BONE TUMORS

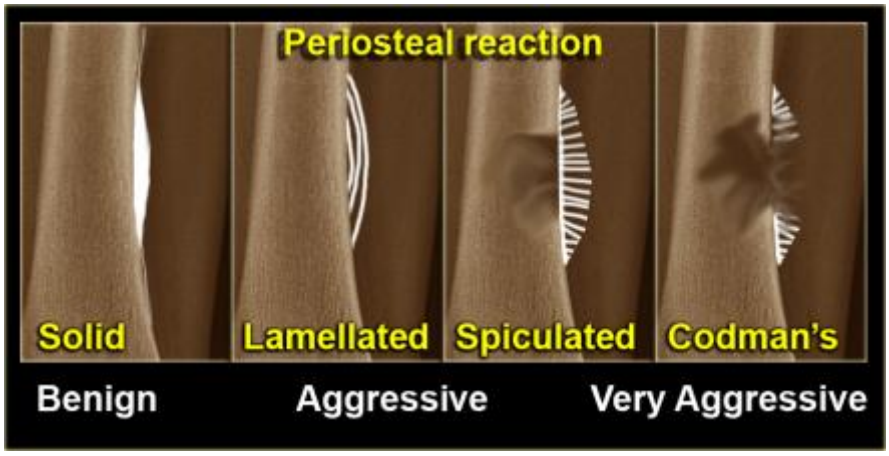
- **Plain X ray is the basal & most important modality to assess bone tumor**

Plain X ray	CT	Bone Scan	MRI
=Most Important =More than one view -	=Assess equivocal =Better assess of : -Margin -Periosteal react. -Soft tissue Extension	= Sensitive But Not specific = Good screening tool → Detect hidden Lesions	=Bone marrow & soft tissue assessment =Can scan whole body
		Non specific	Donot see calcification

⇨ ***To assess bone tumor, determine :***

- **Site** : **E**piphyseal – **M**etaphyseal – **D**iaphyseal
- **Matrix** : Cystic / Calcification = Chondral origin

	Benign "Likely"	Malignant "Likely"
○ **Nature**	**E**xpanding	**D**estructive
○ **Margins**	Sclerotic Well Defined	Lytic Ill Defined
○ **Periosteal reaction**	Candle wax	Onion peel Sun rays



- Lesions of **Characteristic** criteria
- Lesions of **Suggestive** criteria
- Lesions of **No specific** Criteria

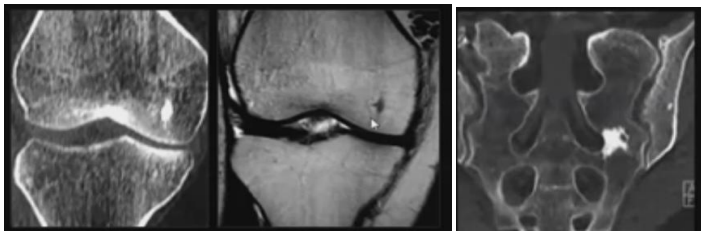
Lesions of Characteristic Criteria

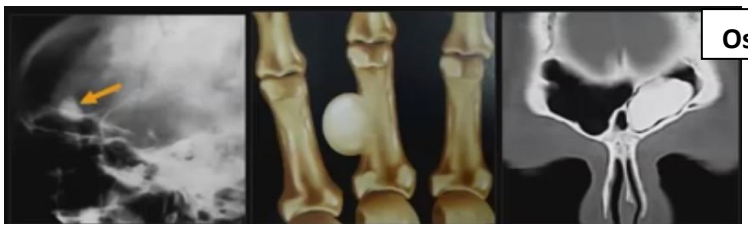
- Bone Island
- **O**steoma
- **O**steoid Osteoma
- **O**steoblastoma
- **O**steochondroma

- **E**nchondroma
- **C**hondroblastoma
- **G**iant Cell Tumor
- NOF / Fibrous Cortical Bone Def
- Hemangioma "vertebral"

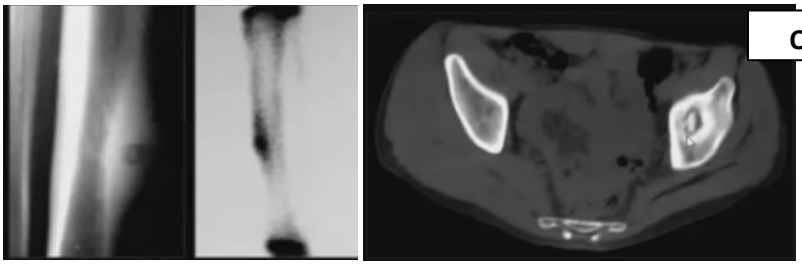
Lesion	Description	Size or Number	Commonest Site	Age	M : F	Incidence of benign B.T.
Bone Island "Enostosis"	Sclerotic Lesion Speculated edge *May inc.or dec. in size*	2:10 mm Up to > 2 cm	Axial skeleton			
Osteoma	Ball of Bone "ivory"	< 2.5 cm	Frontal sinus	-		
Osteoid Osteoma	Lucent Nidus + sclerotic reaction +/- Central Ca	**< 1.5 cm**	80% close to cortex	17 y	M3> F1	10%
Osteo blastoma	Osteoid osteoma>1.5 cm Soft tissue –Expanding +Eccentric Ca *"out spine is not spot"*	**>1.5 cm**	35% Post Spine	2nd & 3rd dec		
Osteo chondroma	***Cartilage caped Exostosis*** ***Sessile or pedicle*** ***Directed away joint***		40% Knee 15% Humr.	2nd Dec	M=F	COMMONEST Benign BT
En chondroma	Expanding – Lytic In long Bone sclerotic lesion + Ca but non expand	*Multi = Olier *Multi+Hemangioma = Mafuci Synd	Short Bones Hand & Feet	ALL 10 : 20 Y		12 % 1% to M.
Chondro blastoma	**NON CLOSED EPIPHYSIS** Well defined -Expanding – Lytic + Ca "60%" Can extend to metaphysis		70% L.L. 20% Humeral	20 th	M>F	1%
Giant Cell Tumor	SUBARTICULAR ECCENTERIC EXPANDING - LYTIC		SUB ARTCULAR	20-40 Closed Epiph	M=F	Local Malignant
NOF F.C.B.D.	Diaphysis –Cortical- Lytic lesion + Sclerotic margin Healed center→**sclerotic**		Around Knee	2nd Dec		
Hemangioma Vertebral	Well Defined High T1 & T2		Vert. Body			

Bone Island



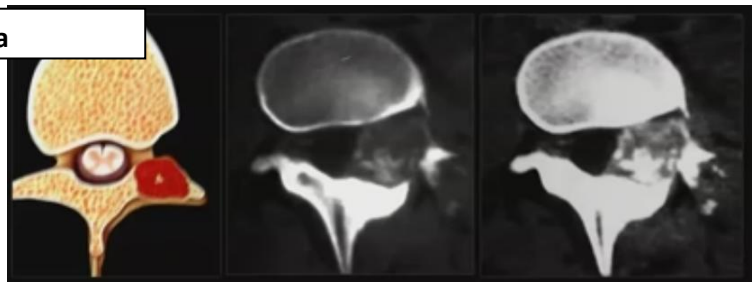


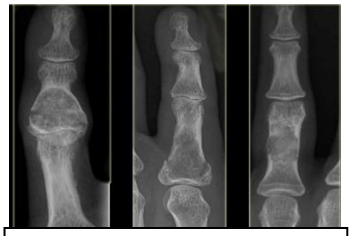
Osteoma



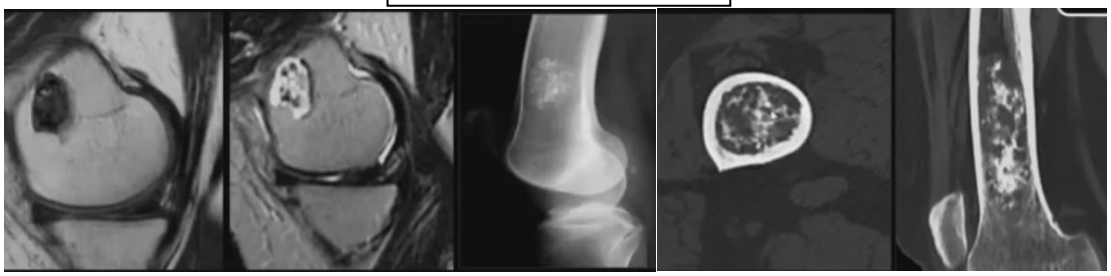
Osteoid Osteoma

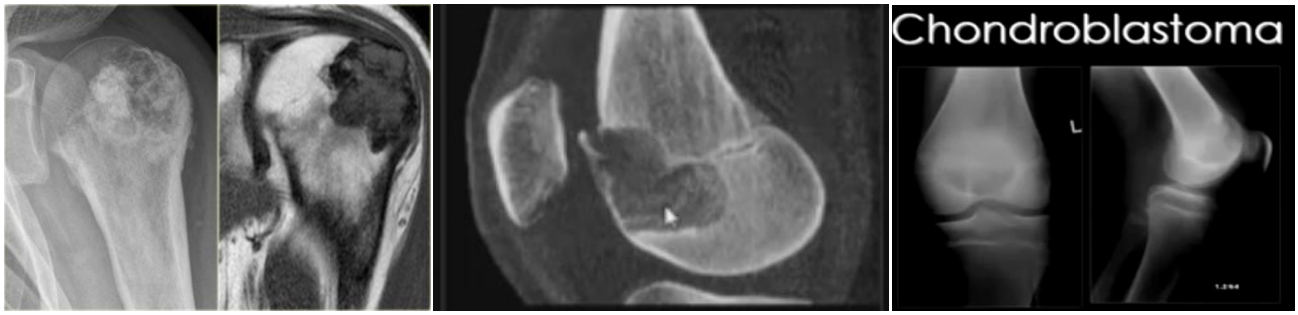
Osteoblastoma



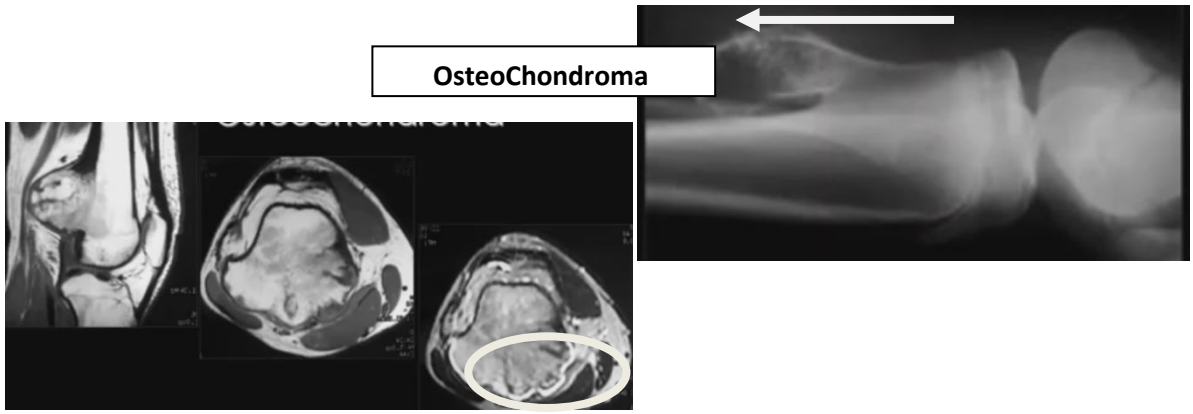


Enchondroma

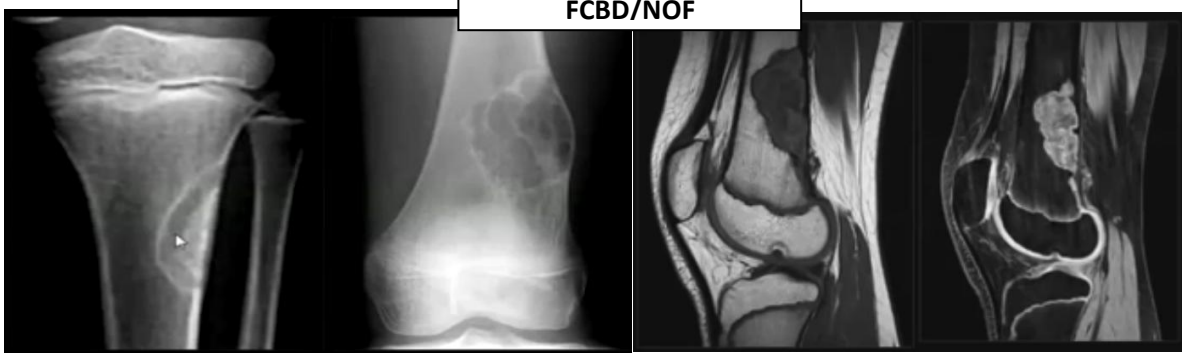


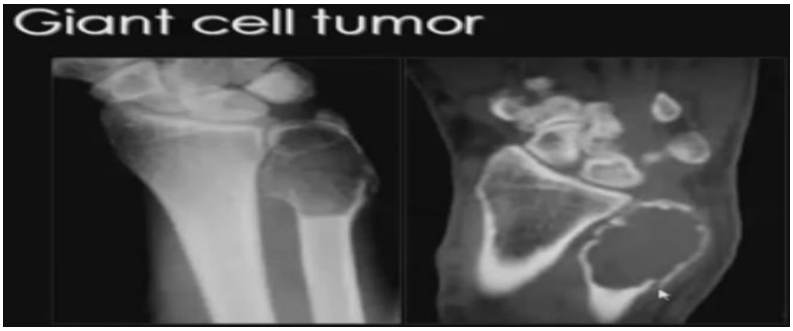


OsteoChondroma



FCBD/NOF





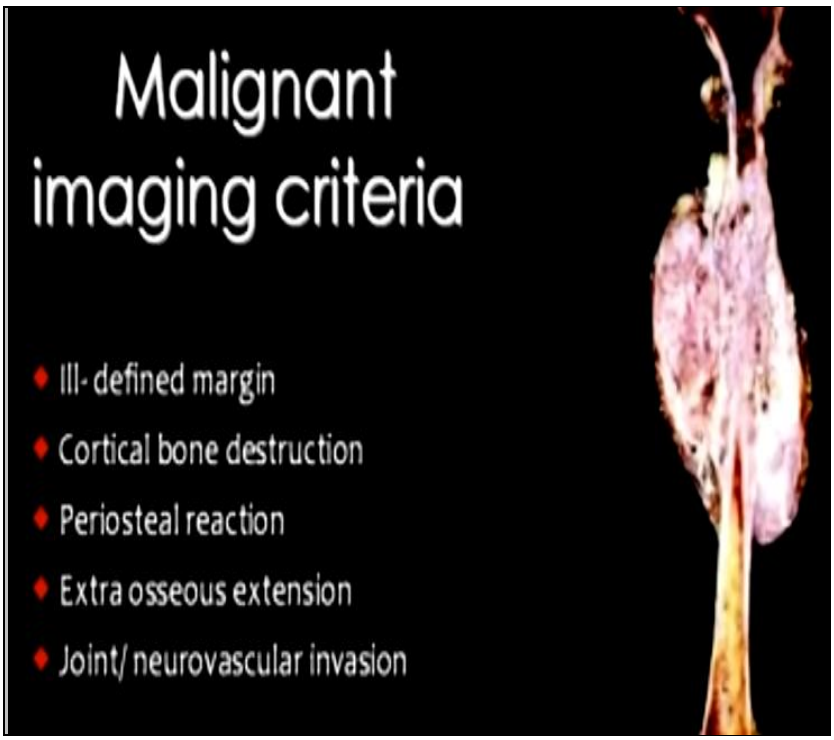
Differential Points

- **Bone Island "speculated edge"** ***Vs*** **Sclerotic Mets "smooth edge"**
- **Osteochondroma +pain or enlarged , thickened cap** *Cart. Cap seen in T2 "High signal*

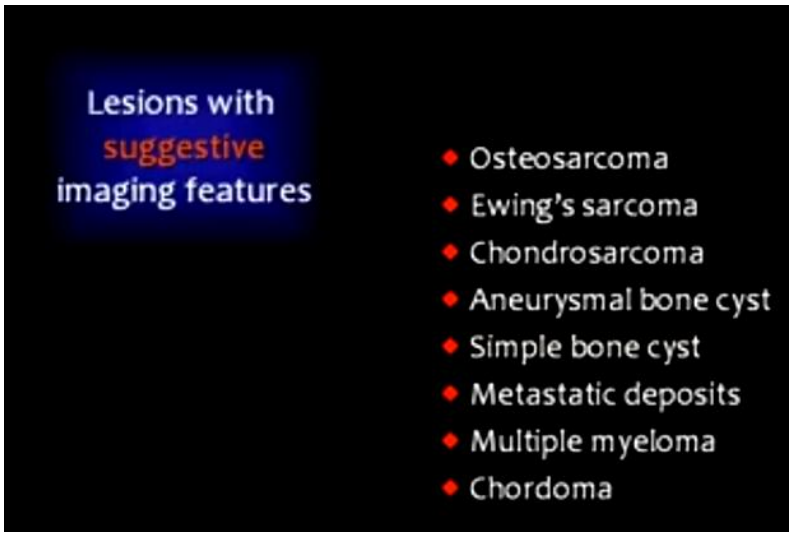
Or bone destruction → **Suggest Malignant transformation** "1%"

- ***Fibrous cortical Bone Defect*** – after 8 Y passed → if Non Healed = ***Non Ossifying Fibroma*** *"Both are written as diagnosis in every case"*
- ***Hemangioma*** *Low or Hi T1 /* ***Hi T2*** ***Vs*** ***Mets*** ***Low in T1 /*** ***Iso T2*** ***"not Hi***
- ***Solitary Dense Vertebra = * Mets * Lymphoma *Paget's*** *"Only Paget expanding it"*

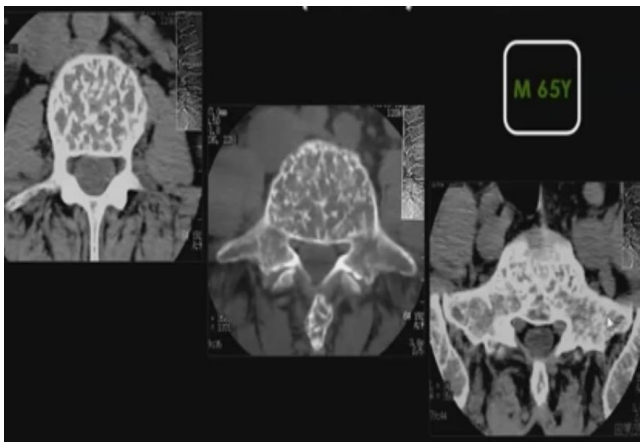
Mutiple	
Enchondroma	**Olier Disease**
Enchondromas + Hemangiomas	**Mafuci Syndrome**
Osteochondromas	**Diaphyseal Aclasia**



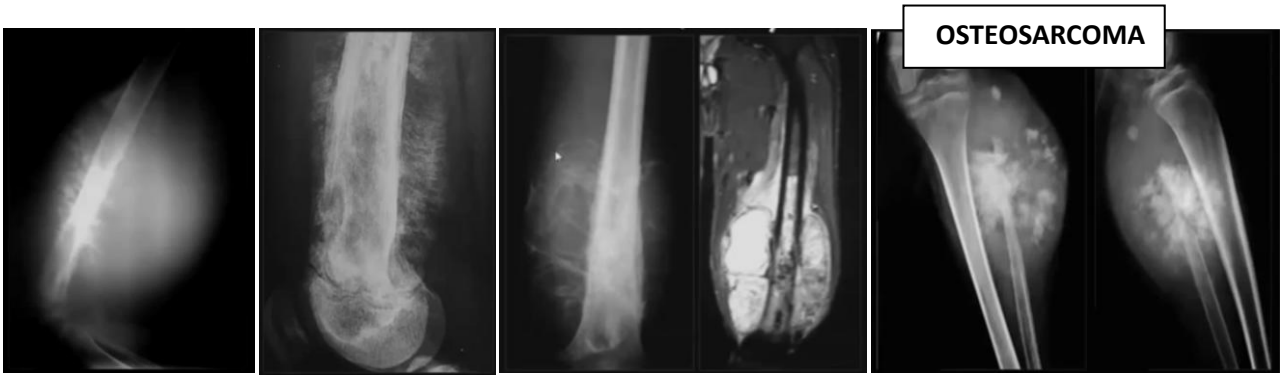
Lesions of SUGGESTING Criteria



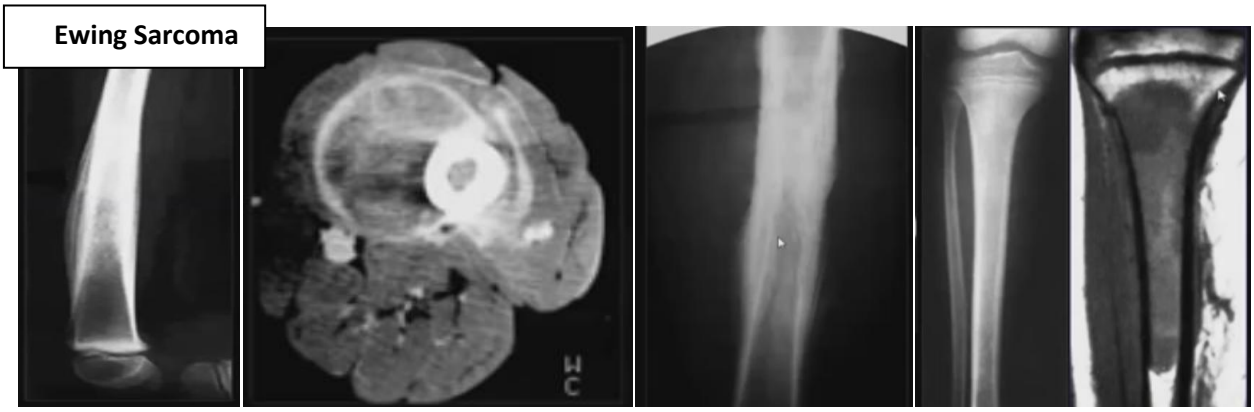
Osteosarcoma	Codman Triangle -**Sun Rays** speculation peri-osteal Reaction – Soft tissue Eccentric
Ewing Sarcoma	Young age - **Onion Peel** Periosteal Reaction - Soft t. Circumferential – Very vascular → Hot limb
C**hondrosacroma**	Matrix Ca
Multiple Myloma	Multiple Lytic lesions - > 40 y
ABC	Expanding – Fluid - Fluid Levels
Simple Bone Cyst	M>F – 10:20y – 90% prox. Humerus or Femur
Mets	Multiple – Lytic or sclerotic



OSTEOSARCOMA

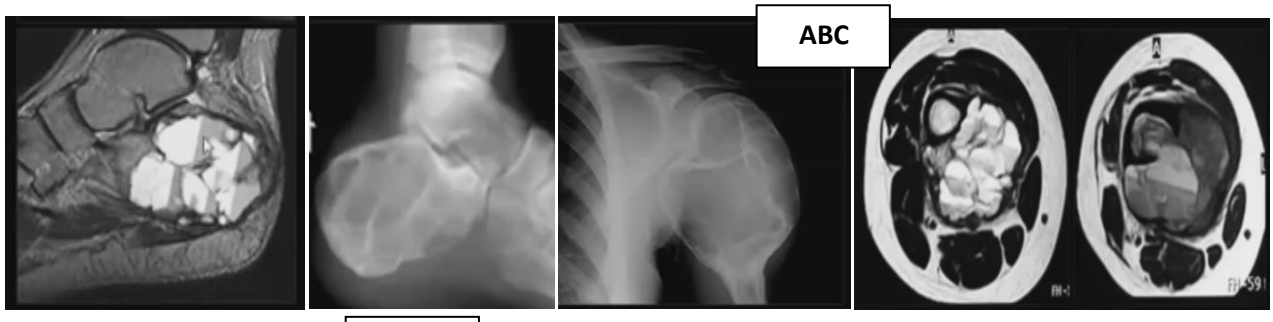


Ewing Sarcoma

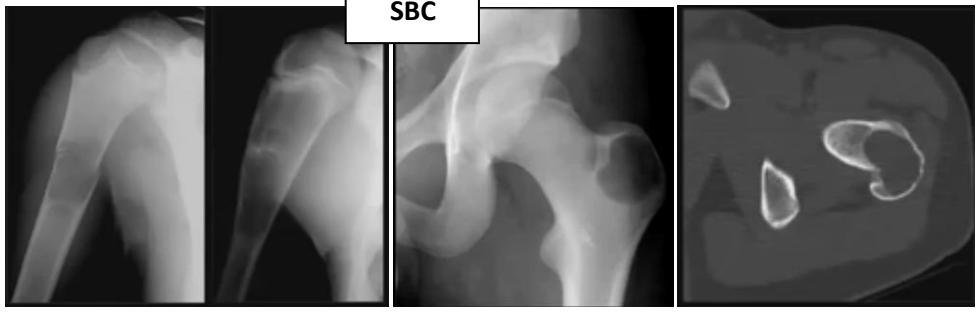


Chondrosarcoma

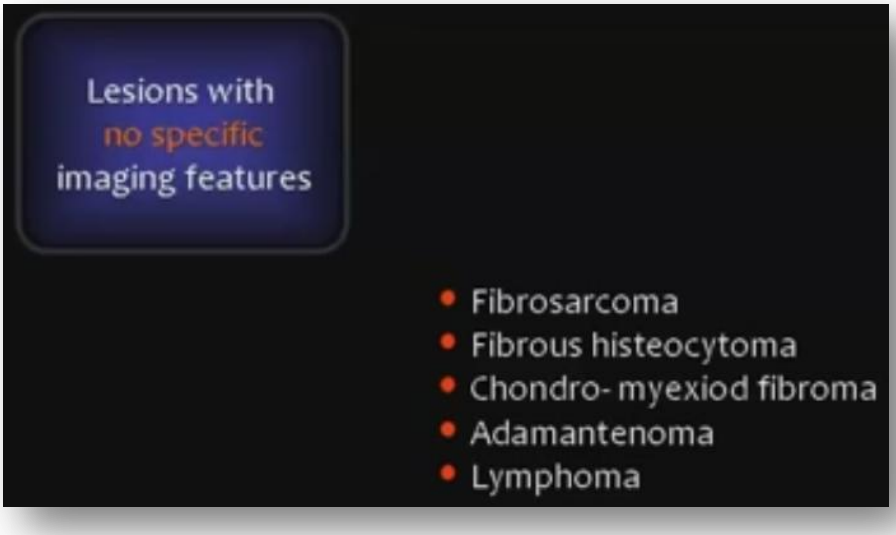
ABC

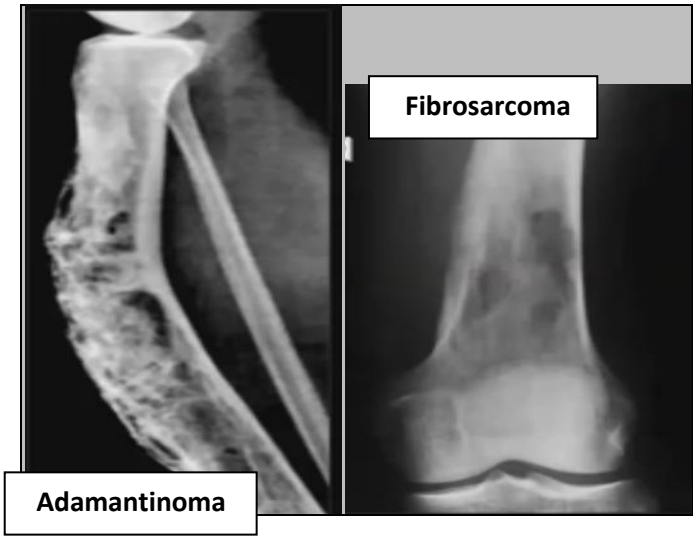


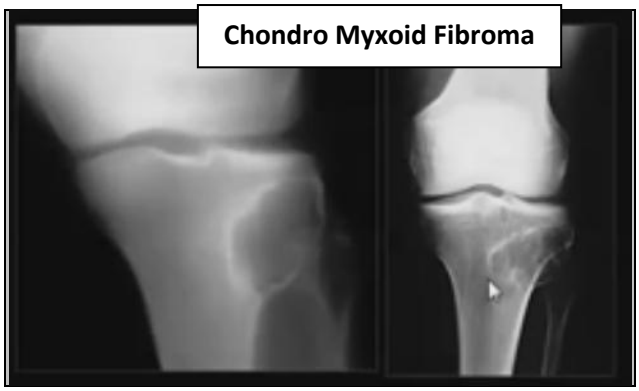
SBC



Lesions of No Specific Criteria







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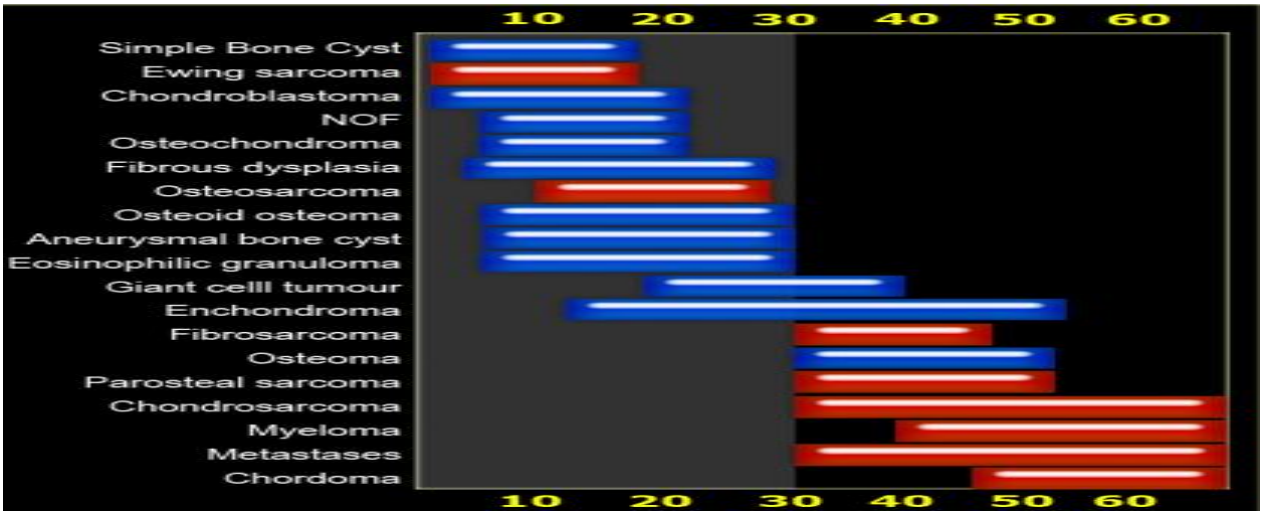
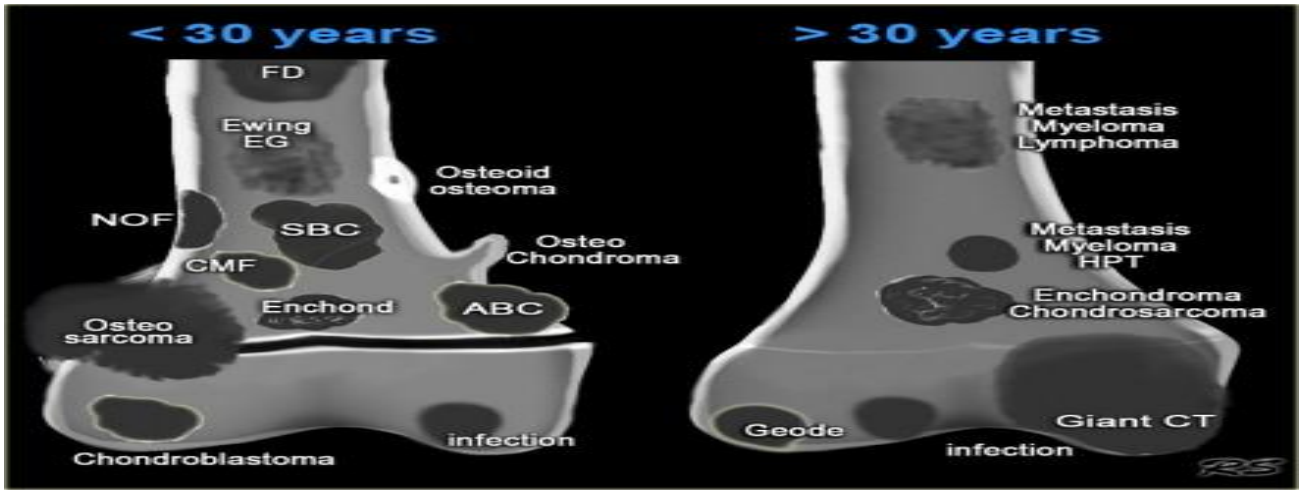
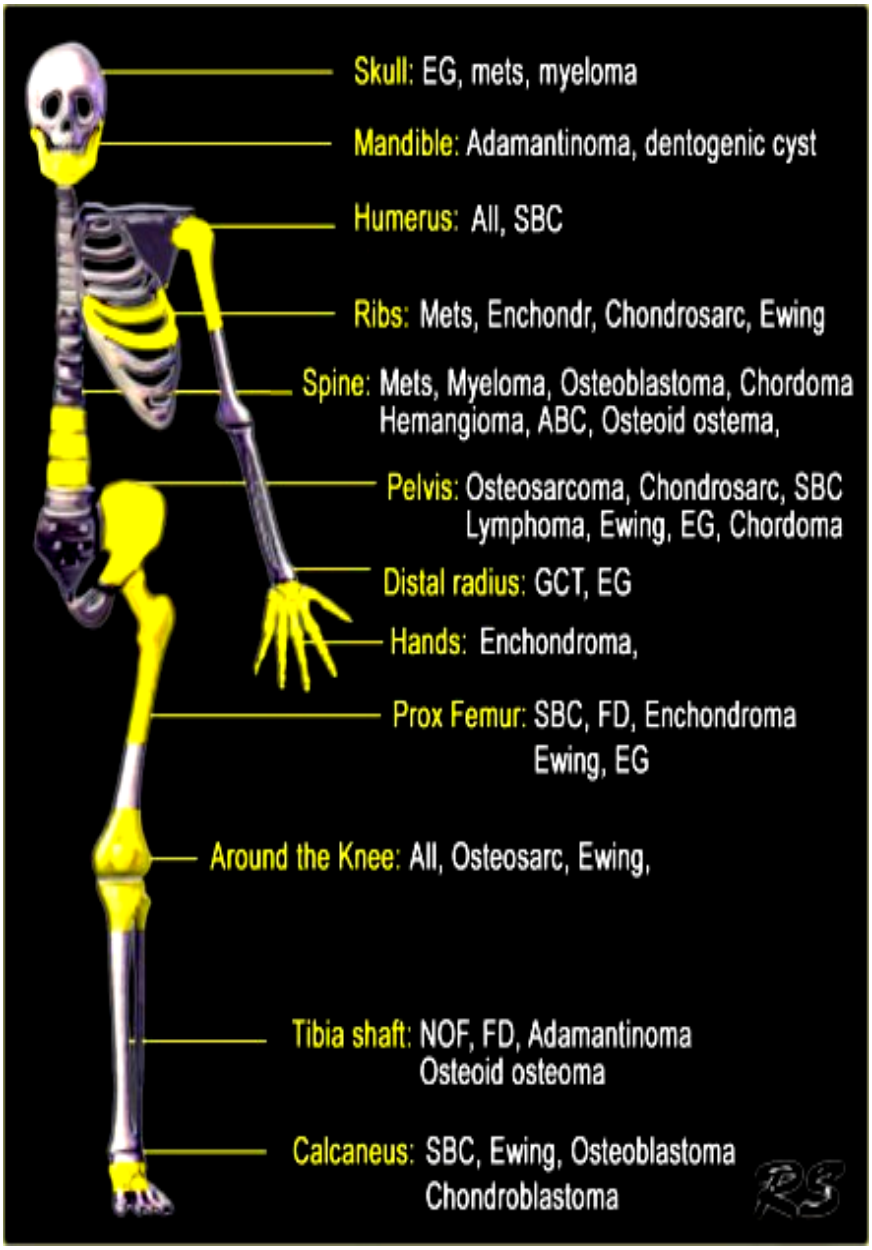
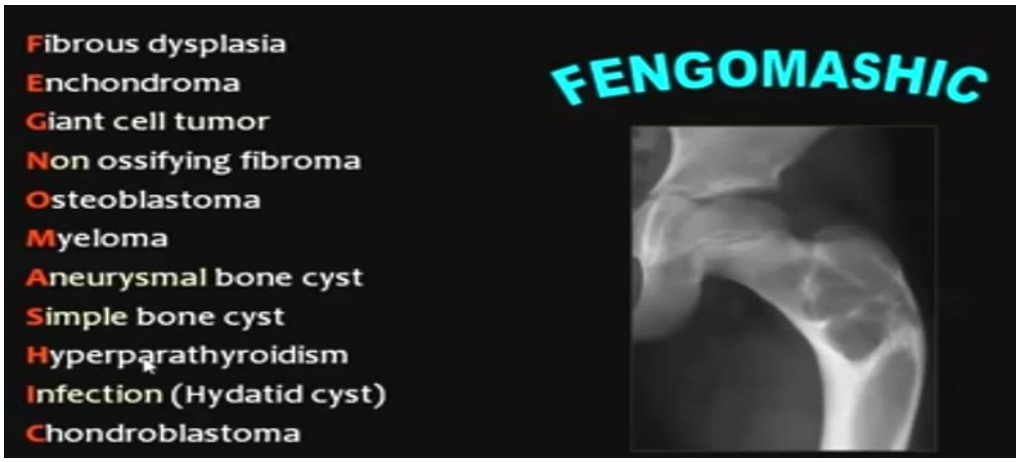
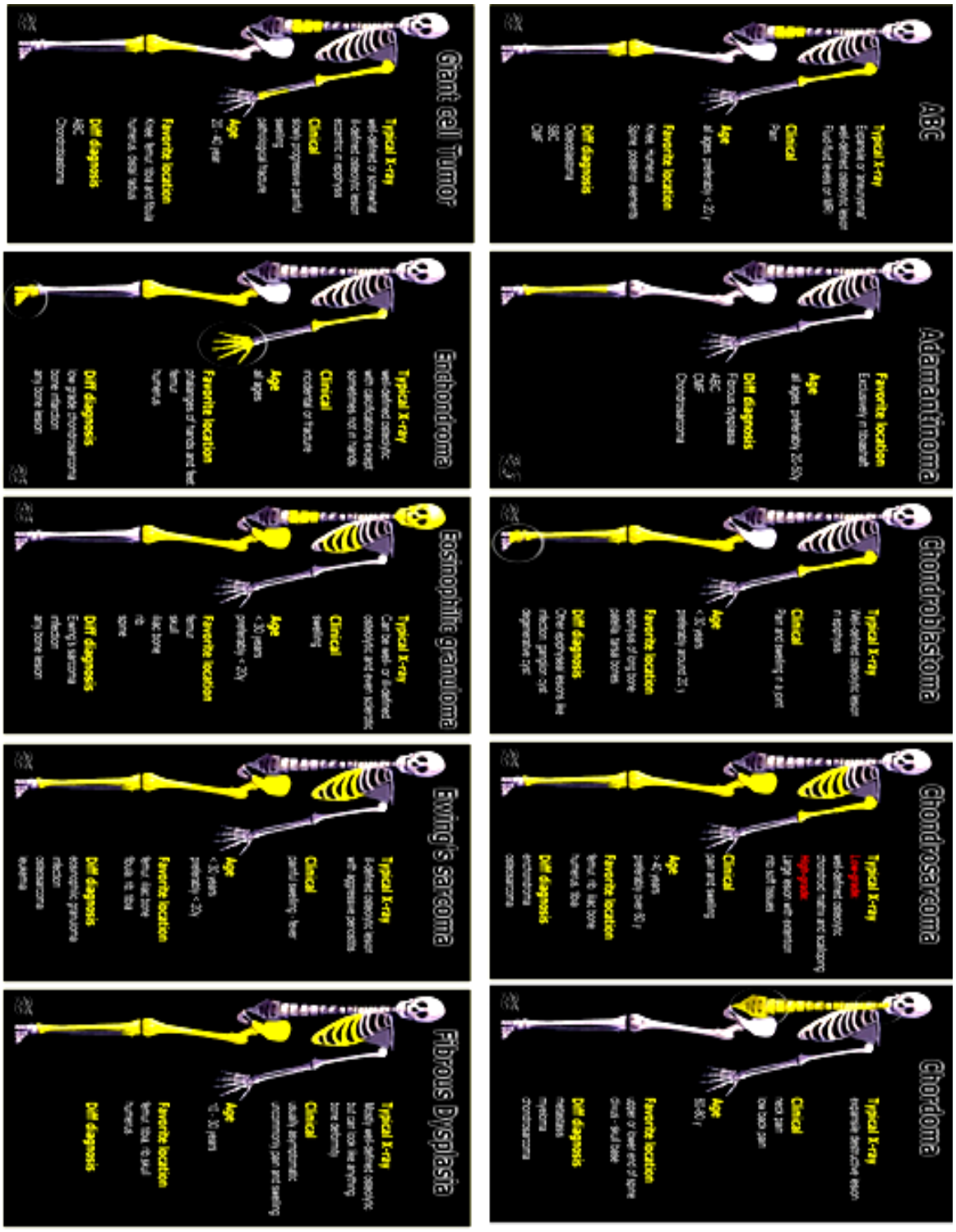




Age	Well-defined	ill-defined	Sclerotic
			
0 - 10	EG SBC	EG - Ewing Osteosarcoma Leukemia	Osteosarcoma
10 - 20	NOF, Osteoblast Fibr dysplasia EG SBC ABC Chondroblast CMF	Ewing EG Osteosarcoma	Osteosarcoma Fibr dysplasia EG Osteoid osteo Osteoblastoma
20 - 40	Giant CT Enchondroma Chondrosarcoma (low grade) HPT - Brown tumor Osteblastoma	Giant CT	Enchondroma Osteoma Bone island Parosteal Osteosar Healed lesions: - NOF, EG - SBC, ABC - Chondroblast
40+	Metastases Myeloma Geode	Metastases Myeloma Chondrosarcoma (high grade)	Metastases Bone island
All ages	Infection	Infection	Infection


Skull: EG, mets, myeloma
Mandible: Adamantinoma, dentogenic cyst
Humerus: All, SBC
Ribs: Mets, Enchondr, Chondrosarc, Ewing
Spine: Mets, Myeloma, Osteoblastoma, Chordoma
Hemangioma, ABC, Osteoid ostema,
Pelvis: Osteosarcoma, Chondrosarc, SBC
Lymphoma, Ewing, EG, Chordoma
Distal radius: GCT, EG
Hands: Enchondroma,
Prox Femur: SBC, FD, Enchondroma
Ewing, EG
Around the Knee: All, Osteosarc, Ewing,
Tibia shaft: NOF, FD, Adamantinoma
Osteoid osteoma
Calcaneus: SBC, Ewing, Osteoblastoma
Chondroblastoma


Fibrous dysplasia
Enchondroma
Giant cell tumor
Non ossifying fibroma
Osteoblastoma
Myeloma
Aneurysmal bone cyst
Simple bone cyst
Hyperparathyroidism
Infection (Hydatid cyst)
Chondroblastoma
FENGOMASHIC


ABC
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Adamantinoma
Favorite location
Age
Diff diagnosis
Chondroblastoma
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Chondrosarcoma
Typical X-ray
Lysis
Age
Clinical
Favorite location
Diff diagnosis
Chordoma
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Giant cell Tumor
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Enchondroma
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Eosinophilic granuloma
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Ewing's sarcoma
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis
Fibrous Dysplasia
Typical X-ray
Age
Clinical
Favorite location
Diff diagnosis