagnosis is based on history, physical examination & diagnostic studies.
- Age : it is useful information before age of 5, a malignant tumour is often metastatic neuroblastoma; between 5 and 15 years old, osteosarcoma or Ewing sarcoma; and after 40 years, metastasis or myeloma.

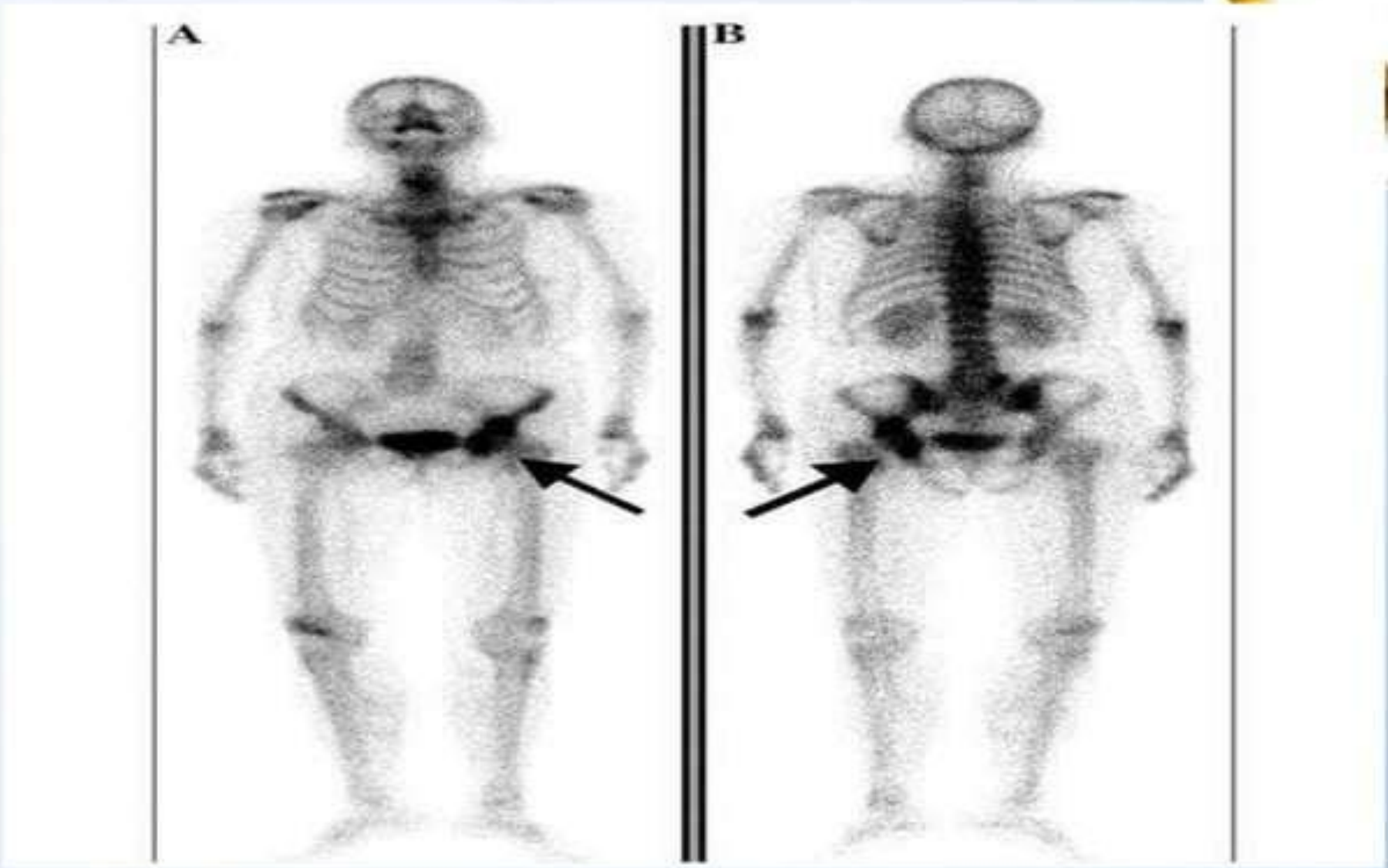
Diagnostic Studies

- X-rays
- Bone scan
- Computed tomography
- Magnetic resonance imaging
- Positron emission tomography
- Biopsy

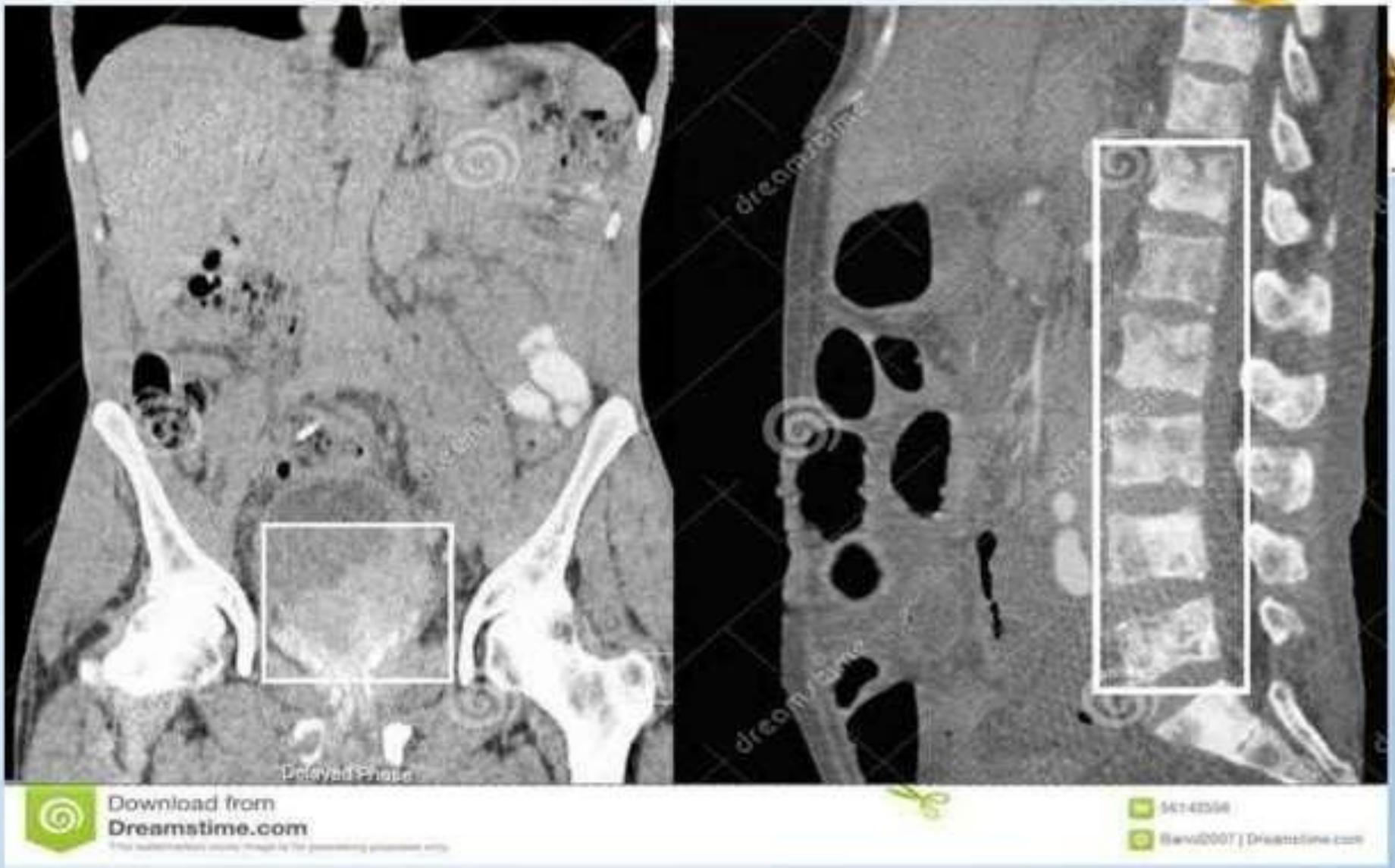
- X-rays: can show the location, size, and shape of a bone tumor. Chest x-rays are performed to determine the presence of lung metastasis
- A bone scan:a test in which a small amount of radioactive material is injected into a blood vessel and travels through the bloodstream; it then collects in the bones and is detected by a scanner.



X RAY BONE TUMORS



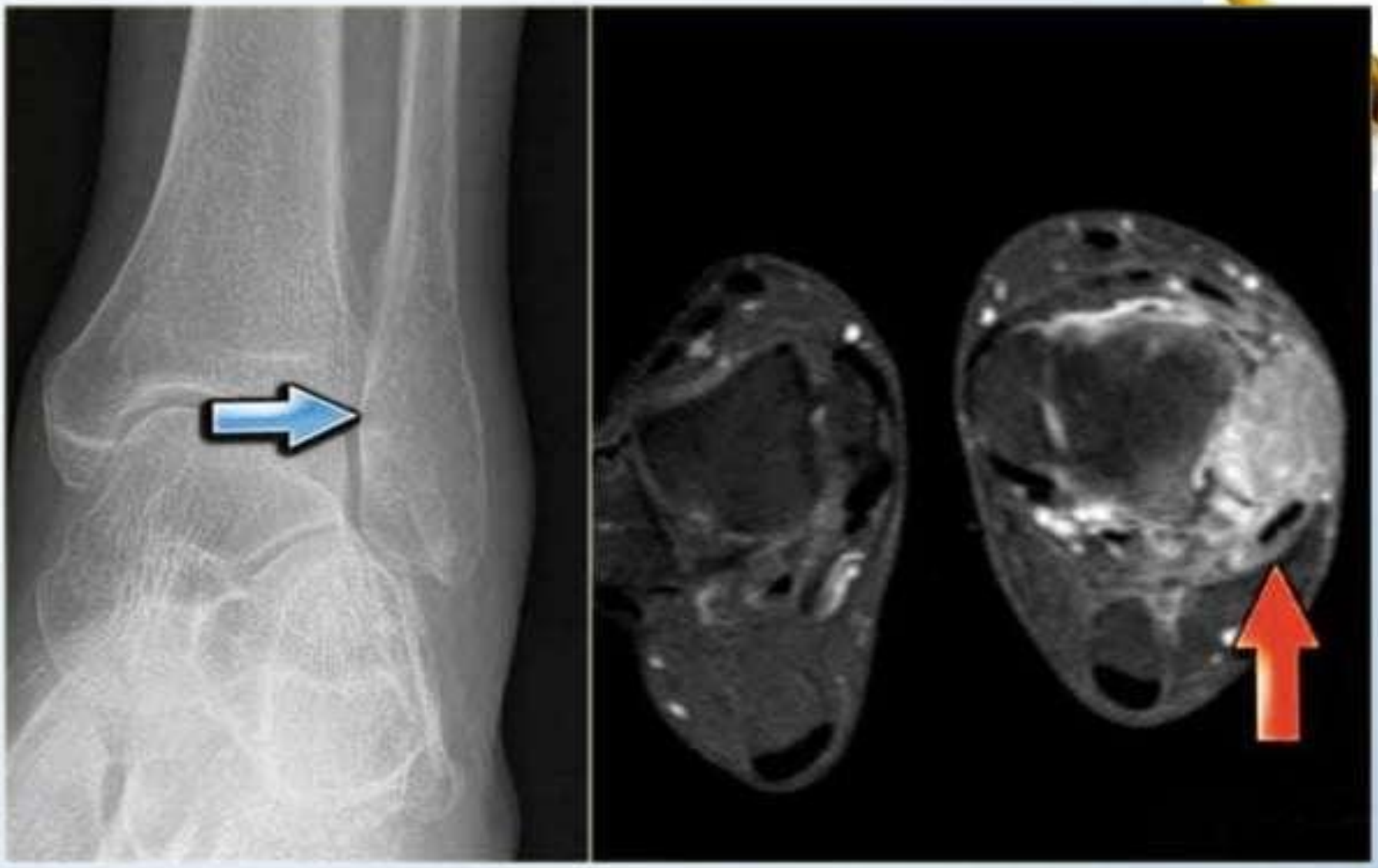
BONE SCAN



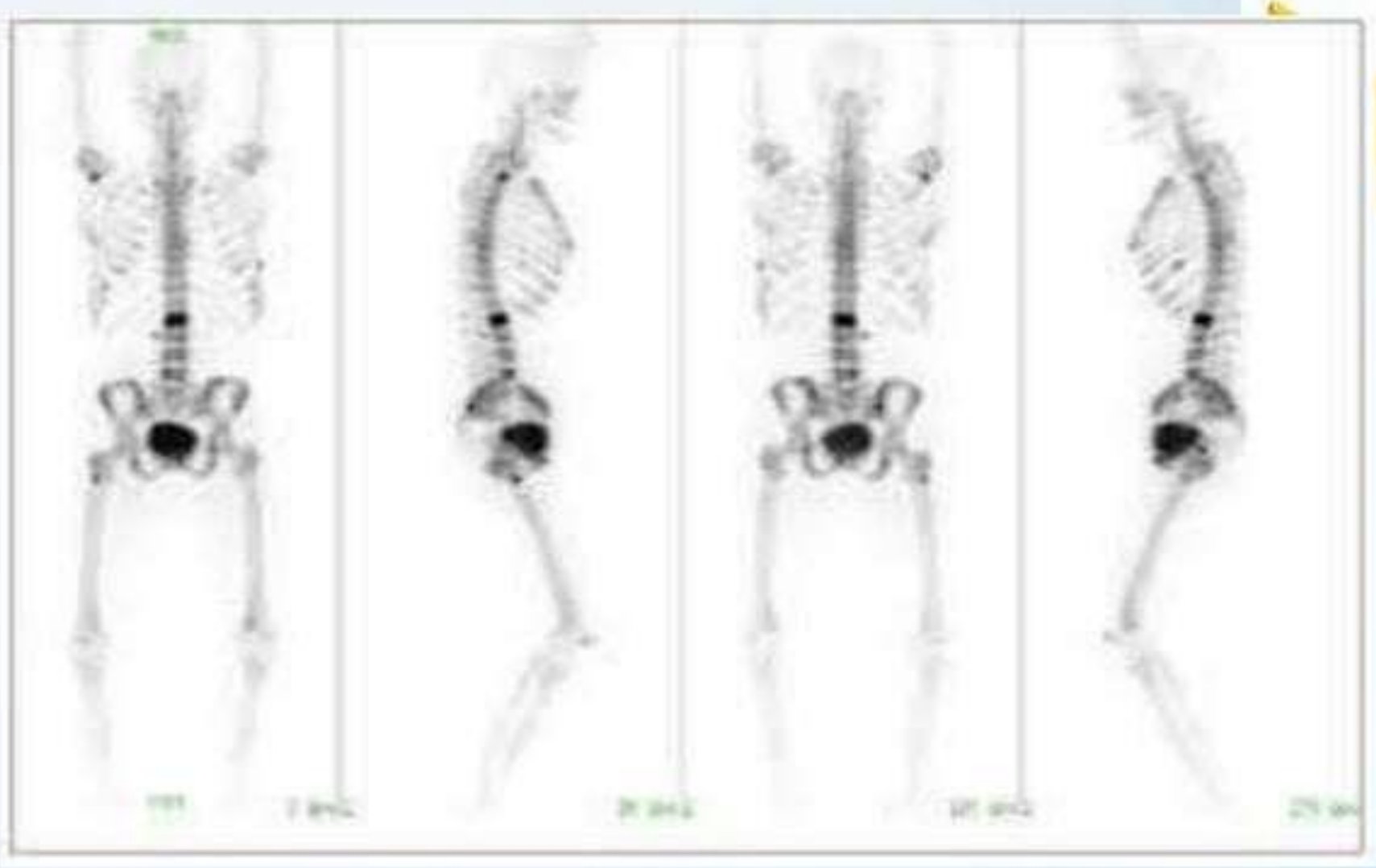
CT SCAN

- A computed tomography: a series of detailed pictures of areas inside the body, taken from different angles, that are created by a computer linked to an x-ray machine.

- A magnetic resonance imaging :which uses a powerful magnet linked to a computer to create detailed pictures of areas inside the body without using x-rays.
- A positron emission tomography: a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body.



MRI BONE TUMORS



PET SCAN

- Biopsy :removal of a tissue sample from the bone tumor.
- The biopsy is the most conclusive test because it confirms if the tumor is malignant or benign, the bone cancer type (primary or secondary bone cancer), and stage.
- According to the tumor size and type (malignant or benign) and the biopsy's purpose
  - needle biopsy
  - incisional biopsy

  - Blood tests :
  - alkaline phosphatase
  - not a completely reliable indicator of bone cancer.

- Biochemical assay of blood & urine: Elevated serum ALP
- Hypercalcemia (muscle weakness, fatigue, anorexia, nausea, vomiting, polyuria, cardiac dysrythmias, seizures & coma.

TNM Classification

- T stages of bone cancer
- TX: Primary tumor can't be measured
- T0: No evidence of the tumor
- T1: Tumor is 8 cm (around 3 inches) or less
- T2: Tumor is larger than 8 cm
- T3: Tumor is in more than one place on the same bone

- N stages of bone cancer
- N0: The cancer has not spread to the lymph nodes near the tumor
- N1: The cancer has spread to nearby lymph nodes

- M stages of bone cancer
- M0: The cancer has not spread anywhere outside of the bone or nearby lymph nodes
- M1: Distant metastasis (the cancer has spread)
- M1a: The cancer has spread only to the lung
- M1b: The cancer has spread to other sites (like the brain, the liver, etc.)

Grades of bone cancer

- G1-G2: Low grade
- G3-G4: High grade

TNM stage grouping

- Stage I: All stage I tumors are low grade and have not yet spread outside of the bone.
- Stage IA: T1, N0, M0, G1-G2: The tumor is 8 cm or less.
- Stage IB: T2 or T3, N0, M0, G1-G2: The tumor is either larger than 8 cm or it is in more than one place on the same bone.

- Stage II: Stage II tumors have not spread outside the bone (like stage I) but are high grade.
- Stage IIA: T1, N0, M0, G3-G4: The tumor is 8 cm or less.
- Stage IIB: T2, N0, M0, G3-G4: The tumor is larger than 8 cm.
- Stage III: T3, N0, M0, G3-G4: Stage III tumors have not spread outside the bone but are in more than one place on the same bone. They are high grade.

- Stage IV: Stage IV tumors have spread outside of the bone they started in. They can be any grade.
- Stage IVA: Any T, N0, M1a, G1-G4: The tumor has spread to the lung.
- Stage IVB: Any T, N1, any M, G1-G4 OR Any T, any N, M1b, G1-G4: The tumor has spread to nearby lymph nodes or to distant sites other than the lung (or both).

Management

- Chemotherapy
- Radiation therapy
- Surgical management
- Targeted therapy
- Other treatments
- Nursing mangement

Chemotherapy

- Use of anticancer drugs to kill cancer cells. Usually receive a combination of anticancer drugs.
- Not often used for bone cancers, like chordomas and chondrosarcomas,
- Most commonly used drug:
- Doxorubicin (40-60 mg/m2)
- Cisplatin (75-100mg/m2)

- Carboplatin
- Etoposide
- Ifosfamide (1.2g/m2)
- Cyclophosphamide 10-15mg/kg IV;1-5mg/kg oral)
- Methotrexate (oral/IV)
- Vincristine (1.4mg/m2)
- Usually, several drugs (2 or 3) are given together. For example, a very common combination is cisplatin and doxorubicin. Other combinations are ifosfamide and etoposide or ifosfamide and doxorubicin

Side effects of chemotherapy

- Some common temporary side effects can include nausea and vomiting, loss of appetite ,hair loss, mouth sores.
- Ifosfamide and cyclophosphamide can cause hemorrhagic cystitis & can be prevented by giving a drug called mesna along with the chemo.
- Cisplatin may cause neuropathy leading to problems with numbness, tingling, and even pain in the hands and feet. Nephropathy can also occur after treatment with cisplatin.

Radiation therapy

- involves the use of high-energy x-rays to kill cancer cells.
- may be used in combination with surgery, if tumor is radiosensitive.
- often used to treat chondrosarcoma, which cannot be treated with chemotherapy.
- may also be used for patients who refuse surgery. Radiation can also reduce pain and decrease the chance of bone fractures.

Types of radiotherapy

- Intensity-modulated radiation therapy (IMRT)
- Proton-beam radiation

Intensity-modulated radiation therapy (IMRT)

- an advanced form of external beam radiation therapy.
- With this technique, a computer matches the radiation beams to the shape of the tumor and can adjust the intensity (strength) of the beams.
- The radiation is delivered to the tumor from several directions to reduce the amount of radiation that goes through any one area of normal tissue.
- Altogether, this makes it possible to reduce radiation damage to normal tissues while increasing the radiation dose to the cancer.

Proton-beam radiation

- a special form of radiation that uses protons instead of regular x-rays to kill cancer cells.
- cause little damage to the tissues they pass through but are very good at killing cells at the end of their path.
- This allows a high dose of radiation to be given to the tumor without hurting the normal tissue around it.
- very helpful in treating skull base chondrosarcomas and chordomas.

Side effects

- depend on what area of the body is being treated and how much radiation is used.
- Common side effects include

  Fatigue (tiredness),

  Loss of appetite,

  Skin changes, ranging from redness and hair loss to blistering and peeling

Surgical management

- usual treatment for bone cancer.
- Removal of entire tumor with negative margins (no cancer cells are found at the edge or border of the tissue removed during surgery).
- special surgical techniques may be used to minimize the amount of healthy tissue removed with the tumor. It ranges from local excision to amputation & disarticulation
- May include Amputation, limb salvage & reconstructive surgery.

Amputation

- surgery to remove part or all of a limb.
- amputation removes the limb part with the tumor, some healthy tissue above it, and everything below it.
- In the past, amputation was the main way to treat bone cancers found in the arms or legs.
- For example, an amputation may be needed if removing all of the cancer requires removing essential nerves, arteries, or muscles that would leave the limb without good function.

Limb-salvage surgery

- goal is to remove all of the cancer and still leave a working leg (or arm).
- Over 90% of patients with bone cancer in a limb are able to have their limb spared.
- The challenge is to remove the entire tumor while still saving the nearby tendons, nerves, and vessels.
- If a cancer has grown into these structures, they will need to be removed along with the tumor. In that case, amputation may be the best option.
- In this type of surgery, a wide-excision is done to remove the tumor.

- A bone graft or an endoprosthesis is used to replace the bone that is lost. May be used in growing children, some can be made longer without any extra surgery as the child grows.
- Further surgery could be needed if the bone graft becomes infected, loose, or broken.
- May need more surgery during the following 5 years, and some may eventually need an amputation.
- Rehabilitation is much more intense after limb-salvage surgery than it is after amputation.

Reconstructive surgery

- If the leg must be amputated mid-thigh, the lower leg and foot can be rotated and attached to the thigh bone.
- The old ankle joint becomes the new knee joint. This surgery is called rotationplasty.
- If the bone tumor is located in the upper arm, the tumor may be removed and then the lower arm attached again. This leaves the patient with an arm that works but is much shorter.

Tumors in other areas

- Bone cancer in the pelvis is treated with a wide-excision when possible.
- If needed, bone grafts can be used to rebuild the pelvic bones.
- For a tumor in the lower jaw bone, the entire lower half of the jaw may be removed and later replaced with bones from other parts of the body.
- For tumors in areas like the spine or the skull, it may not be possible to safely do a wide-excision. Cancers in these bones may require a combination of treatments such as curettage, cryosurgery, and radiation.

Surgical treatment of metastasis

- lungs are the most common site of distant spread
- However, not all lung metastases can be removed. Some tumors are too big or are too close to important structures in the chest (such as large blood vessels) to be removed safely.
- People whose general condition is not good (due to poor nutritional status or problems with the heart, liver, or kidneys) may not be able to withstand the stress of anesthesia and surgery to remove metastases

- **<u>Correlation b/W functional status and QOL after surgery in pts. with primary malignant bone tumor of the lower extremities.</u>**
- Liu Y, Hu A, Zhang M, Shi C, Zhang X, Zhang J
- This study aims to explore the correlation b/w functional status & QOL after surgery in pt.with primary malignant bone tumor of the lower extremities.
- All patients presented ↓ed physical function, ADL & social participation capability. Their QOL was significantly ↓ than the norm. Scores under all items of functional status significantly correlated with the QOLscore

- CONCLUSION:
- To improve quality of life, necessary nursing measures should be adopted to intervene with postoperative functional rehabilitation processes

Targeted therapy

- As researchers have learned more about the molecular and genetic changes in cells that cause cancer, they have been able to develop newer drugs that specifically target some of these changes.
- These drugs, often called targeted therapy drugs, work differently from standard chemotherapy (chemo) drugs and have different side effects.
- Targeted drugs are especially important in diseases such as chordomas and other bone cancers, where chemo has not been very useful.

- Imatinib: Some chordomas have gene mutations c-kit, PDGFRA, and PDGFRB. The drug imatinib is a targeted therapy drug that can block the signals from these genes.
- This can make some tumors stop growing or even shrink a little.
- used to treat chordomas that have spread or have come back after treatment. This drug is given as a pill, taken with food once a day.
- Common side effects are mild and can include diarrhea, nausea, muscle pain, and fatigue. These are generally mild. Some people taking the drug have itchy skin rashes.

- Denosumab: a monoclonal antibody that binds to a protein called RANK ligand.
- RANK ligand normally tells osteoclasts to break down bone,denosumab binds to it & action is blocked.
- injected under the skin (sub-q or SQ), weekly for 4 weeks, and then every 4 weeks.
- can take months to see tumor shrinkage.
- side effects are mild and can include body aches, headache, and nausea.

- A rare but very distressing side effect of denosumab is damage to the jawbone called osteonecrosis of the jaw (ONJ).
- Maintaining good oral hygiene by flossing, brushing, making sure that dentures fit properly, and having regular dental check-ups may help prevent this.
- Most doctors recommend that patients have a dental checkup and have any tooth or jaw problems treated before they start taking this drug.

Other treatments

- If the bone is weakened, structural support & stabilization is needed to prevent pathologic fractures.

- Bones are strengthened by prophylactic internal fixation, arthroplasty or PMMA (bone cement) reconstruction.
  - Blood component therapy
  - Pain management

- Bisphosphonates to stabilize bones
- may be an acute reaction of a flu-like syndrome with fever, chills, myalgia and arthralgia, in approximately 50% of patients.
- This typically occurs within 48 hours of the infusion and resolves in 24 to 48 hours. Acetaminophen or NSAIDs may be used to relieve the symptoms and can be given prophylactically prior to the infusion.

Bisphosphonate-related osteonecrosis of the jaw in cancer patients: Implications for nurses

- Morris M, Cruickshank S.
- This paper reports a review of the literature with a specific focus on osteonecrosis of the jaw. Bisphosphonate drugs are commonly used in the treatment of bone disease secondary to myeloma and solid tumours, such as breast and prostate cancer. In the past few years, an uncommon but distressing condition known as osteonecrosis of the jaw (ONJ) has been detected in patients who are having bisphosphonate treatment, particularly the intravenous (IV) preparations.

- Fourty-two articles were reviewed which described the clinical manifestations of ONJ, the reported incidence and clinical cases.
- The results indicate there is an emerging body of evidence in this field and nurses delivering bisphosphonates need to familiarise themselves with the current guidance to ensure risks are minimised for patients.

Specific treatment: Chondrosarcomas

- Surgery is done to remove the tumor.
- For a low-grade in an arm or leg, curettage with cryotherapy is an option.
- If high-grade, limb-sparing surgery will be done. Sometimes amputation is needed to completely remove the cancer.
- If the chondrosarcoma has spread to the lung and there are only a few metastases, they may be removed surgically.

- Chondrosarcomas in the skull are hard to treat. Complete surgical removal is difficult, and may cause serious side effects.
- Sometimes the patient is treated with radiation therapy. Since chondrosarcomas are resistant to radiation, high doses are required. Proton-beam radiation works well for these tumors.
- Chemotherapy is not often used to treat chondrosarcoma, most types are resistant to chemo.

Malignant fibrous histiocytomas (MFH)

- MFH is treated the same way osteosarcoma is treated.
- Often the patient is first treated with chemotherapy to shrink the tumor.
- Then the tumor and some surrounding normal tissue is removed (wide-excision).
- After resection, the bone may be reconstructed with a bone graft or a prosthesis (metallic rod).
- Amputation is rarely needed. In some cases, chemotherapy is also given after surgery.

Fibrosarcomas

- Surgery is the main treatment for this kind of cancer, with the goal of removing the tumor and a margin of surrounding normal bone.
- Radiation is sometimes given after surgery when it is suspected that some cancer has been left behind.
- Radiation therapy is sometimes used instead of surgery if the tumor cannot be removed completely.
- Radiation is also used if a fibrosarcoma returns after surgery.

Giant cell tumors

- These are treated mainly with surgery.
- Different surgeries are used, depending on the size and location of the tumor.
- One option is wide-excision.
- Another option is curettage followed by cryosurgery.

- Radiation therapy may sometimes be used for giant cell tumors in bones where surgery may be difficult to perform without damaging nearby sensitive tissues − such as the skull and the spine.
- Radiation is not often used to treat giant cell tumors because if the tumor is not killed completely it may increase the chance that it comes back in the malignant form.
- Amputation is rarely needed to treat a giant cell tumor. If a giant cell bone tumor spreads to other organs, the lungs are most commonly affected. Metastases that can't be removed can be treated with radiation or with the drug denosumab (Xgeva).

Chordomas

- This primary tumor of bone most often occurs in the base of the skull or the bones of the spine.
- The best treatment is a wide excision to remove the tumor completely with some nearby normal tissue.
- Radiation is often given after surgery to lower the chance that the tumor will grow back.
- Proton-beam radiation, either alone or with IMRT, is often used.
- Imatinib is often used for a chordoma that has spread widely

Nursing management

- Acute Pain r/t disease process (compression/destruction of nerve tissue, infiltration of nerves or their vascular supply, obstruction of a nerve pathway, inflammation)
- Altered Nutrition: Less Than Body Requirements r/t consequences of chemotherapy, radiation, surgery, e.g., anorexia, gastric irritation, taste distortions, nausea

- Fatigue r/t altered body chemistry:side effects of pain & other medications, chemotherapy
- Risk for Infection r/t immunosuppression
- Risk for Fluid Volume Deficit r/t excessive losses(vomiting, diarrhea) or impaired intake.
- Risk for Altered Oral Mucous Membranes r/t Side effect of some chemotherapeutic agents
- Risk for Impaired Skin Integrity r/t effects of radiation and chemotherapy
- Situational Low Self-Esteem r/t feelings of lack of control and doubt regarding acceptance by others
- Fear/Anxiety r/t threat of death

Acute Pain

- pain history (location, frequency, duration & intensity (0–10 scale), or verbal rating scale & relief measures used.
- Evaluate and be aware of painful effects of particular therapies
- Provide nonpharmacological comfort measures (massage, repositioning, backrub) and diversional activities (music, television)
- May refer to pain clinic

- use of stress management skills or complementary therapies (relaxation techniques, visualization, guided imagery, biofeedback, laughter, music, aromatherapy, and therapeutic touch).
- cutaneous stimulation (heat or cold, massage).
- Evaluate pain relief and control at regular intervals.
- Inform patient of the expected therapeutic effects and discuss management of side effects
- Discuss use of additional alternative or complementary therapies (acupuncture and acupressure).

Altered Nutrition: Less Than Body Requirements

- Monitor daily food intake; have patient keep food diary as indicated.
- Measure height, weight or other anthropometric measurements as appropriate. Weigh daily or as indicated.
- Encourage patient to eat high-calorie, nutrient-rich diet, with adequate fluid intake. Encourage use of supplements and frequent or smaller meals spaced throughout the day.
- Create pleasant dining atmosphere; encourage patient to share meals with family and friends.

- Control environmental factors (strong or noxious odors or noise). Avoid overly sweet, fatty, or spicy foods.
- Encourage use of relaxation techniques, visualization, guided imagery, moderate exercise before meals.
- Administer antiemetic as appropriate.
- Insert and maintain NG or feeding tube for enteric feedings, or central line for total parenteral nutrition (TPN) if indicated.

Fatigue

- Have patient rate fatigue, using a numeric scale, if possible, and the time of day when it is most severe.
- Plan care to allow for rest periods. Schedule activities for periods when patient has most energy. Involve patient in schedule planning.
- Establish realistic activity goals with patient.

- Assist with self-care needs when indicated; keep bed in low position, pathways clear of furniture; assist with ambulation.
- Encourage patient to do whatever possible (self-bathing, sitting up in chair, walking). Increase activity level as individual is able.
- Monitor physiological response to activity (changes in BP, heart and respiratory rate).

Risk for Infection

- Promote good handwashing procedures by staff and visitors. Screen and limit visitors who may have infections.
- Emphasize personal hygiene.
- Monitor temperature.
- Assess all systems (skin, respiratory, genitourinary) for signs and symptoms of infection on a continual basis.

- Promote adequate rest and exercise periods.
- Stress importance of good oral hygiene.
- Avoid or limit invasive procedures. Adhere to aseptic techniques.
- Monitor CBC with differential WBC and granulocyte count, and platelets as indicated.
- Obtain cultures as indicated.
- Administer antibiotics as indicated.

Risk for Fluid Volume Deficit.

- Monitor I&O and specific gravity; include all output sources, (emesis, diarrhea, draining wounds. Calculate 24-hr balance).
- Weigh as indicated.
- Monitor vital signs. Evaluate peripheral pulses, capillary refill.
- Assess skin turgor and moisture of mucous membranes. Note reports of thirst.

- Encourage increased fluid intake to 3000 mL per day as individually appropriate or tolerated.
- Observe for bleeding tendencies (oozing from mucous membranes, puncture sites); presence of ecchymosis or petechiae.
- Avoid trauma and apply pressure to puncture sites.
- Provide IV fluids as indicated.
- Monitor laboratory studies (CBC, electrolytes, serum albumin).

Risk for Altered Oral Mucous Membranes

- Assess dental health and oral hygiene periodically.
- Use of mouthwash made from warm saline, dilute solution of hydrogen peroxide or baking soda and water
- Brush with soft toothbrush
- Floss gently
- Keep lips moist

- Encourage use of mints or hard candy or artificial saliva as indicated.
- Instruct regarding dietary changes: avoid hot or spicy foods,
- Encourage fluid intake as individually tolerated.
- Discuss limitation of smoking and alcohol intake.
- Monitor for and explain to patient signs of oral superinfection (thrush).
- Culture suspicious oral lesions.

Risk for Impaired Skin Integrity

- Assess skin frequently for side effects of cancer therapy; note breakdown and delayed wound healing.
- Bathe with lukewarm water and mild soap.
- Encourage patient to avoid vigorous rubbing and scratching and to pat skin dry instead of rubbing.
- Turn or reposition frequently.
- Review skin care protocol for patient receiving radiation therapy

- Avoid applying heat or attempting to wash off marks or tattoos
- Recommend wearing soft, loose cotton clothing; Encourage liberal use of sunscreen & protective clothing.
- Assess skin, IV site,vein for erythema, edema, tenderness, itching and burning;swelling, soreness; blisters progressing to ulceration or tissue necrosis.
- Wash skin immediately with soap and water if antineoplastic agents are spilled on unprotected skin (patient or caregiver).

- Advise patients receiving 5-fluorouracil (5-FU) and methotrexate to avoid sun exposure. Withhold methotrexate if sunburn present.
- Review expected dermatologic side effects seen with chemotherapy (rash, hyperpigmentation, and peeling of skin on palms).
- Inform patient that if alopecia occurs, hair could grow back after completion of chemotherapy, but may or may not grow back after radiation therapy.
- Apply ice pack or warm compresses per protocol

Situational Low Self-Esteem

- Discuss with patient how the diagnosis and treatment are affecting the patient's personal life, home and work activities.
- Review anticipated side effects associated with a particular treatment, including possible effects on sexual activity and sense of attractiveness and desirability (alopecia, disfiguring surgery). Tell patient that not all side effects occur, and others may be minimized or controlled.

- Encourage discussion of concerns about effects of cancer and treatments on role as homemaker, wage earner, parent, and so forth.
- Evaluate support structures available to and used by patient.
- Provide emotional support for patient during diagnostic tests and treatment phase.

Fear/Anxiety

- Review patient's previous experience with cancer.
- Encourage patient to share thoughts and feelings.
- Provide open environment in which patient feels safe to discuss feelings
- Maintain frequent contact with patient.

- Be aware of effects of isolation on patient when required by immunosuppression or radiation implant.
- Assist patient in recognizing and clarifying fears to begin developing coping strategies for dealing with these fears.
- Provide accurate, consistent information regarding diagnosis and prognosis. Avoid arguing about patient's perceptions of situation.
- Permit expressions of anger, fear, despair without confrontation. Give information that feelings are normal and are to be appropriately expressed.

- Explain the recommended treatment, its purpose, and potential side effects. Help patient prepare for treatments.
- Explain procedures, providing opportunity for questions and honest answers. Stay with patient during anxiety-producing procedures and consultations.
- Promote calm, quiet environment.
- Encourage and foster patient interaction with support systems

CONCLUSION

- Bone tumors develop when cells within a bone divide uncontrollably, forming a lump or mass of abnormal tissue.
- Depending upon the type of tumor, treatment options are wide-ranging—from simple observation to surgery to remove the tumor. Some bone tumors are malignant. Malignant bone tumors can metastasize—or cause cancer cells to spread throughout the body.
- In almost all cases, treatment involves a combination of chemotherapy, radiation, and surgery.

Summary

- Definition of bone tumors.
- Risk factors
- Types
- WHO classification
- Diagnostic techniques
- TNM staging
- Management

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- Which drug can cause hemorrhagic cystitis?
  a) Mesna
  b) Cyclophosphamide
  c) Cisplatin
  d) Doxorubicin

  – Ans (b)

- TNM staging of T1, N0, M0 is
  a) Low grade
  b) High grade

  Ans (a)

- Cardinal symptoms of bone tumors are all except

a) Pain

b) Mass

c) Swelling

d) General discomfort

Ans (b)

THANK YOU