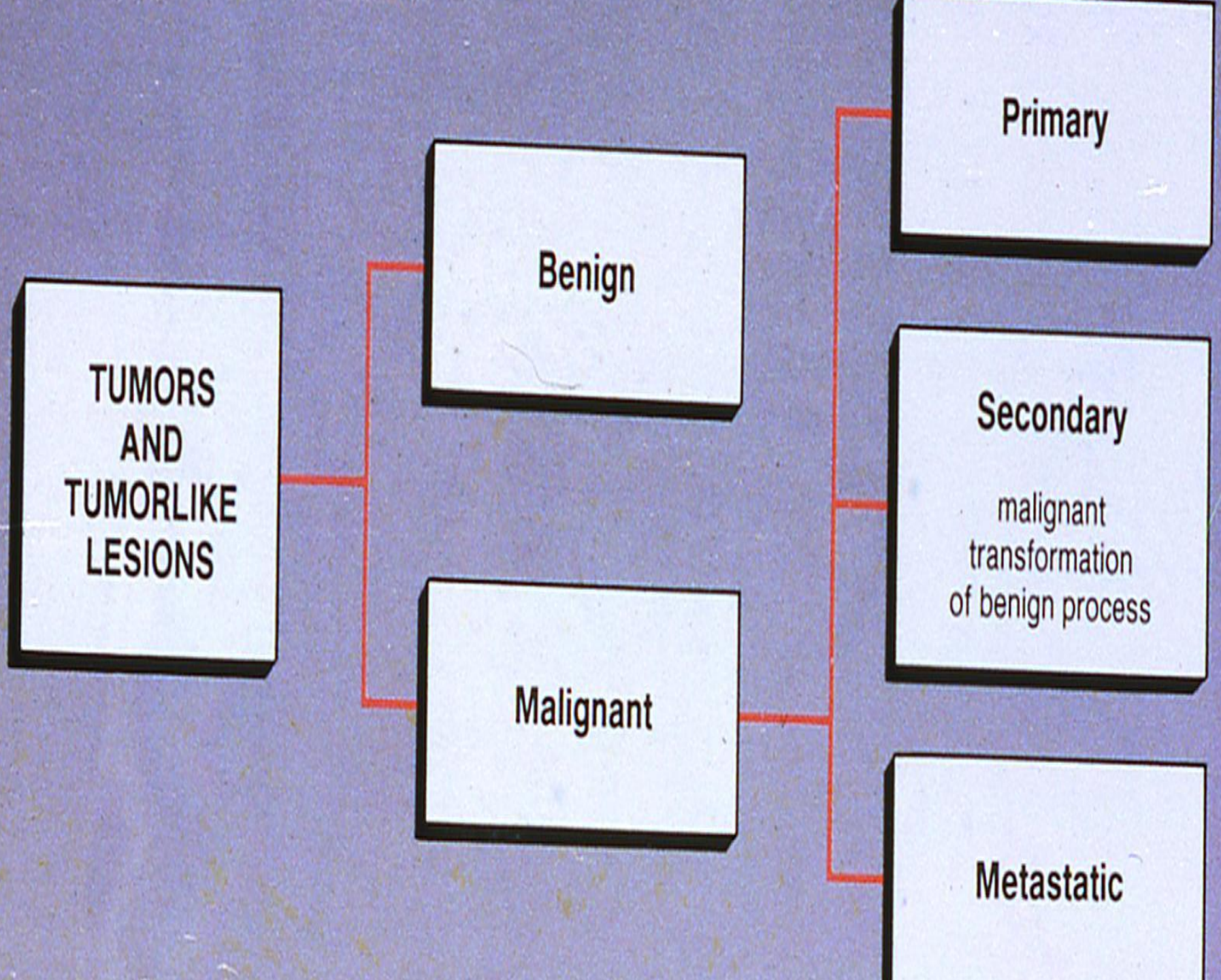
BONE TUMORS

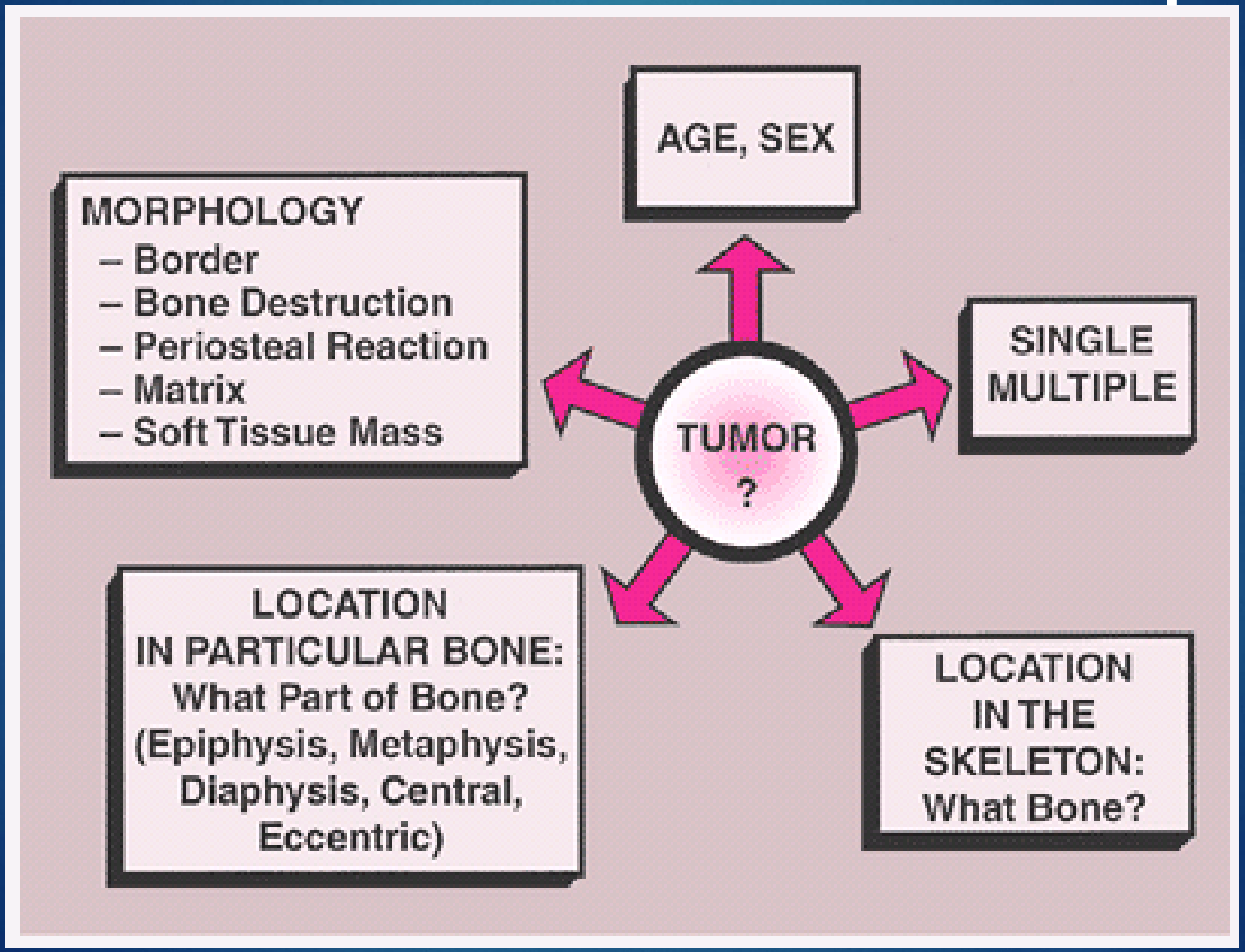
BONE TUMORS

- 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


TUMORS AND TUMORLIKE LESIONS
Benign
Malignant
Primary
Secondary
malignant transformation of benign process
Metastatic

Histologic Type	Benign	Malignant
Hematopoietic (40%)		Myeloma
		Malignant lymphoma
Chondrogenic (22%)	Osteochondroma	Chondrosarcoma
	Chondroma	Dedifferentiated chondrosarcoma
	Chondroblastoma	Mesenchymal chondrosarcoma
	Chondromyxoid fibroma	
Osteogenic (19%)	Osteoid osteoma	Osteosarcoma
	Osteoblastoma	
Unknown origin (10%)	Giant cell tumor	Ewing tumor
		Giant cell tumor
		Adamantinoma
Histiocytic origin	Fibrous histiocytoma	Malignant fibrous histiocytoma
Fibrogenic	Metaphyseal fibrous defect (fibroma)	Desmoplastic fibroma
		Fibrosarcoma
Notochordal		Chordoma
Vascular	Hemangioma	Hemangioendothelioma
		Hemangiopericytoma
Lipogenic	Lipoma	Liposarcoma
Neurogenic	Neurilemmoma	

Analytic approach to evaluation of the bone neoplasm

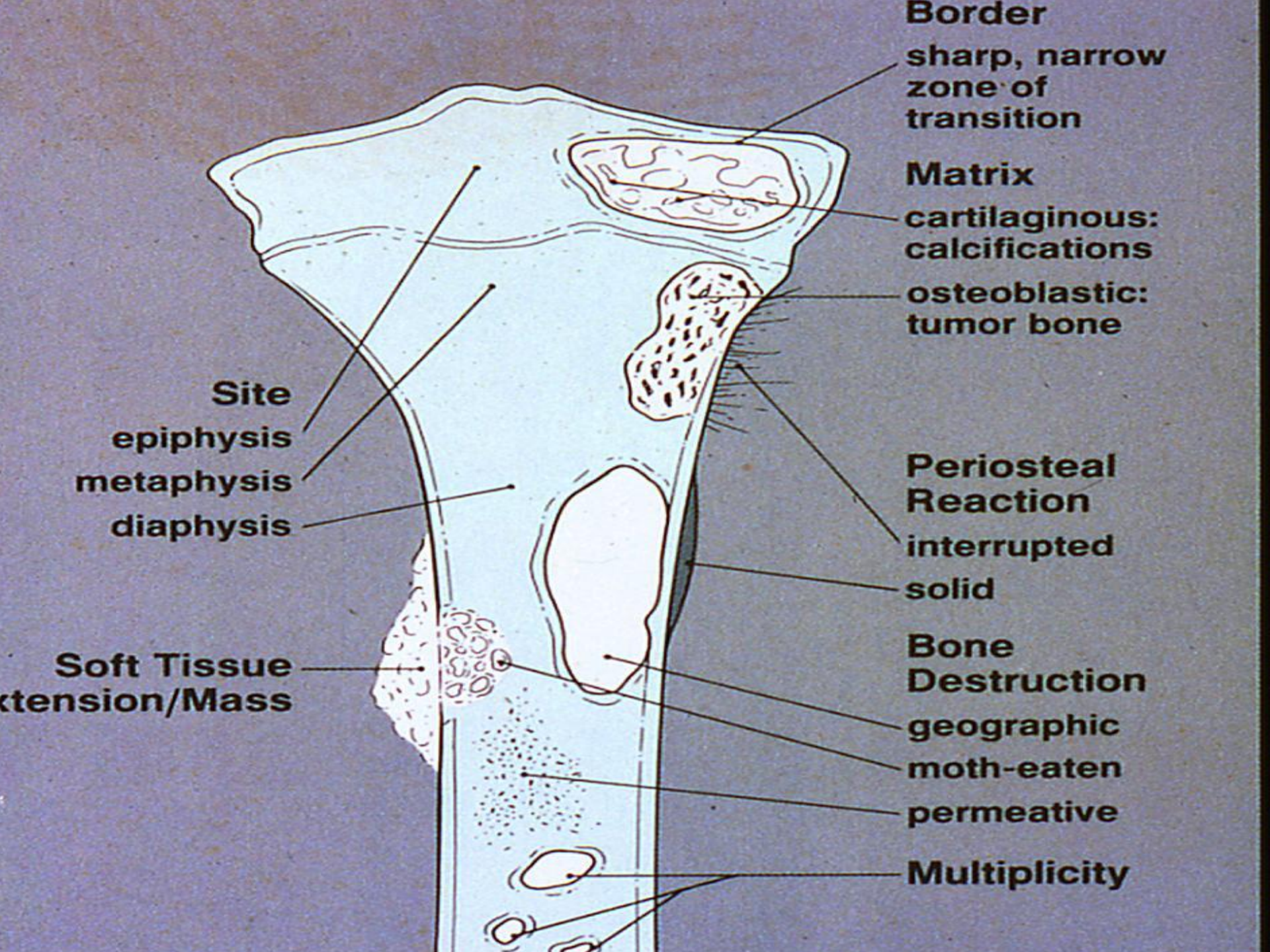


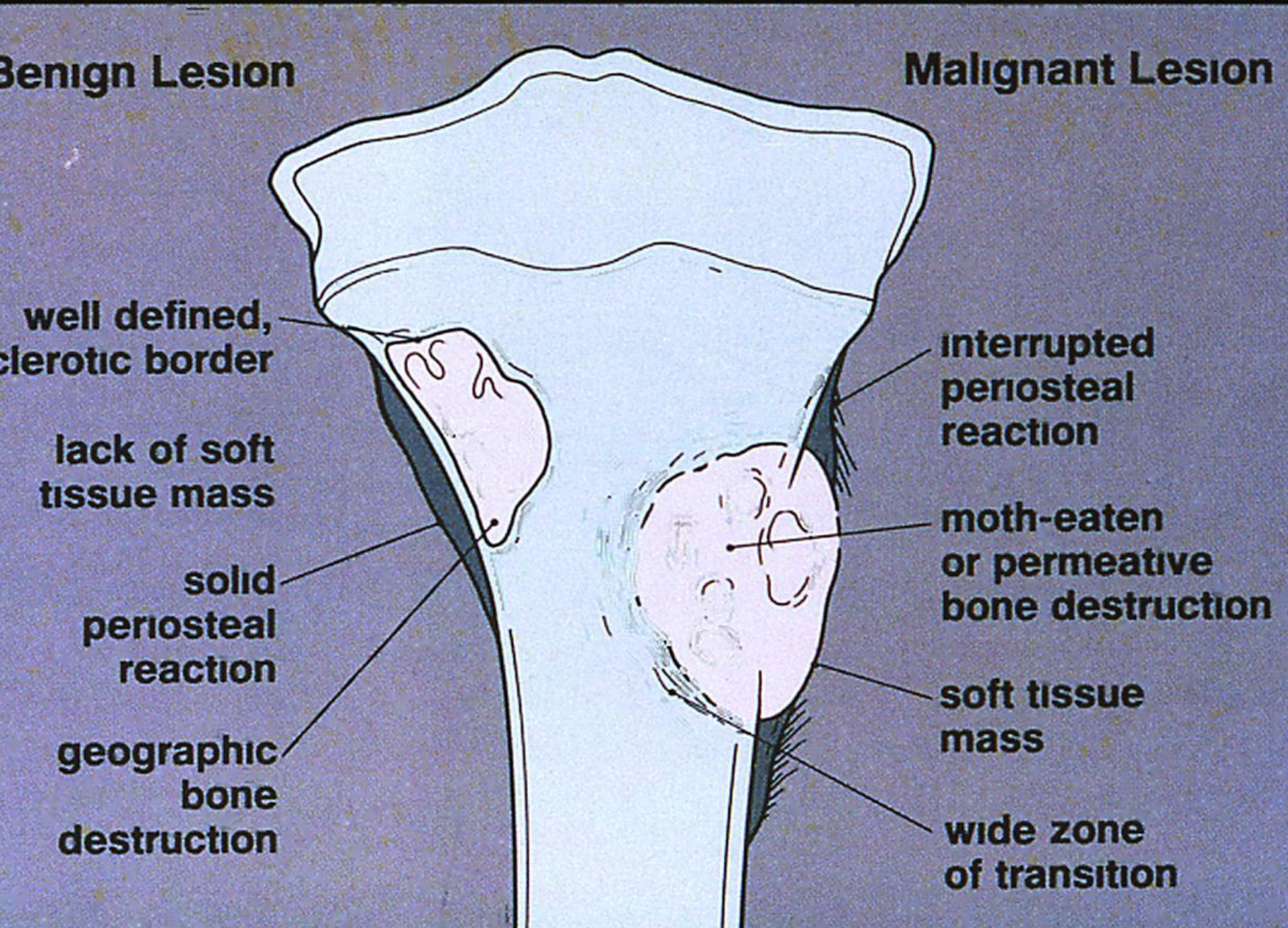
Evaluation

- History
- Physical examination
- Investigations; labs, imaging
- Biopsy

Radiography

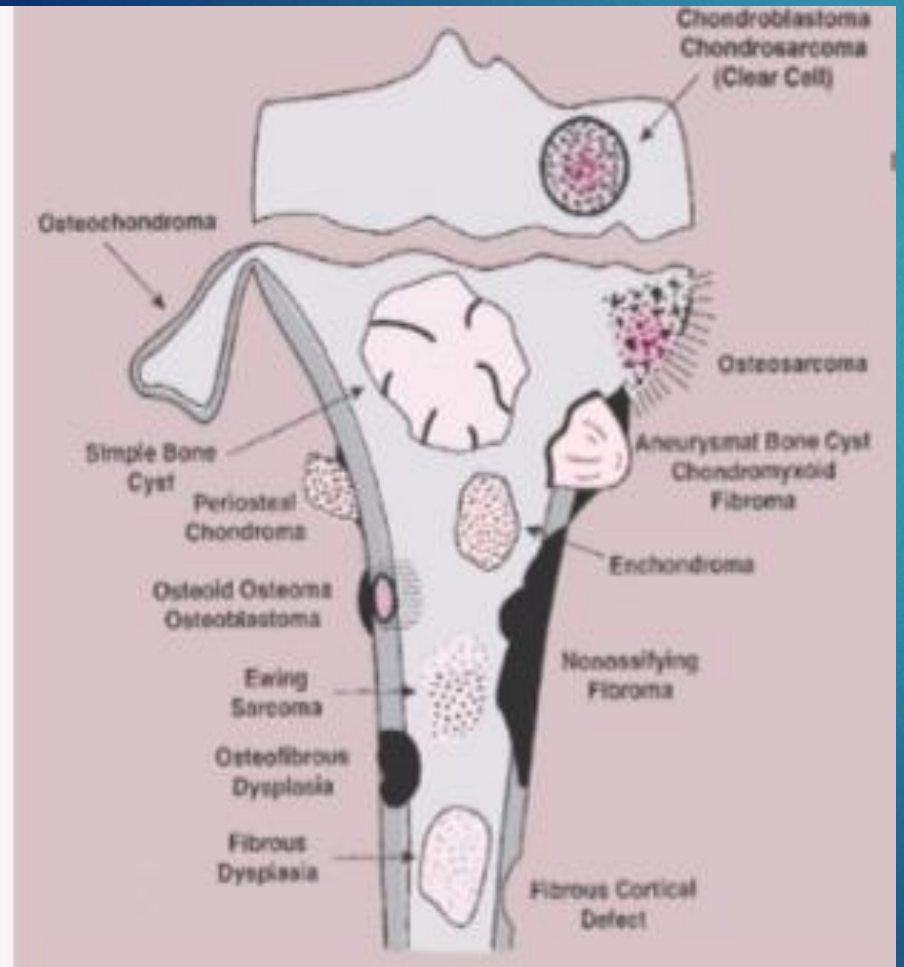
- Information yielded by radiography includes :
  - Site of the Lesion
  - Borders of the lesion/zone of transition
  - Type of bone destruction
  - Periosteal reaction
  - Matrix of the lesion
  - Nature and extent of soft tissue involvement


Border
sharp, narrow zone of transition
Matrix
cartilaginous: calcifications
osteoblastic: tumor bone
Site
epiphysis
metaphysis
diaphysis
Periosteal Reaction
interrupted
solid
Soft Tissue
xtension/Mass
Bone Destruction
geographic
moth-eaten
permeative
Multiplicity

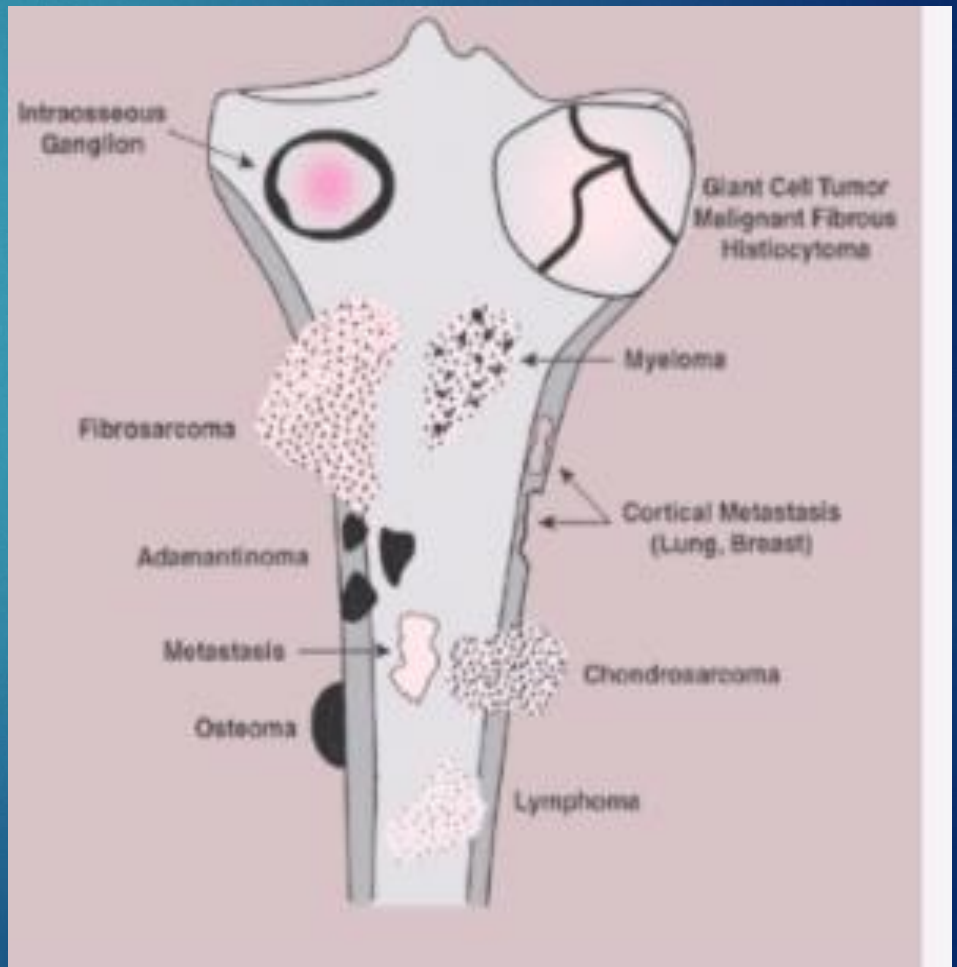

Benign Lesion
Malignant Lesion
well defined, sclerotic border
lack of soft tissue mass
solid periosteal reaction
geographic bone destruction
interrupted periosteal reaction
moth-eaten or permeative bone destruction
soft tissue mass
wide zone of transition

Site of the lesion.

Distribution of various lesions in a long tubular bone in a growing skeleton

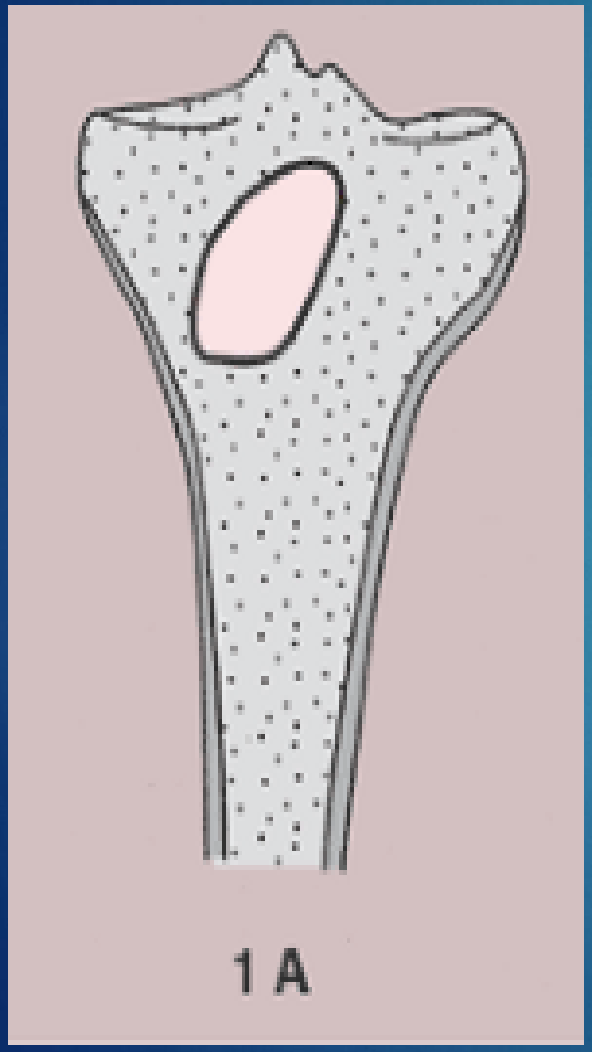


Distribution of various lesions in a long tubular bone after skeletal maturity

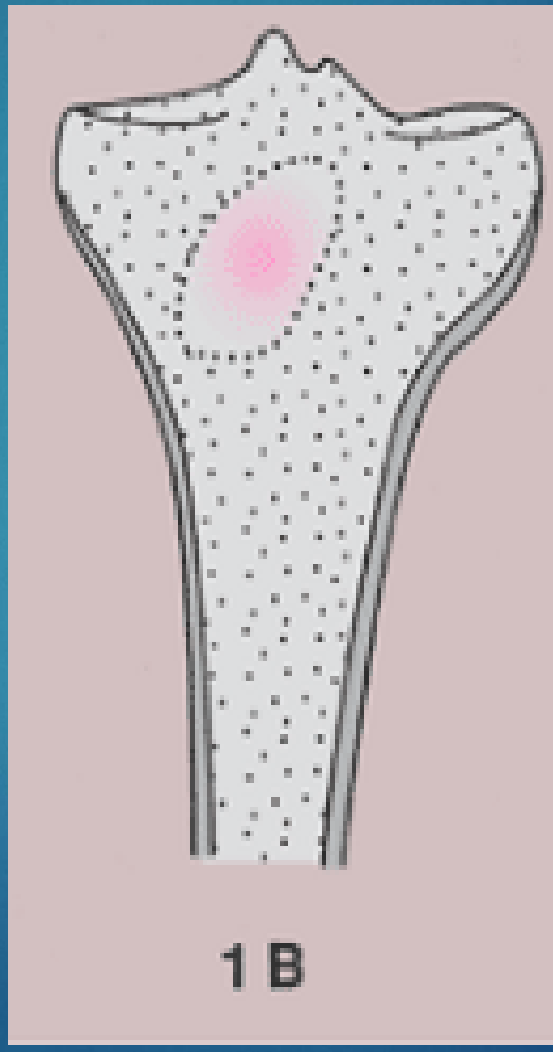


Borders of the lesion determine its growth rate.

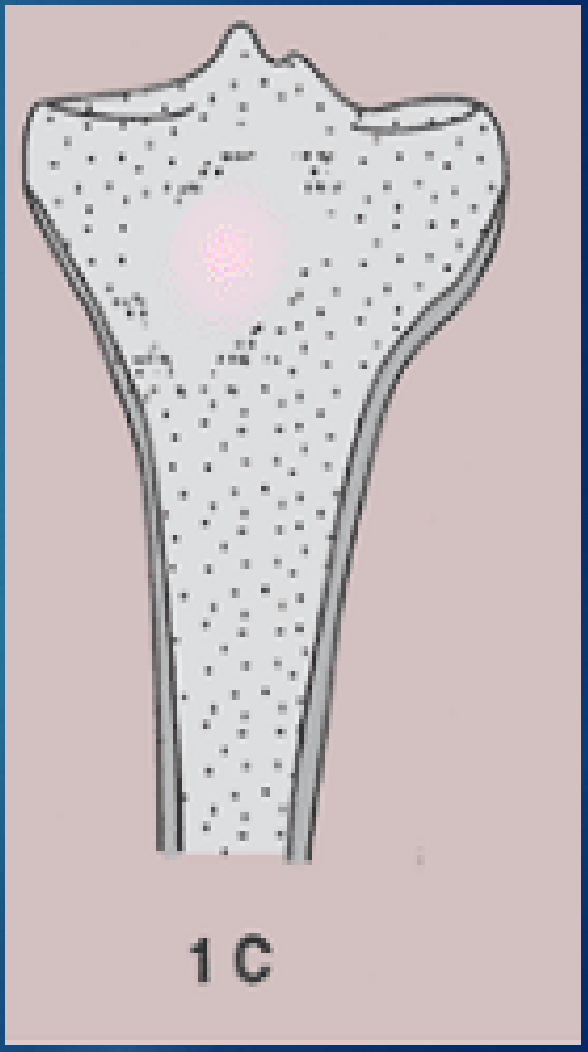
sharp sclerotic



sharp lytic



ill-defined.



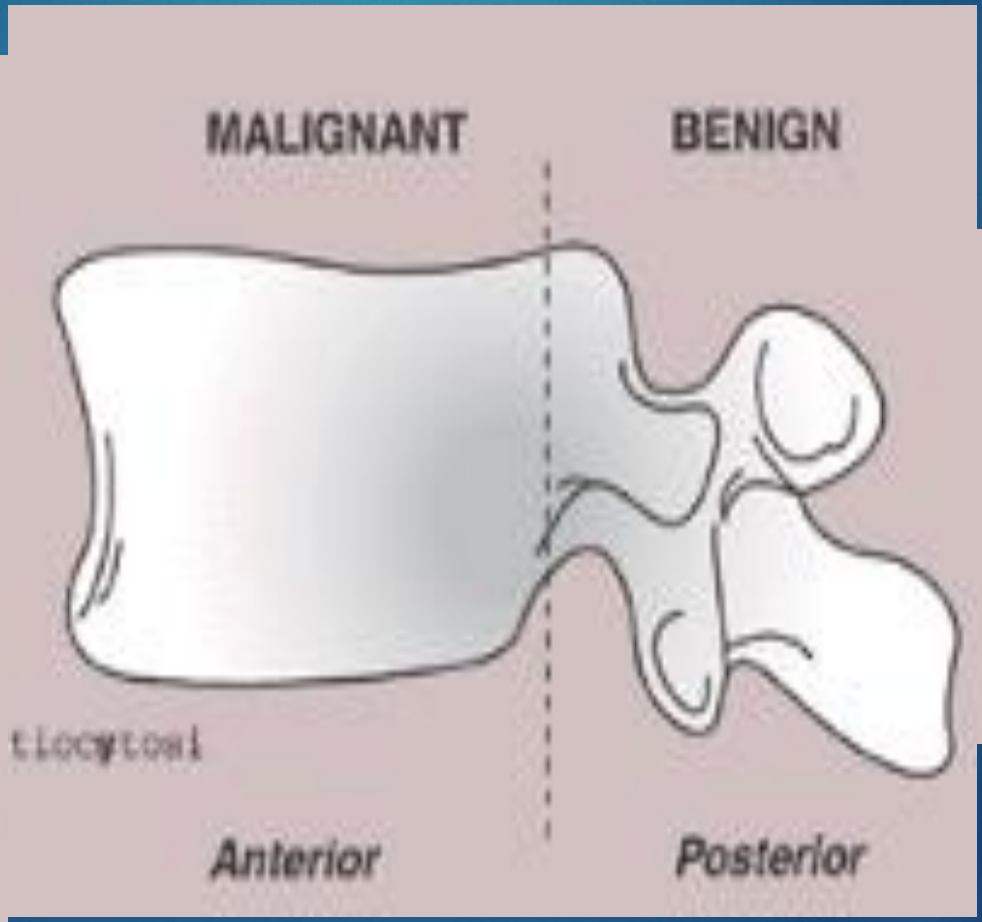
Distribution of various lesions in a vertebra.

Malignant lesions are seen predominantly in its anterior part (body)

Benign lesions predominate in its posterior elements

Lymphoma
Hodgkin
Myeloma
Ewing
Osteosarcoma
Chondrosarcoma
Metastasis

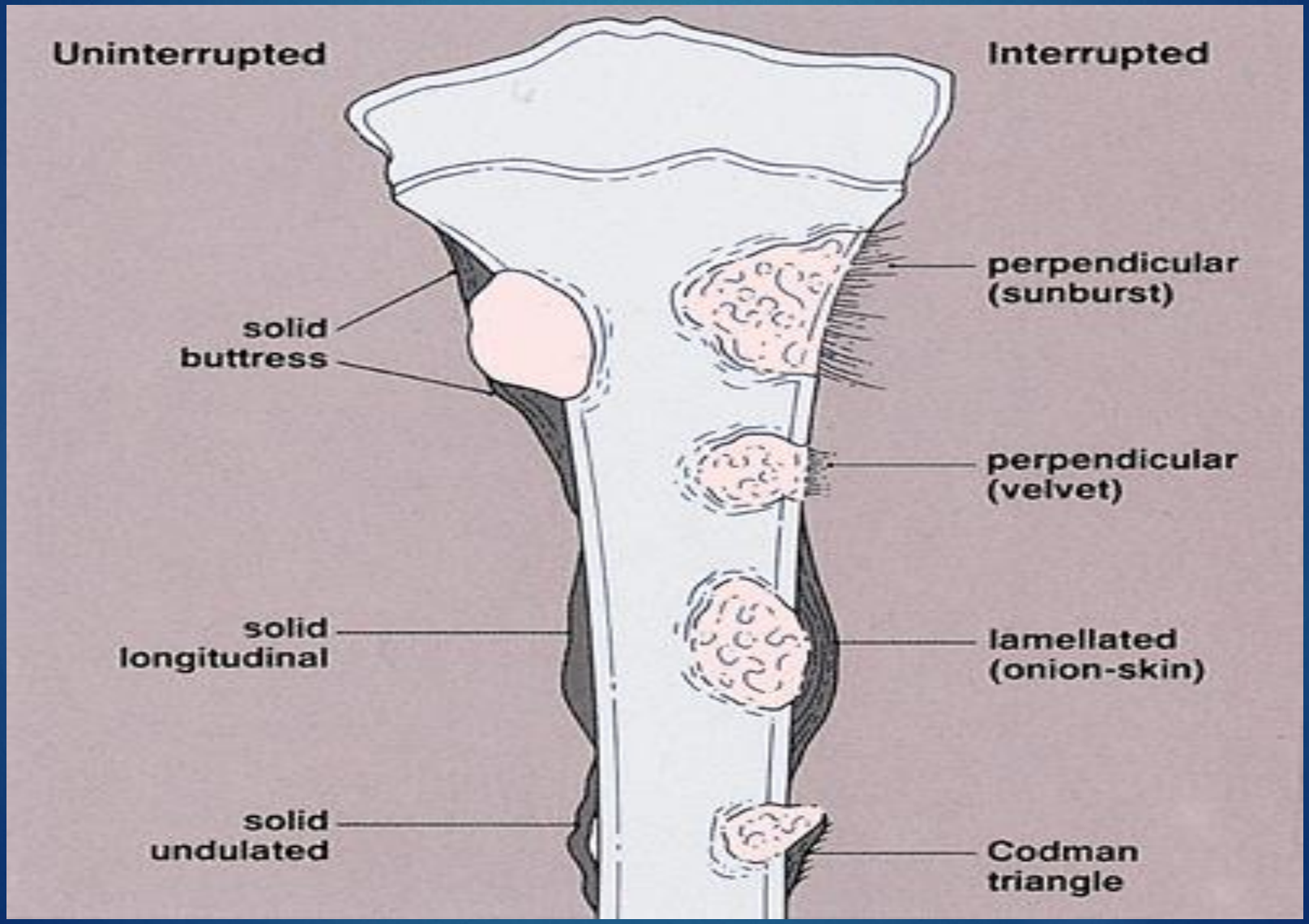
Exceptions:
Hemangioma
Langerhans cell tiocytosi
Fibrous Dysplasia



Osteoblastoma
Osteoid Osteoma
Aneurysmal Bone Cyst
Osteochondroma
Chondromyxoid Fibroma

Types of periosteal reaction.

An uninterrupted periosteal reaction usually indicates a benign process, whereas an interrupted reaction indicates a malignant or aggressive nonmalignant process



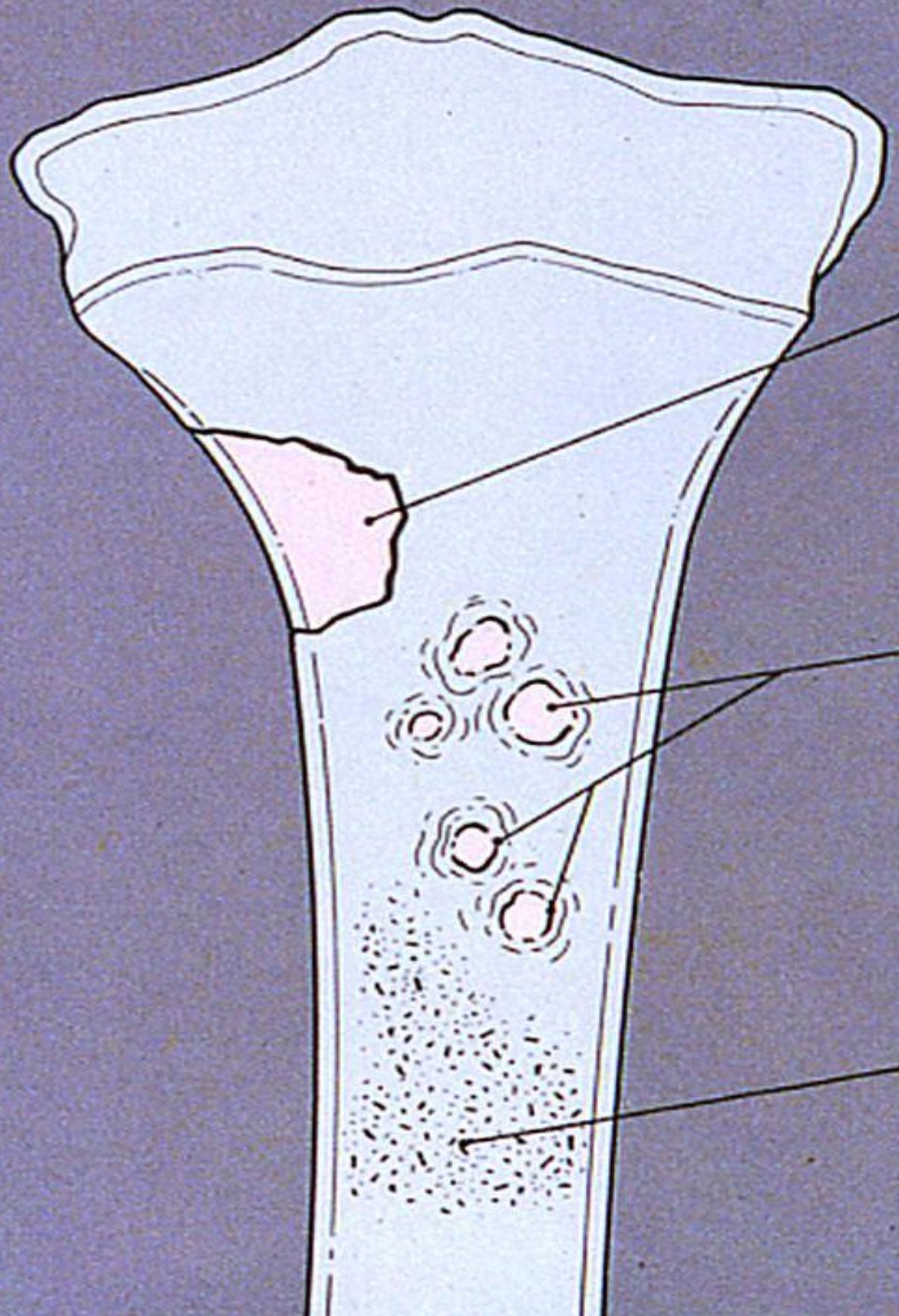
Interrupted type of periosteal reaction

sunburst pattern - osteosarcoma

lamellated or onion-skin type in ewing sarcoma

Ewing sarcoma - lamellated type

Codman triangle (*arrow*)



Benign Process

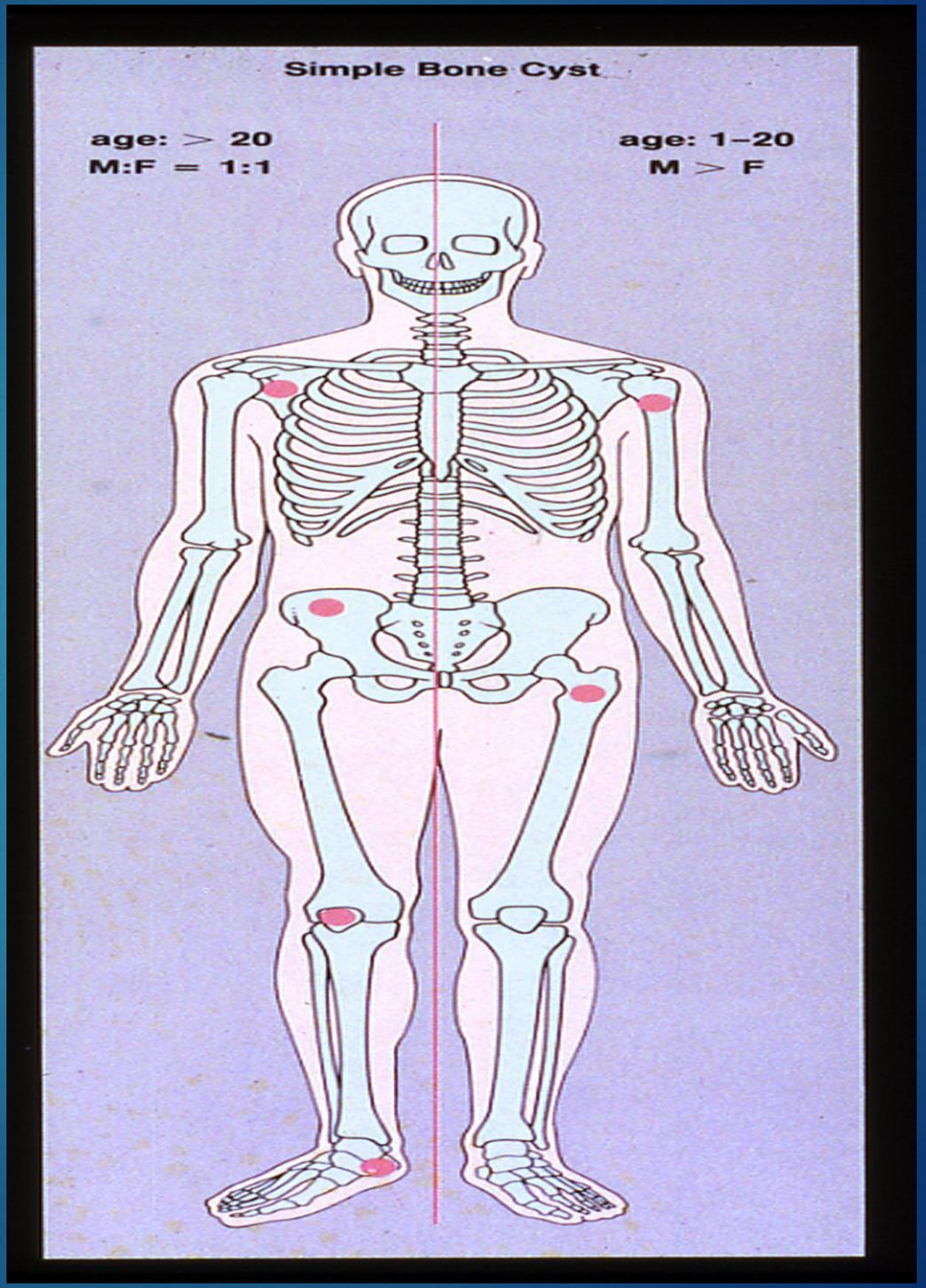
geographic—uniformly destroyed area with sharply defined border

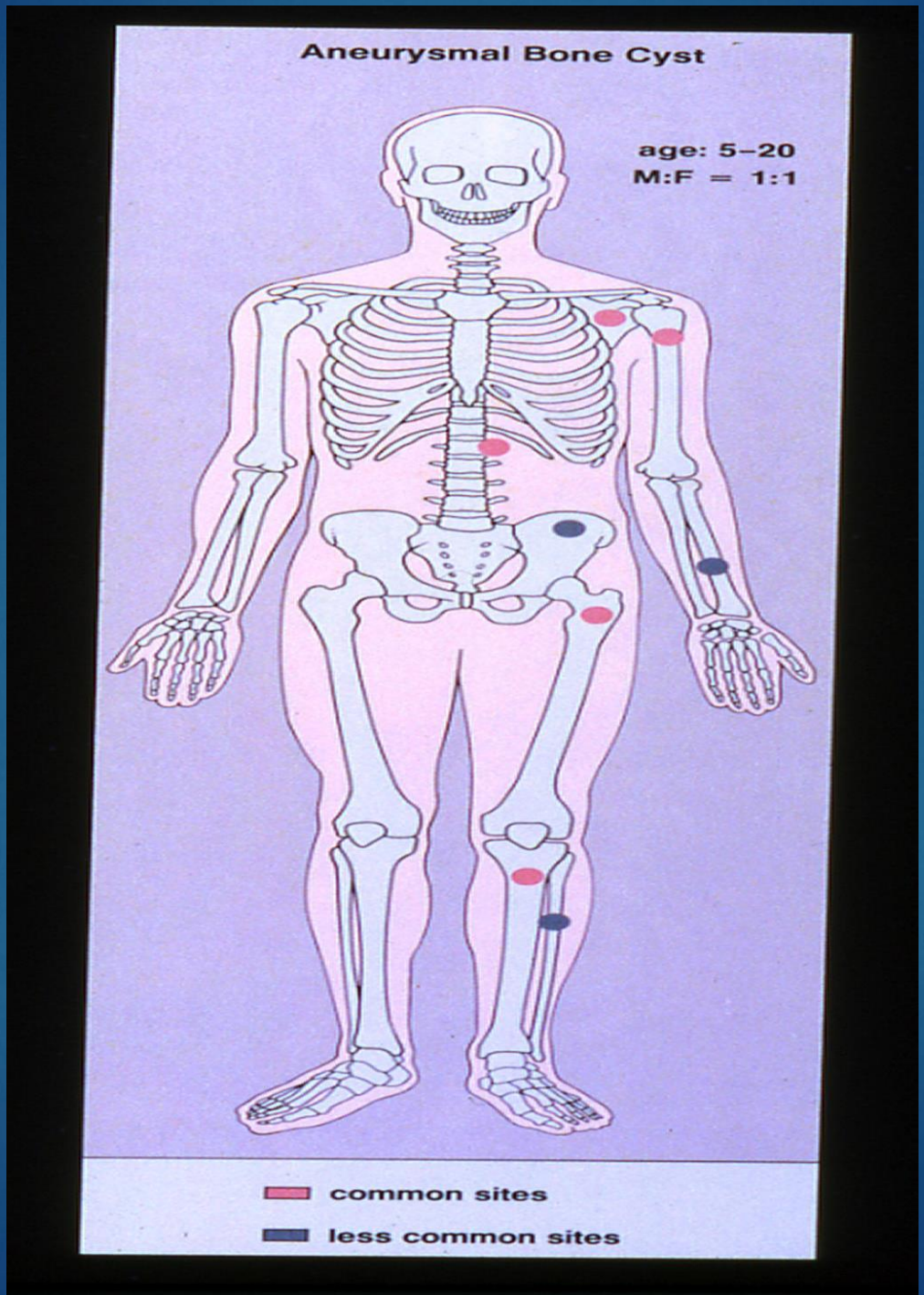
Likely Malignant Proces

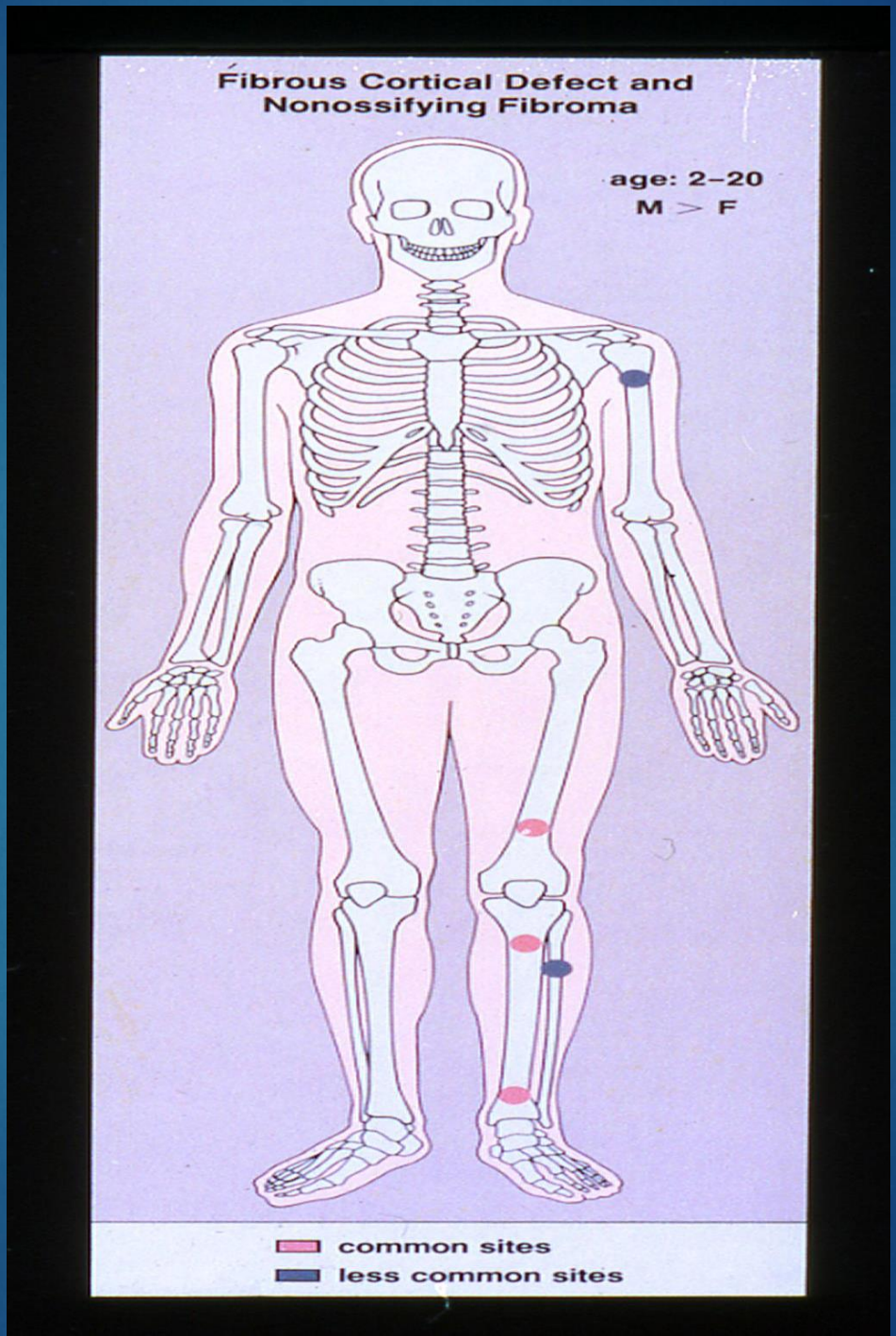
moth-eaten—areas of destruction with ragged borders

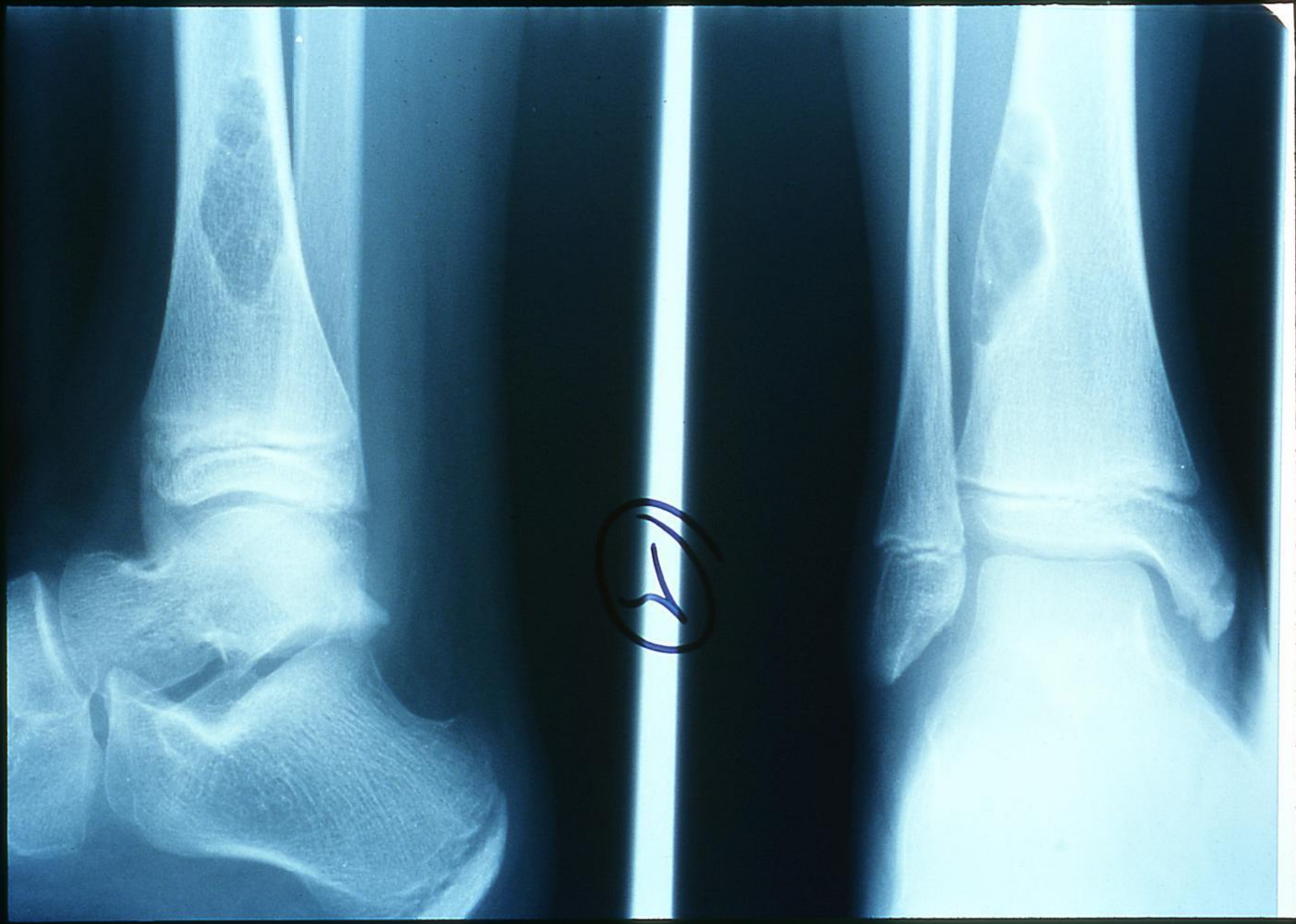
Aggressive/Malignant Process

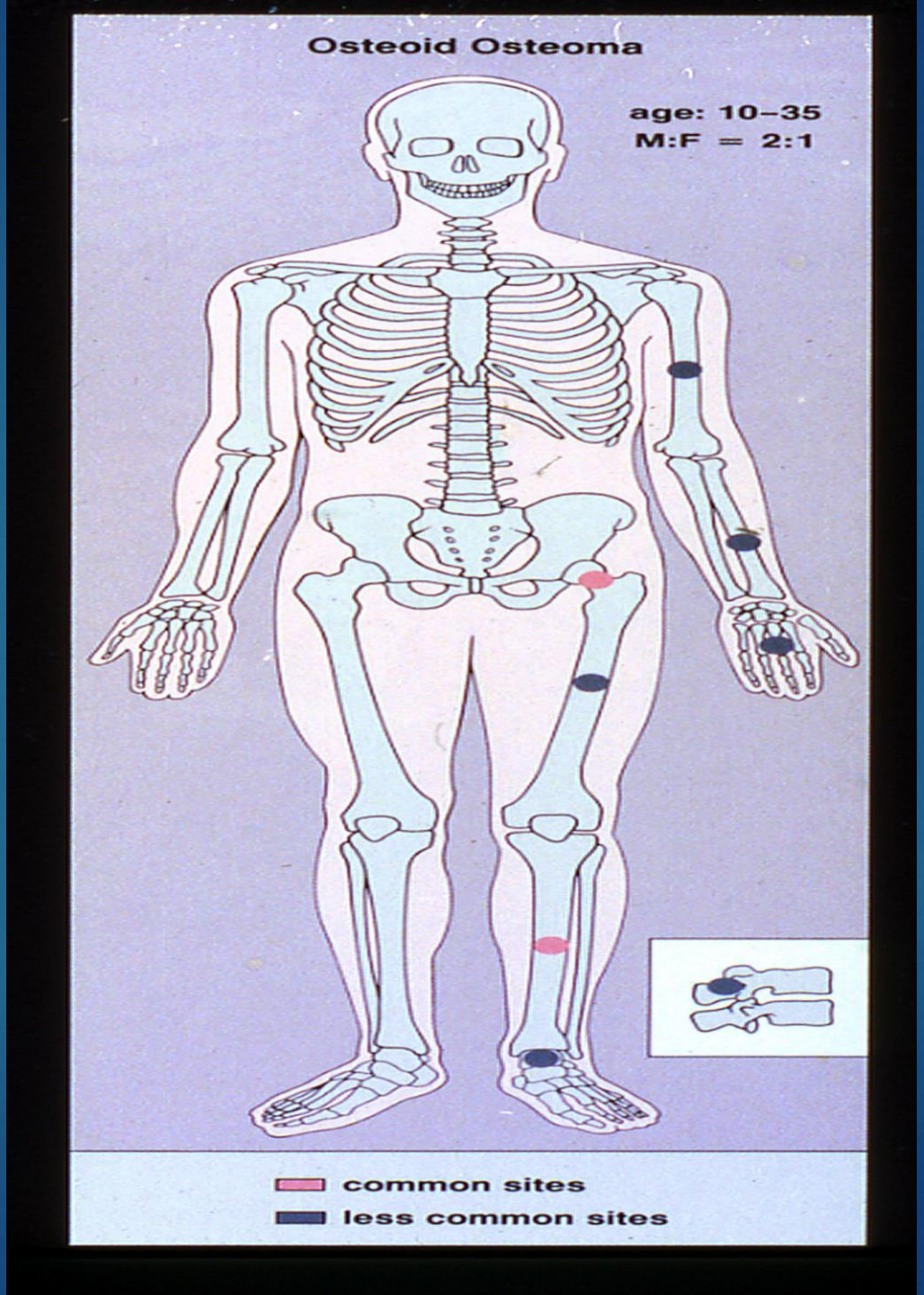
permeative—ill-defined area spreading through marrow space

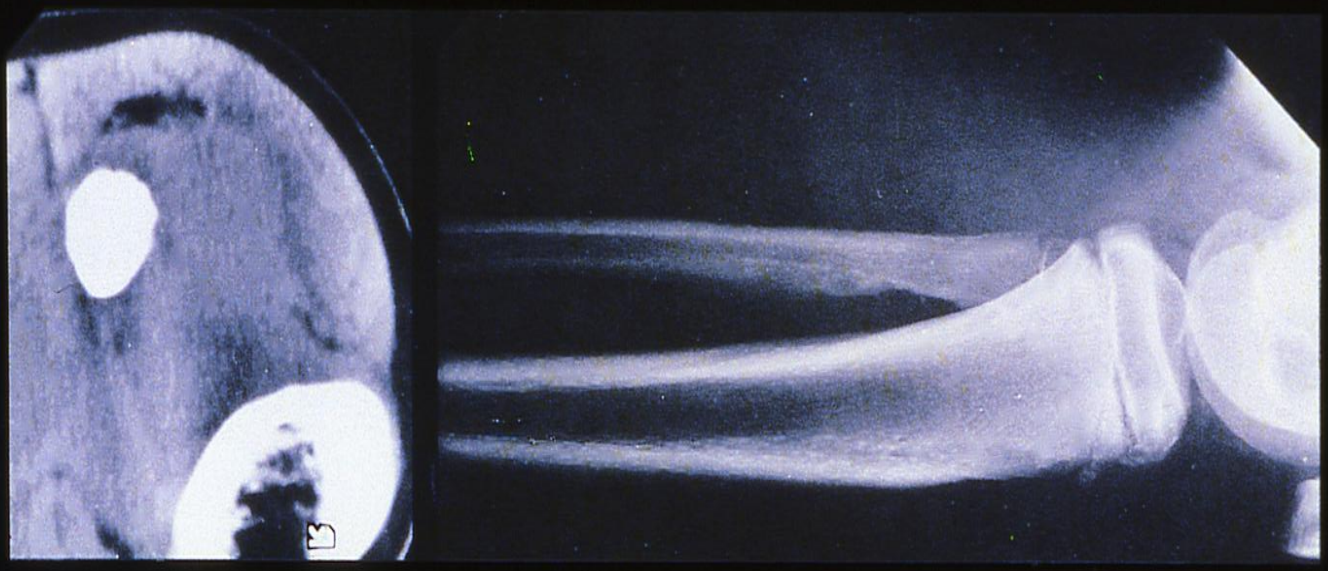

Simple Bone Cyst
age: > 20
M:F = 1:1
age: 1–20
M > F

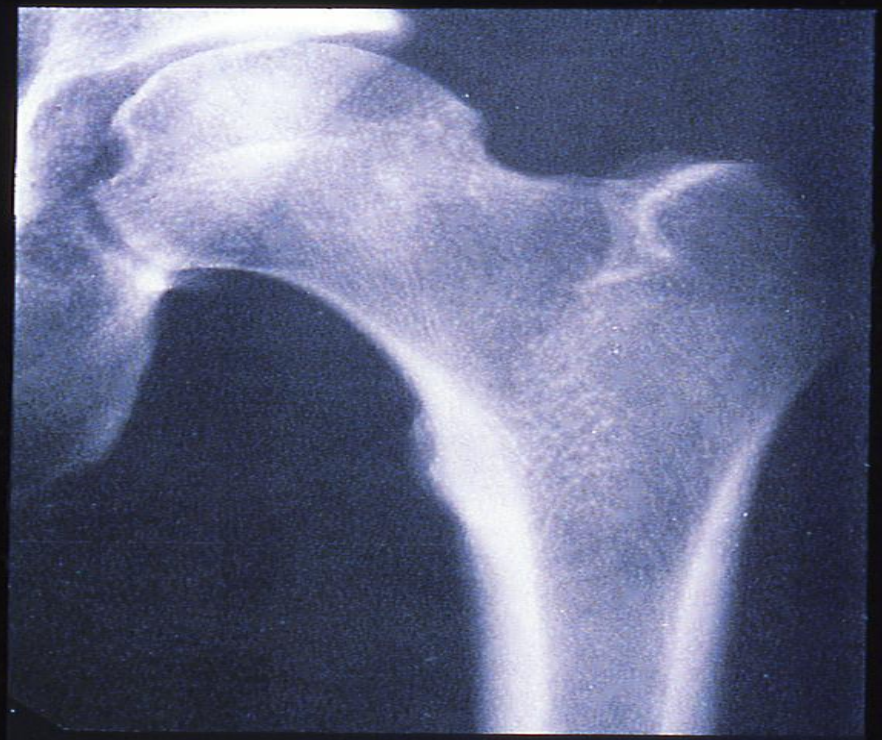

Aneurysmal Bone Cyst
age: 5–20
M:F = 1:1
common sites
less common sites

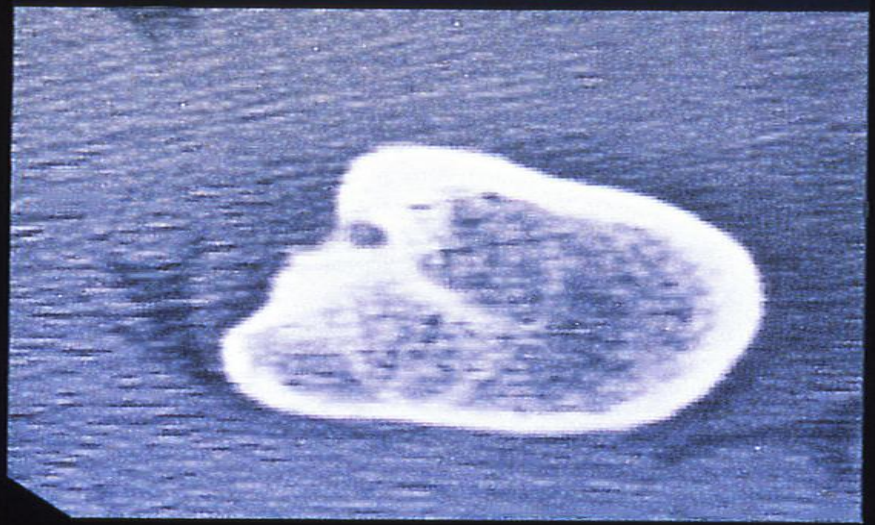

Fibrous Cortical Defect and
Nonossifying Fibroma
age: 2–20
M > F
common sites
less common sites

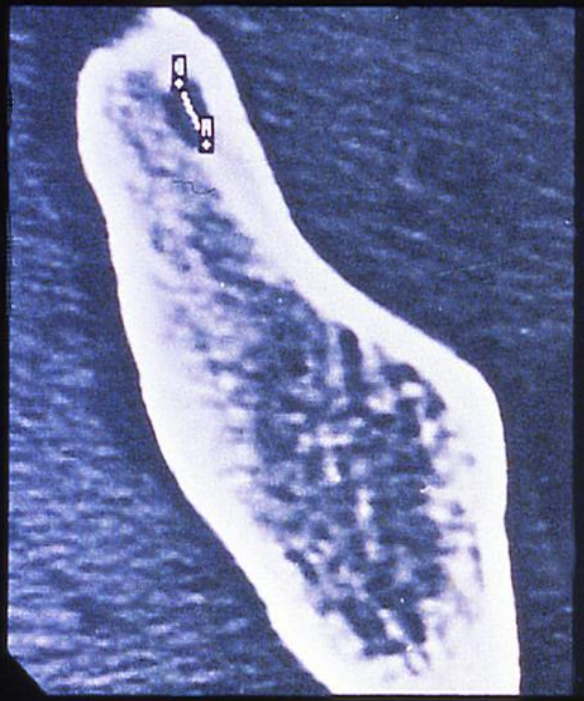


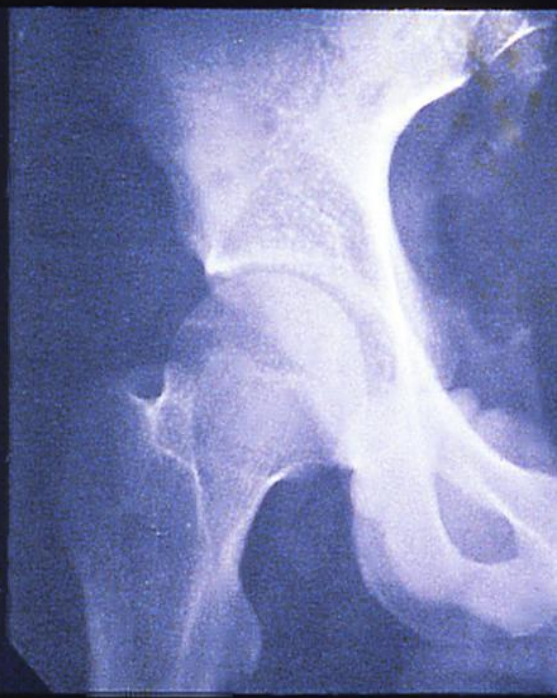

Osteoid Osteoma
age: 10–35
M:F = 2:1
common sites
less common sites

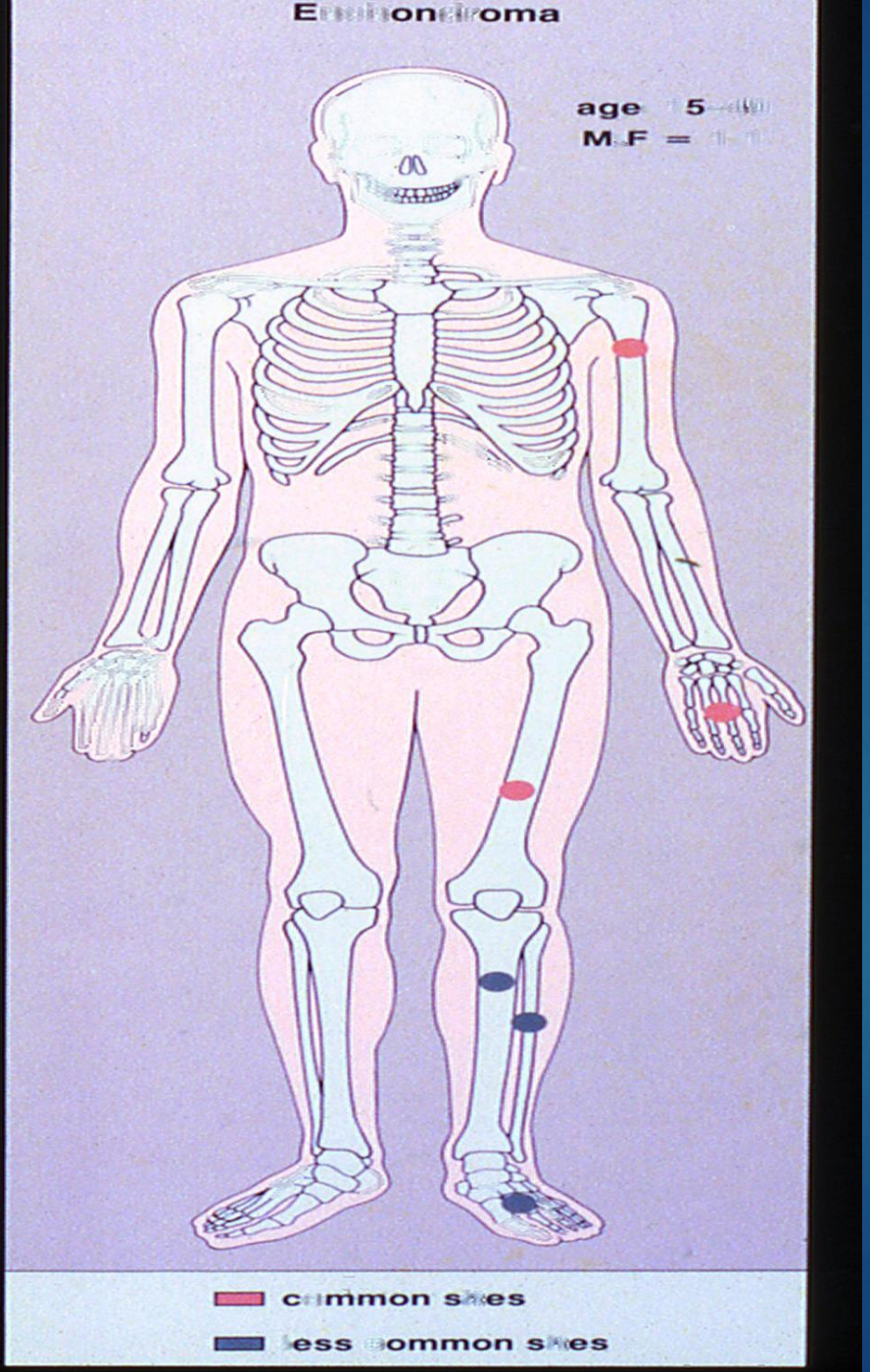


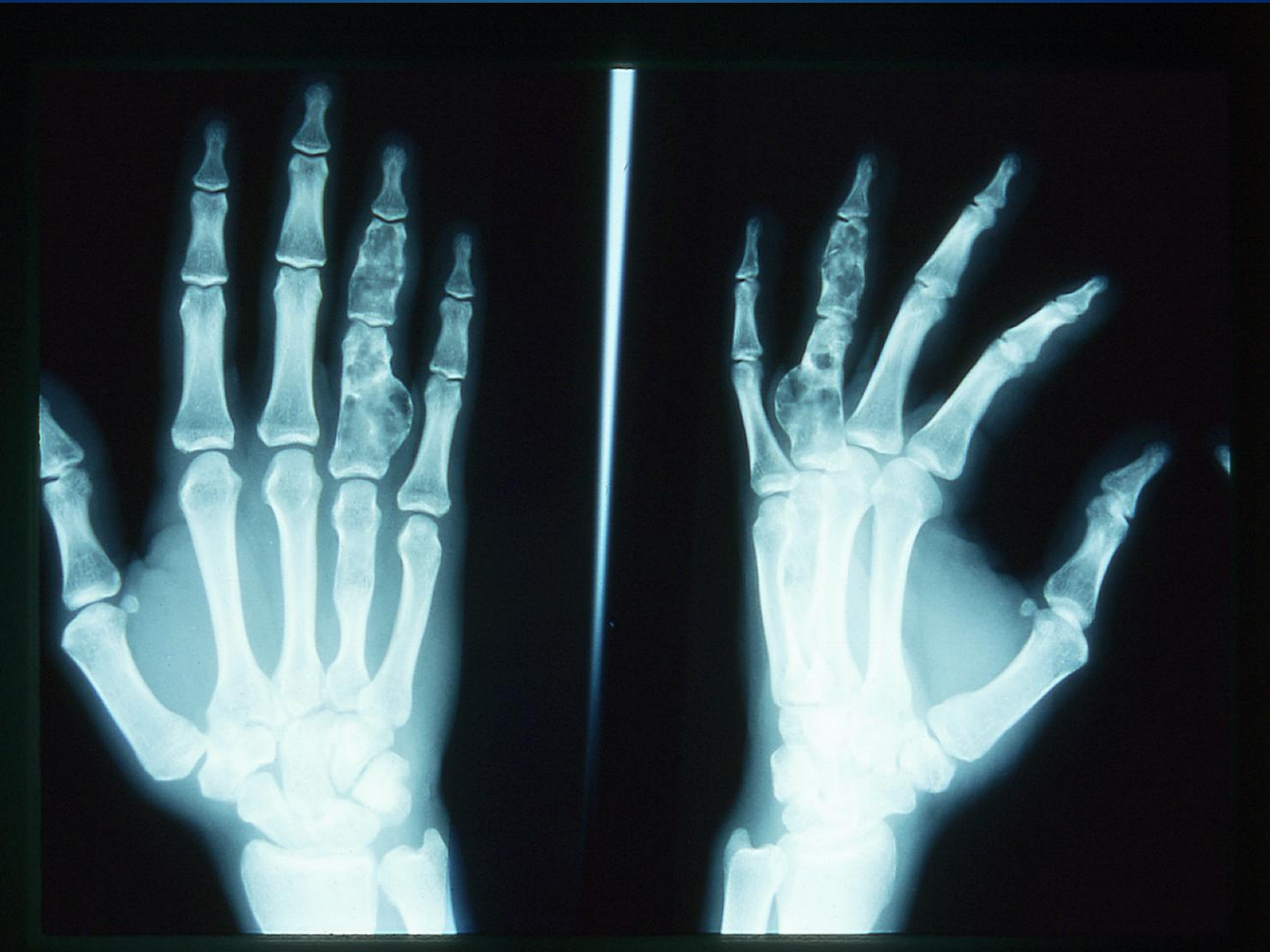


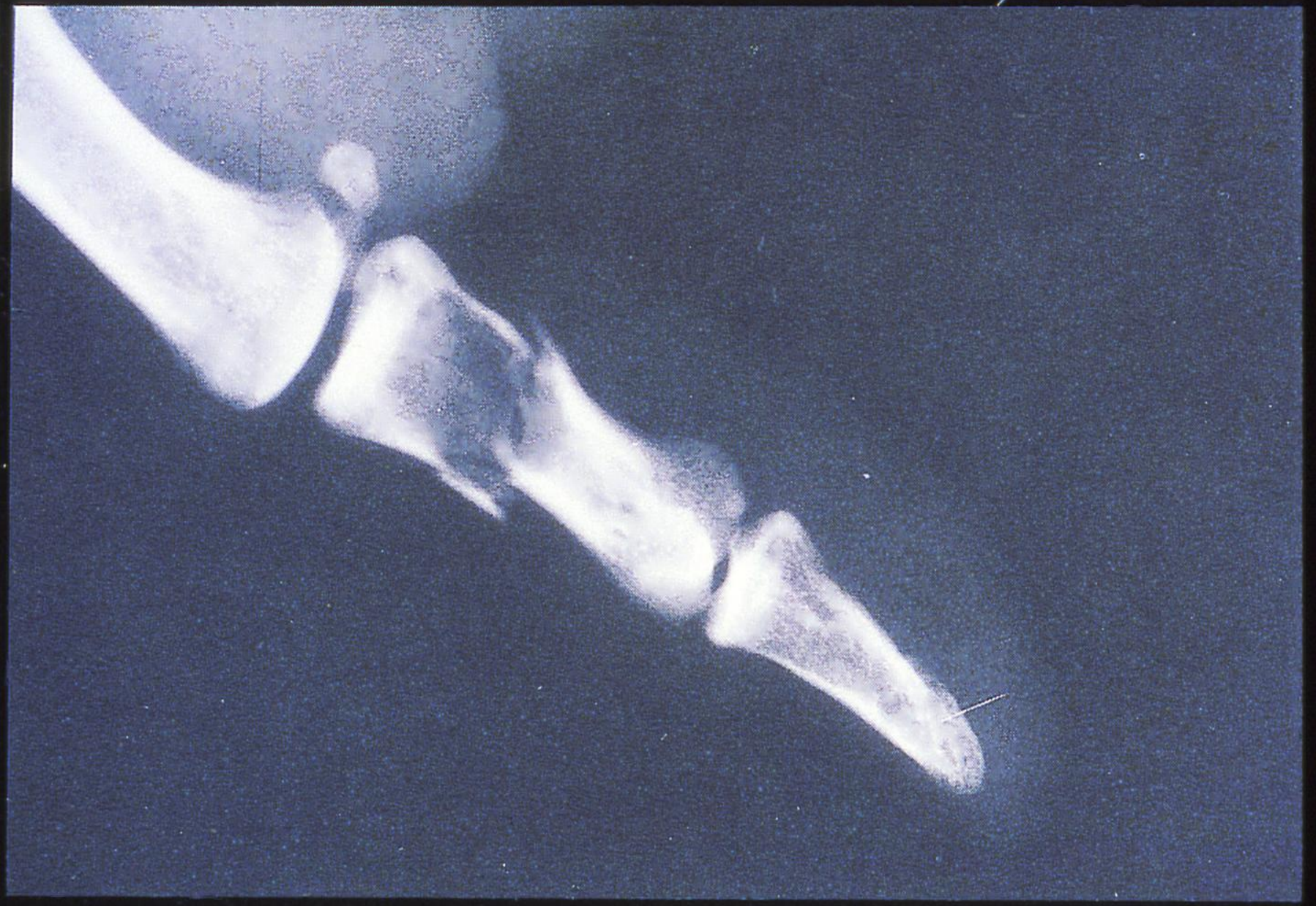




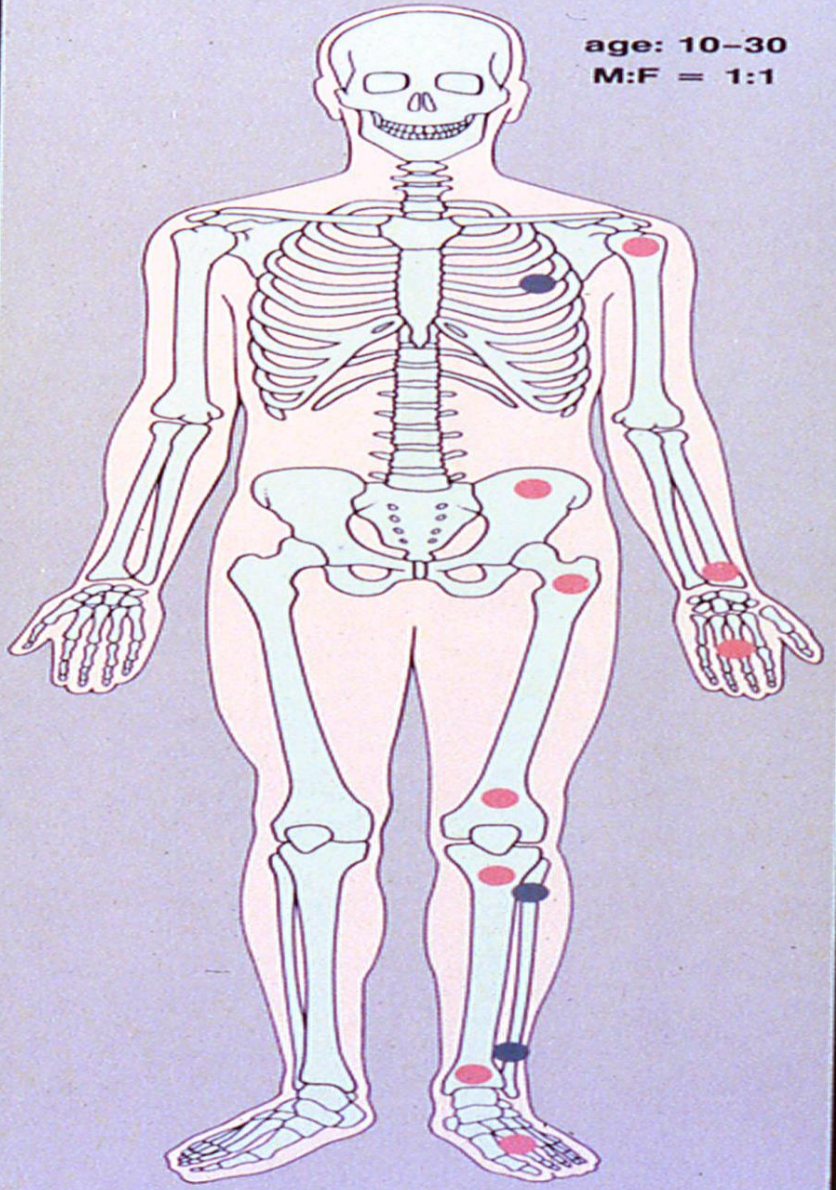


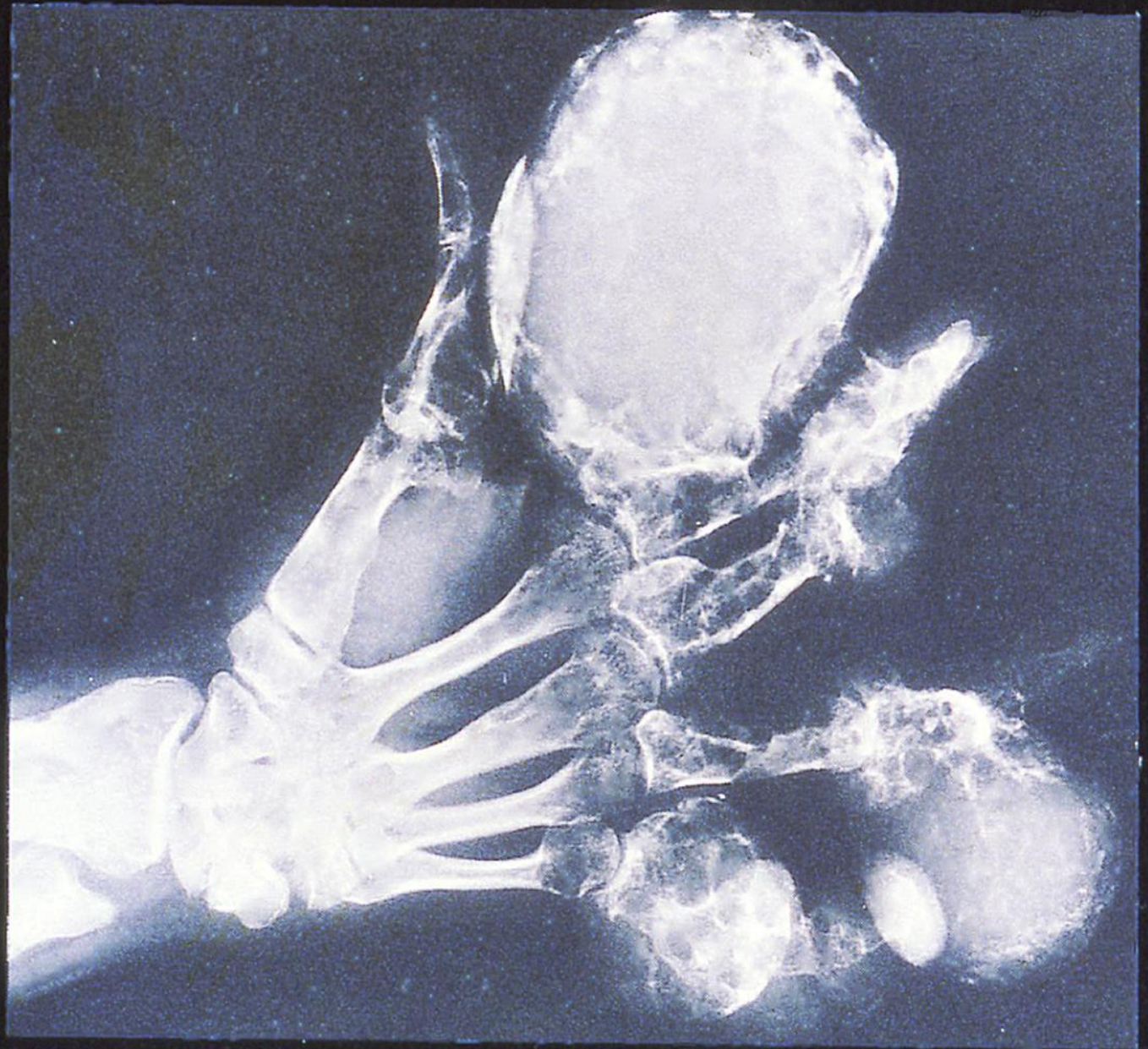

age 5
M F =
common sites
less common sites

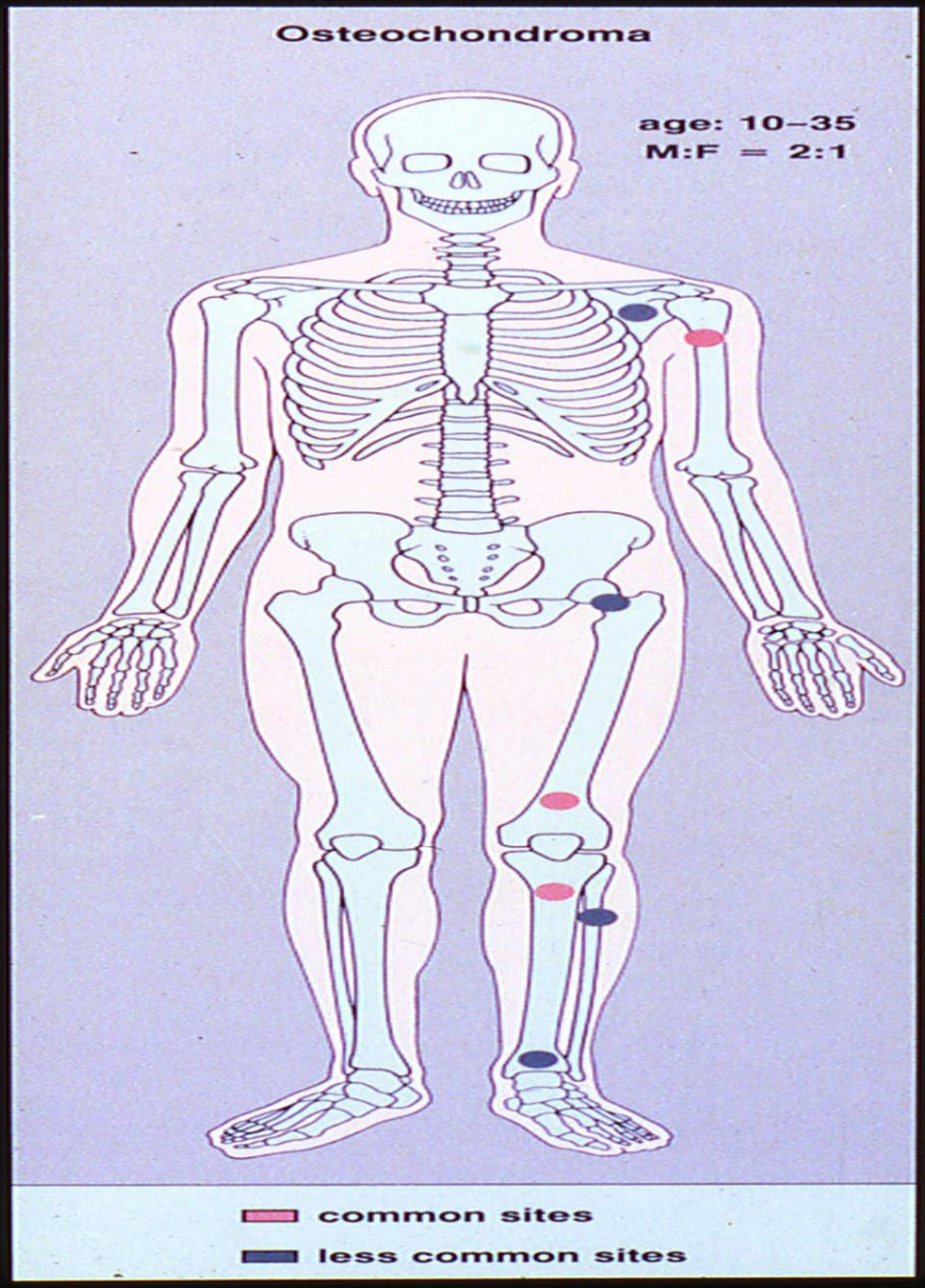


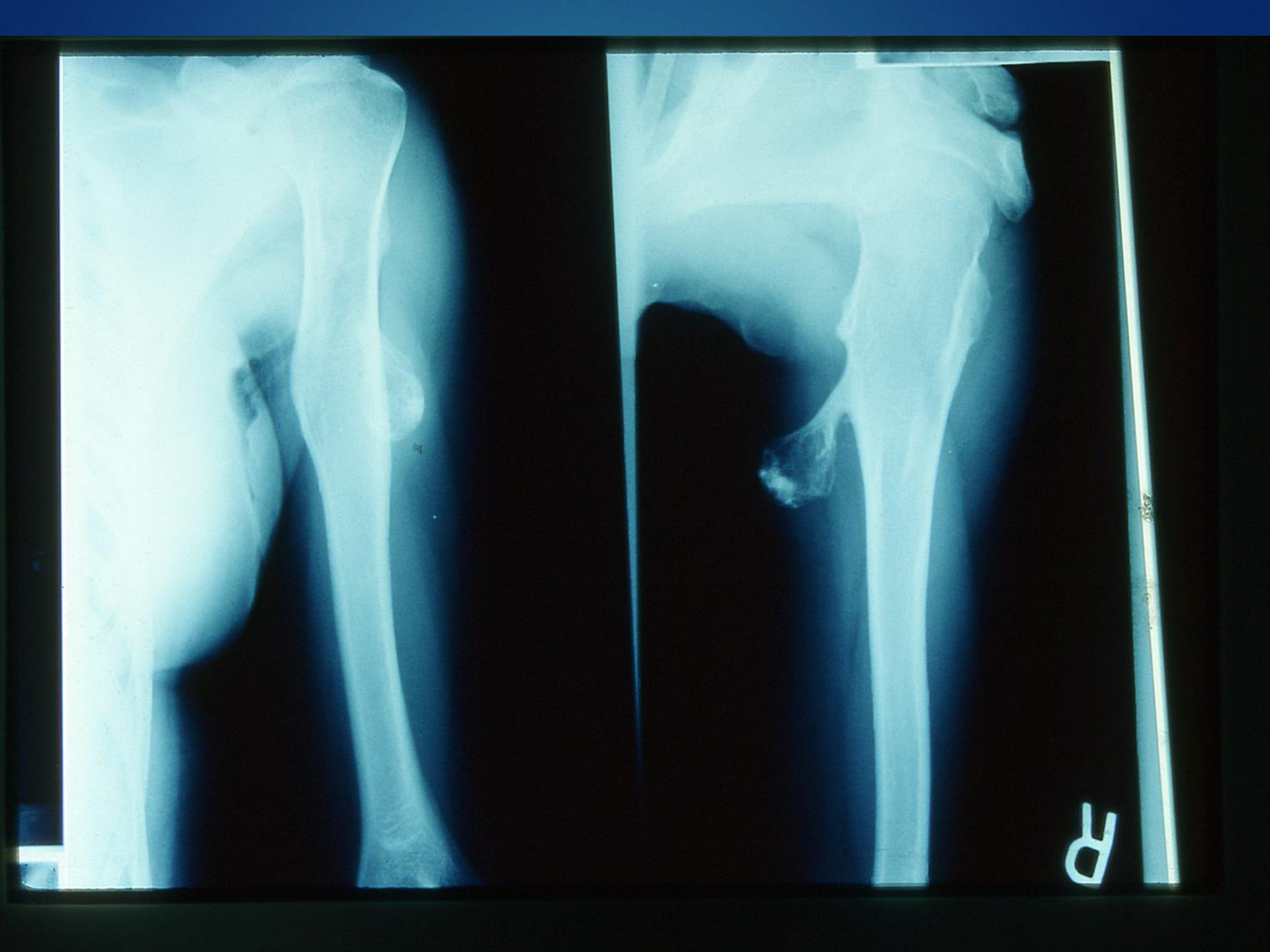


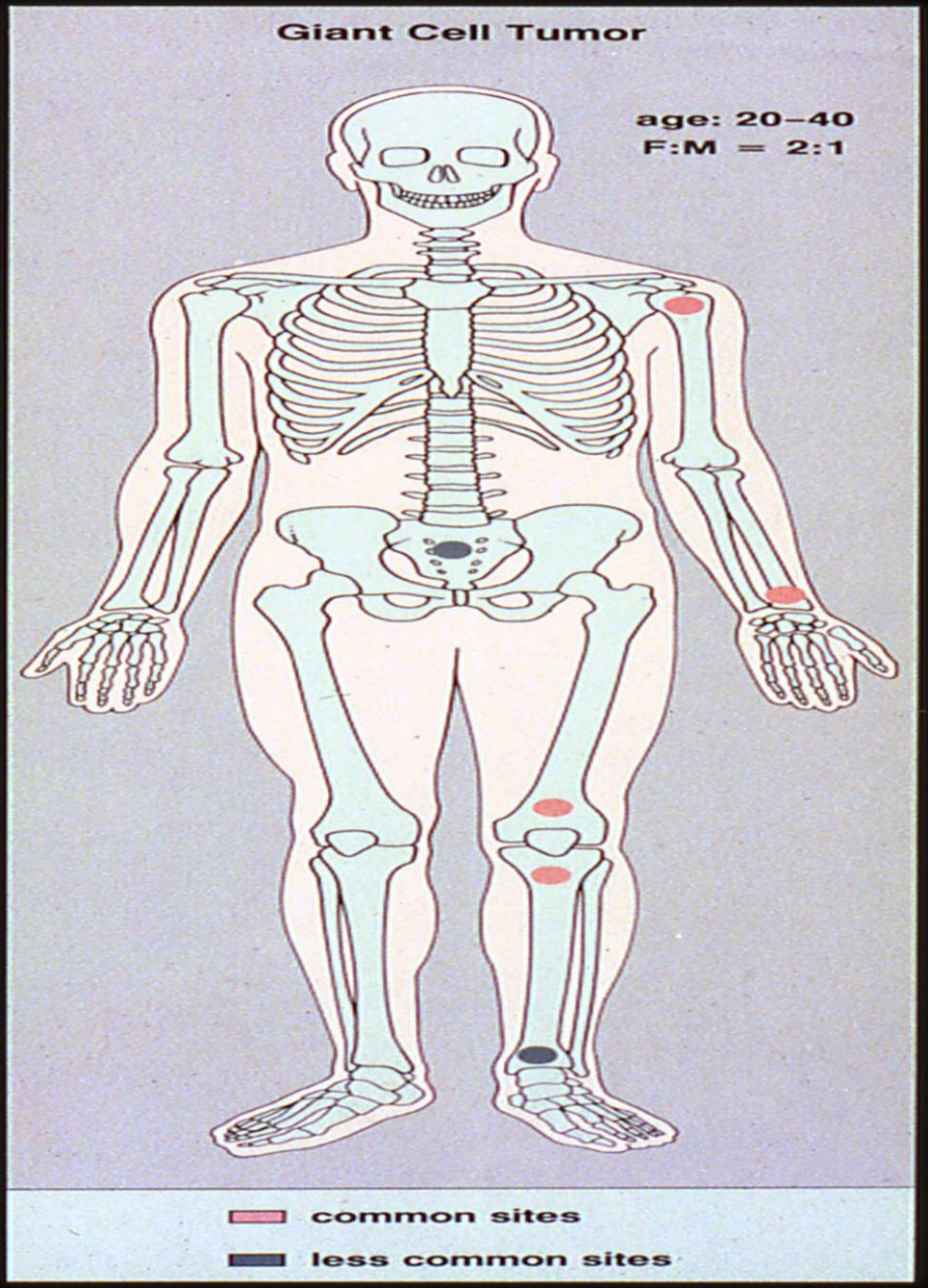
Enchondromatosis (Ollier's Disease)

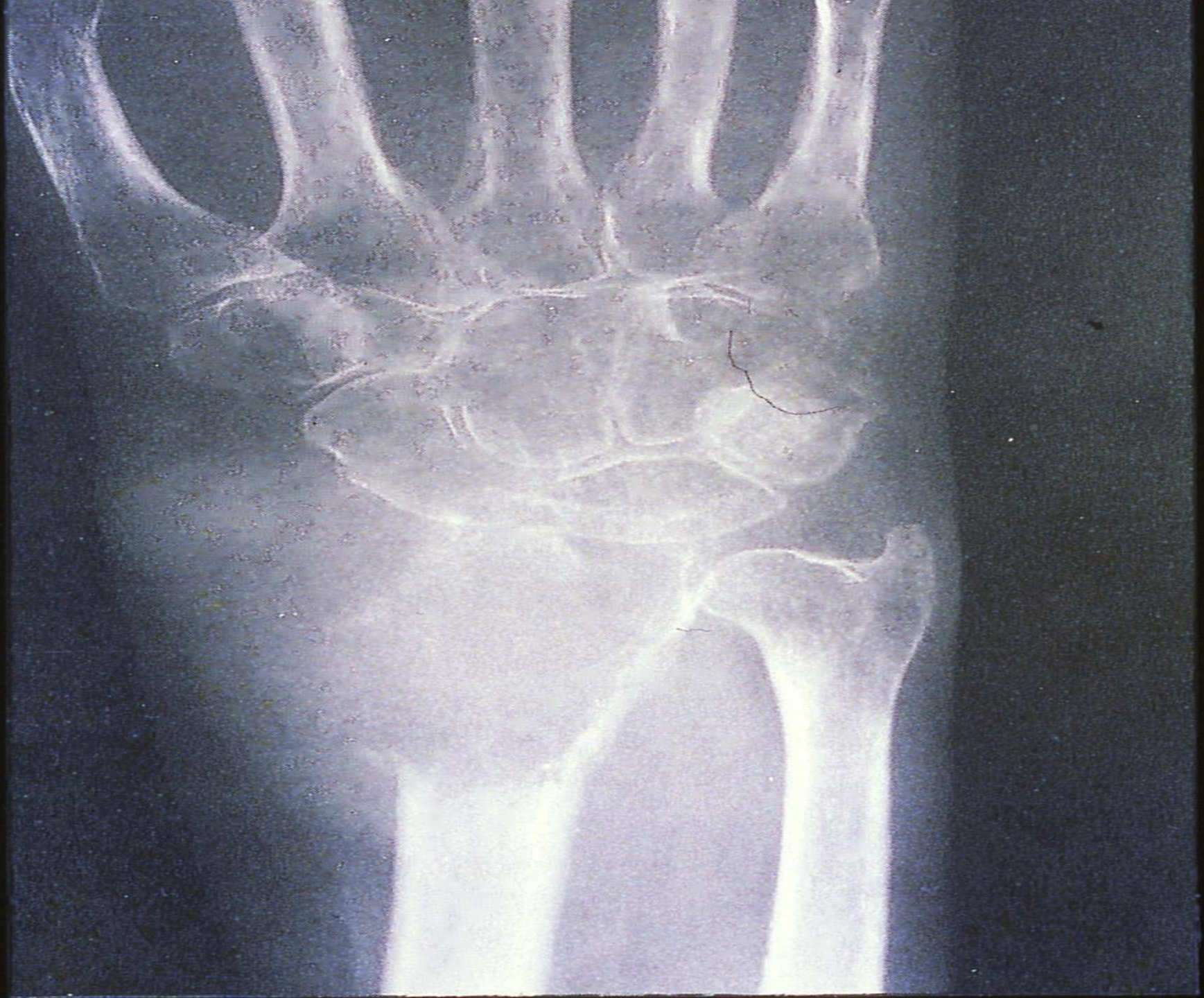


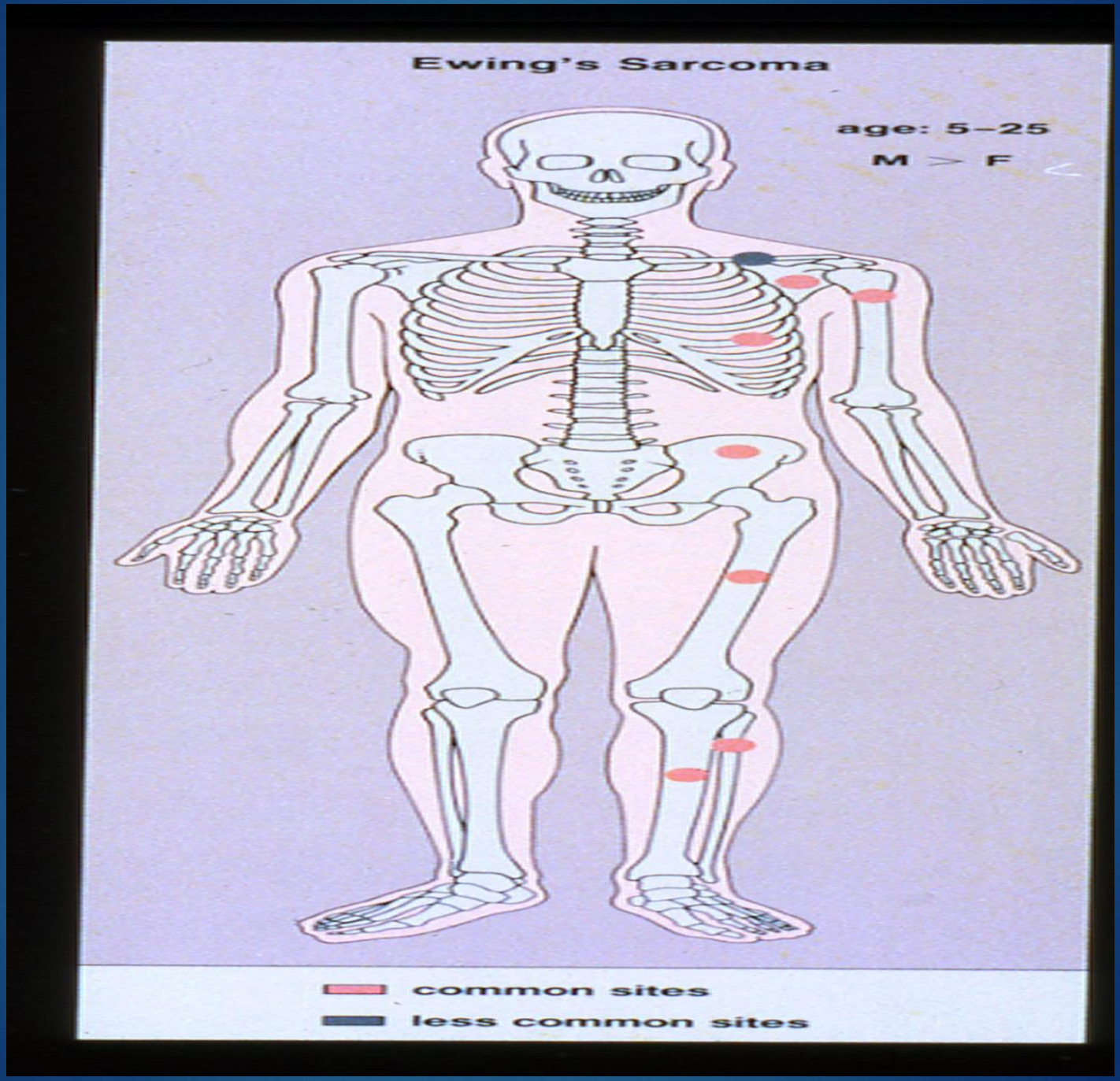


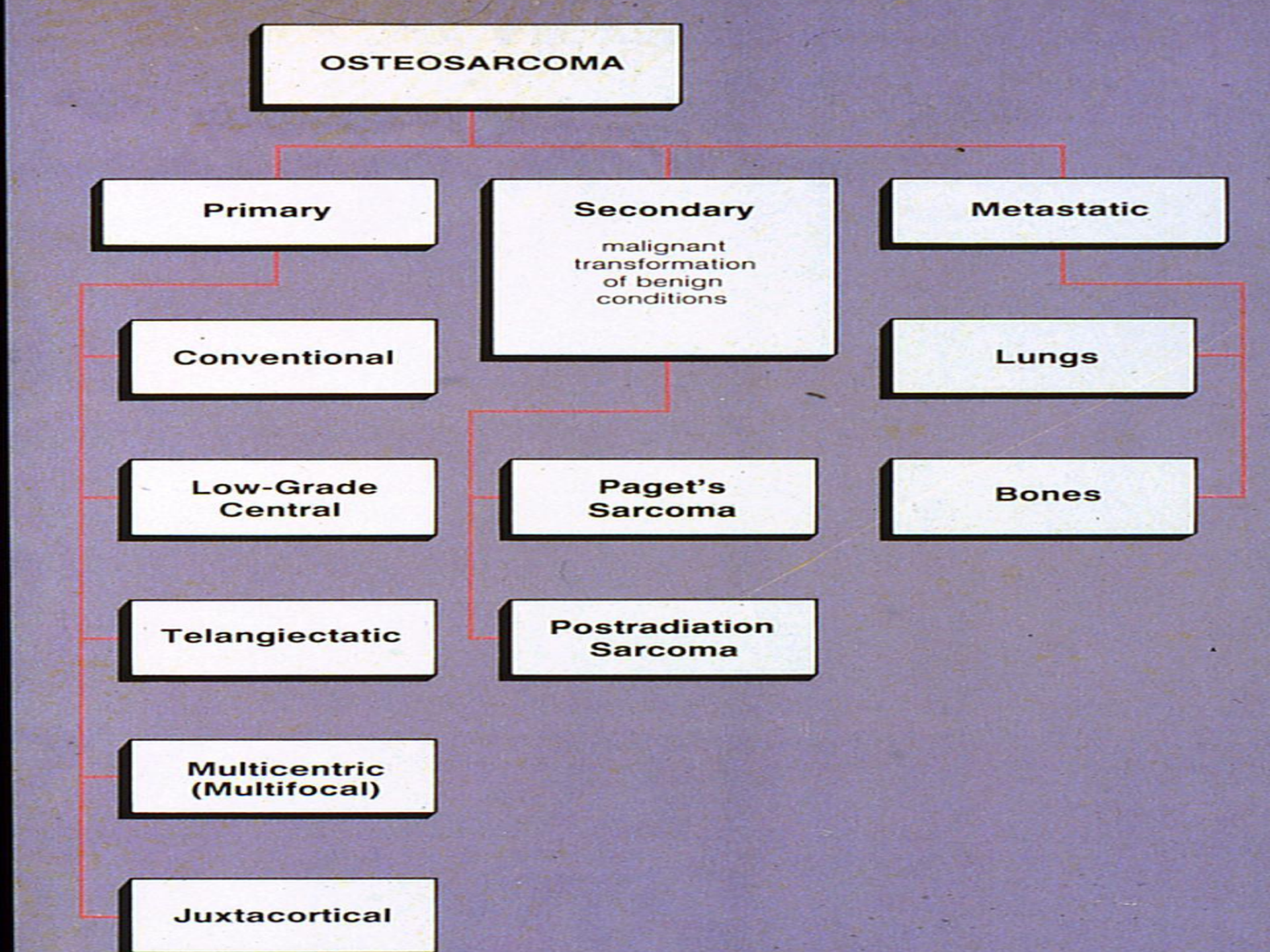

Osteochondroma
age: 10–35
M:F = 2:1
common sites
less common sites

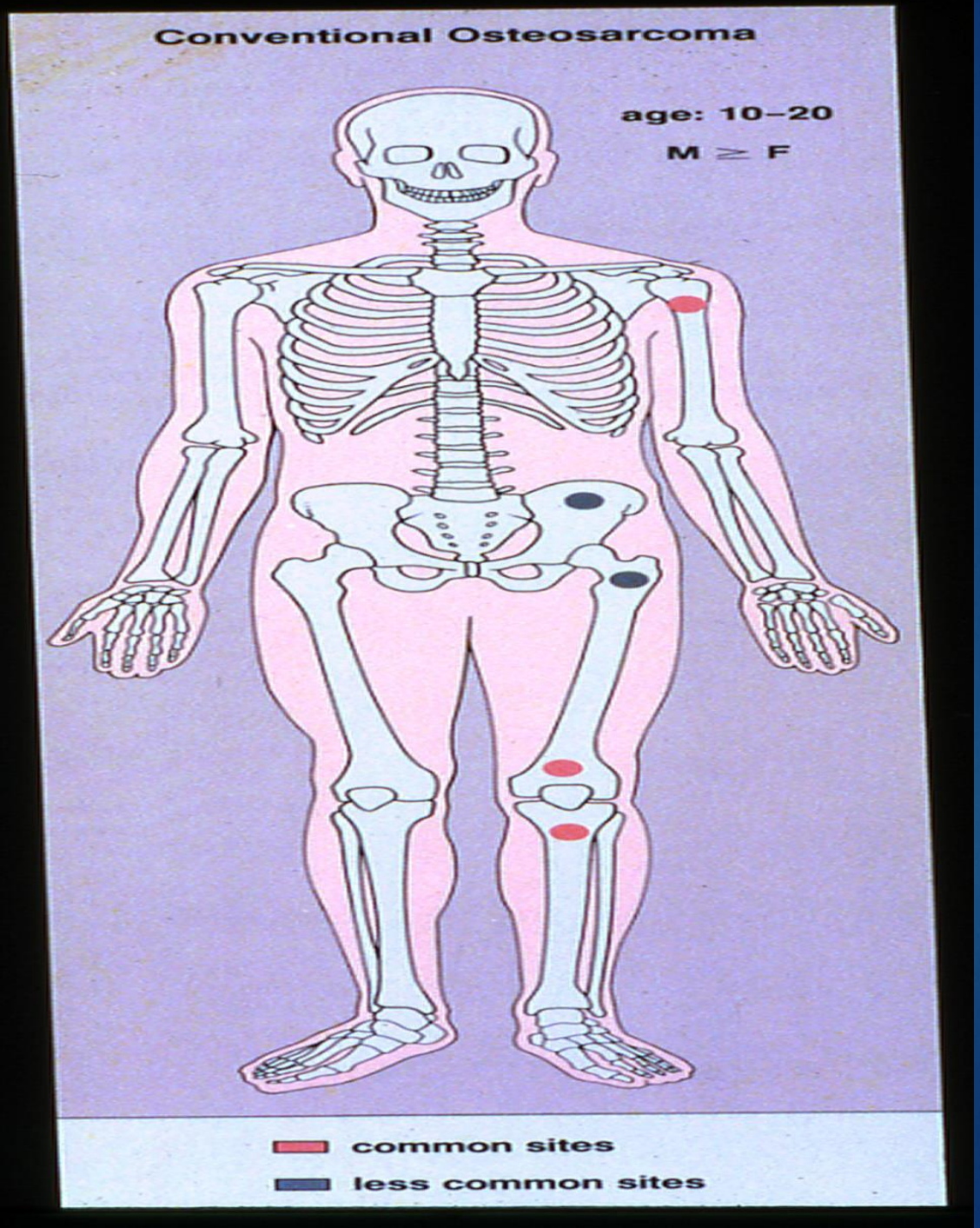

R

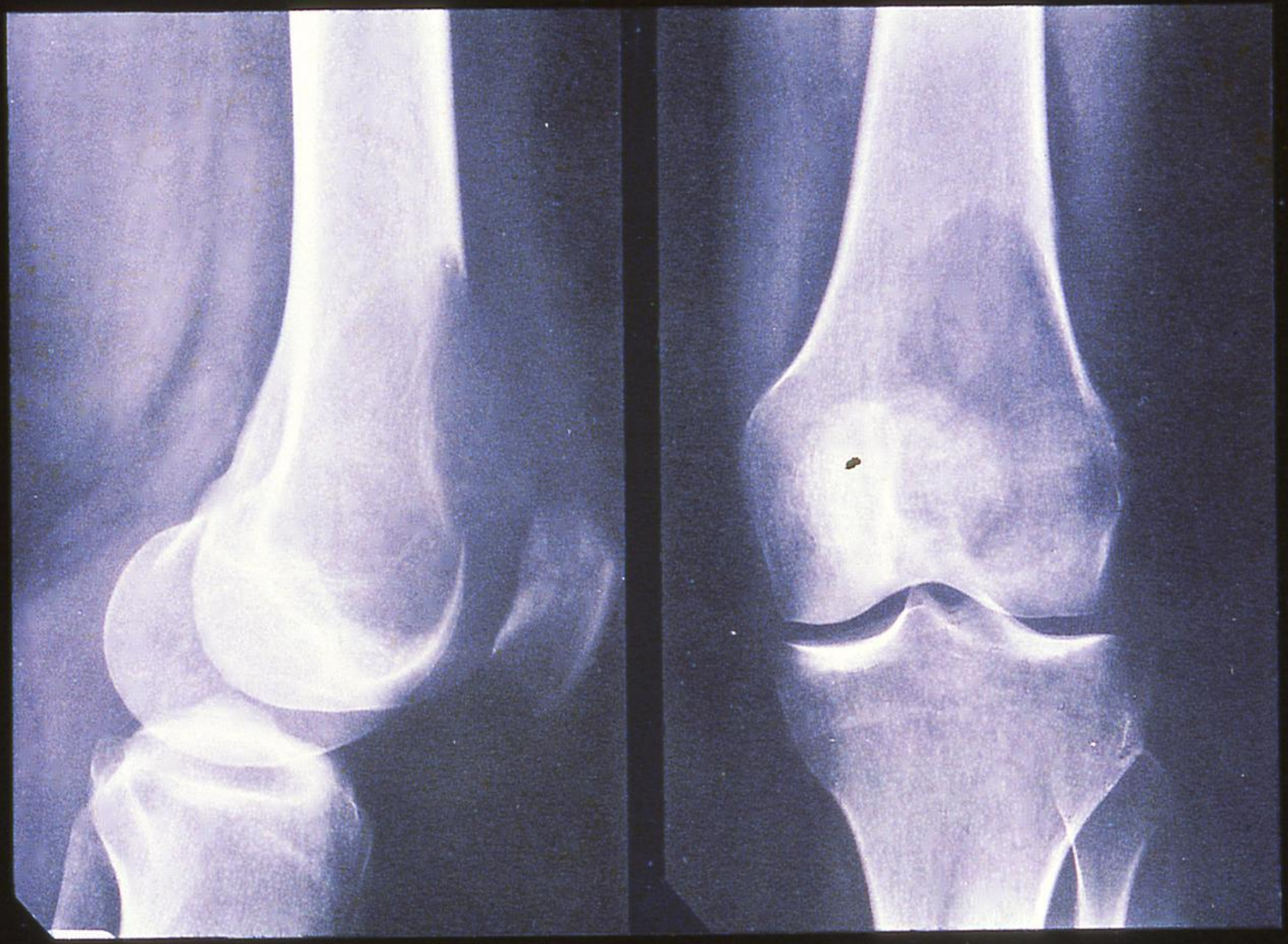

Giant Cell Tumor
age: 20–40
F:M = 2:1
common sites
less common sites

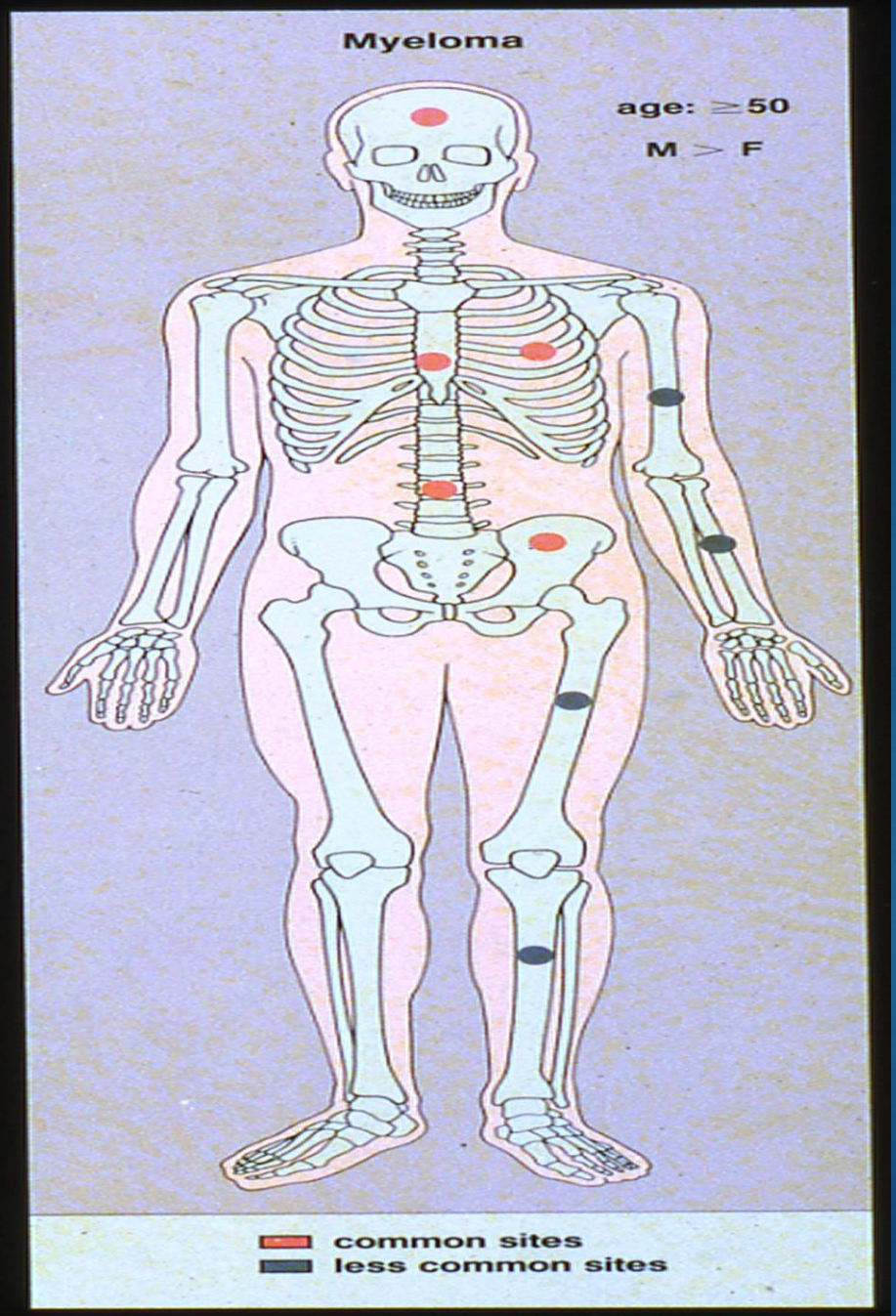


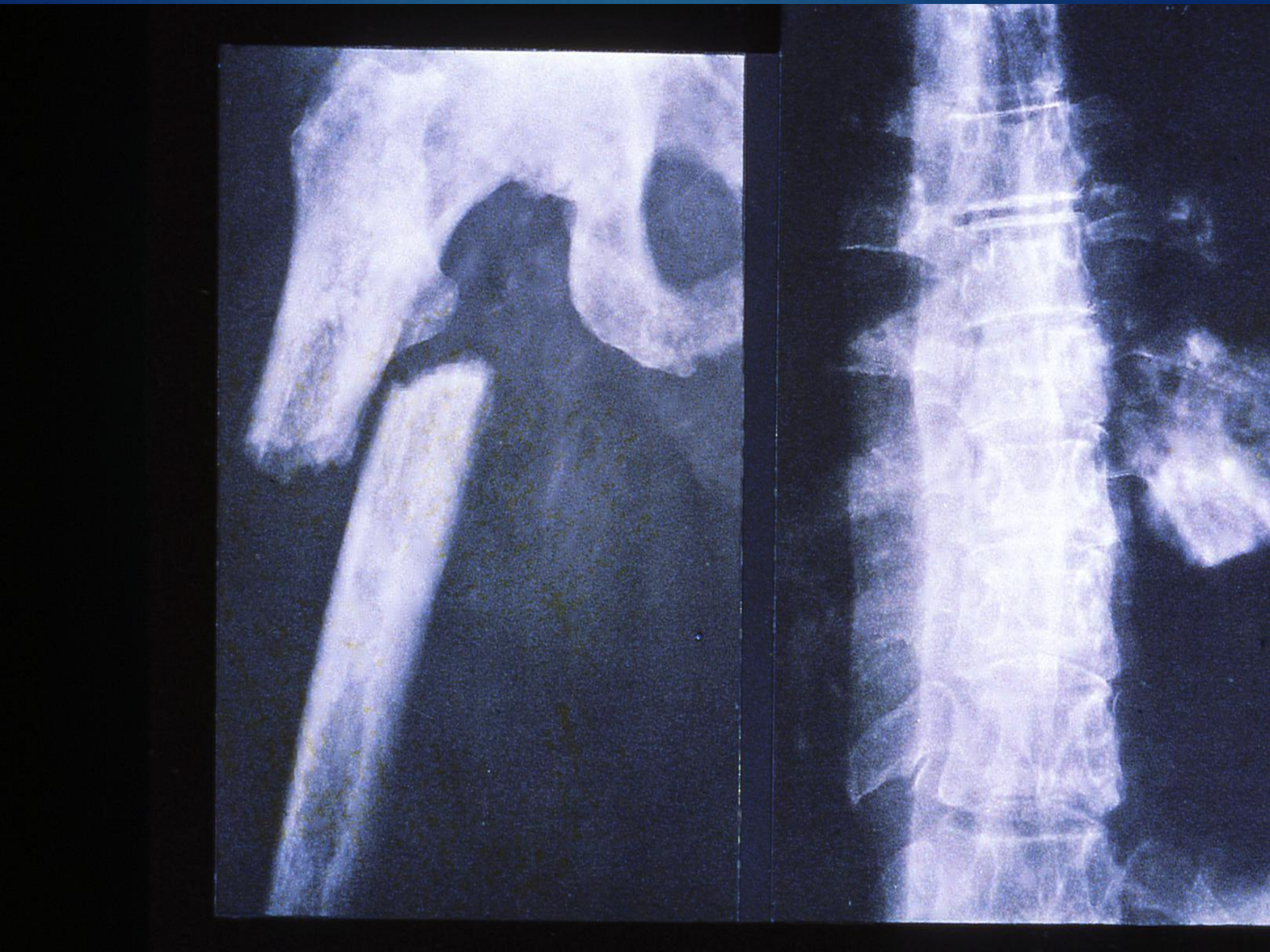

Ewing's Sarcoma
age: 5–25
M > F
common sites
less common sites

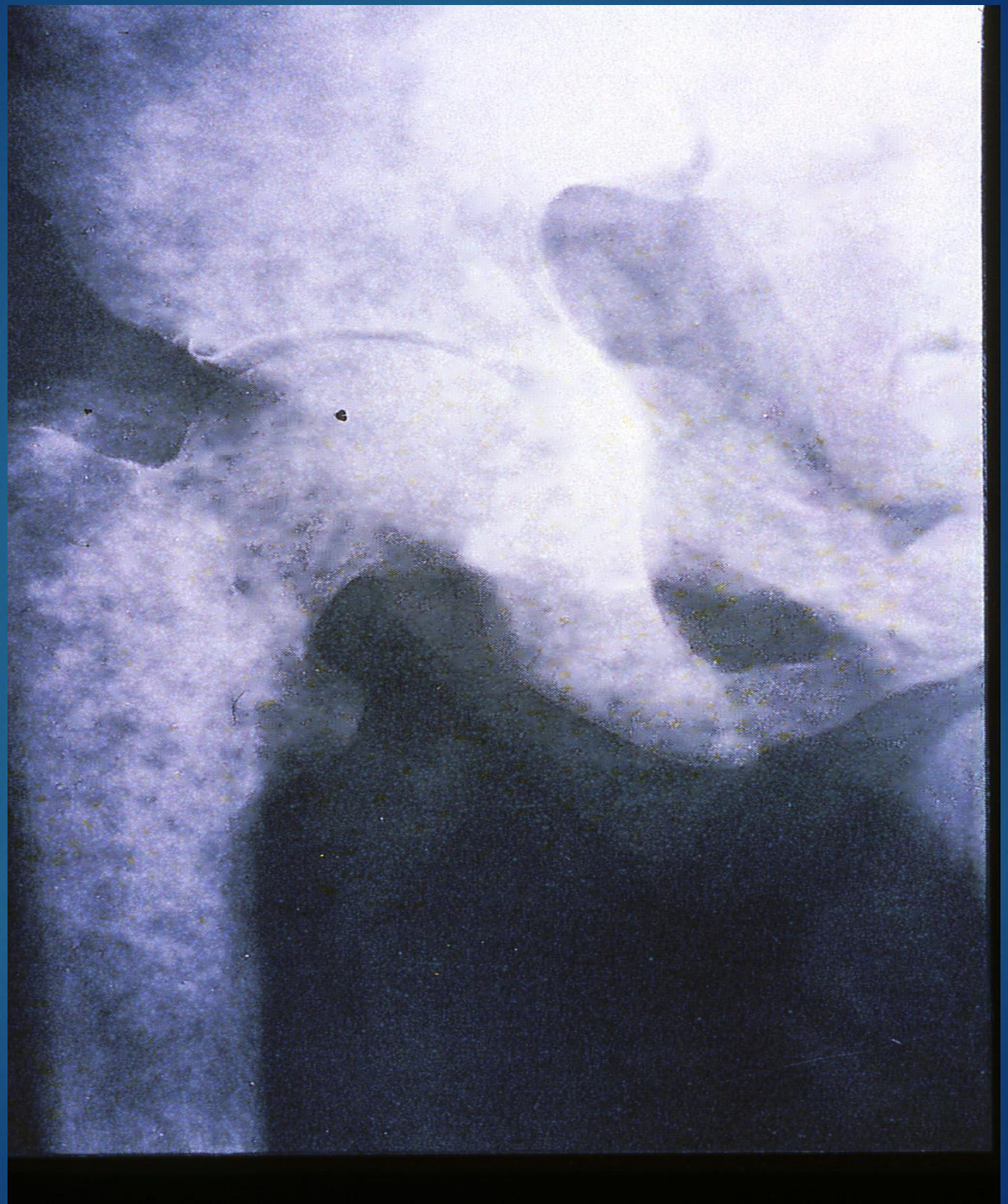

OSTEOSARCOMA
Primary
Secondary
malignant transformation of benign conditions
Metastatic
Conventional
Low-Grade Central
Telangiectatic
Multicentric (Multifocal)
Juxtacortical
Paget's Sarcoma
Postradiation Sarcoma
Lungs
Bones

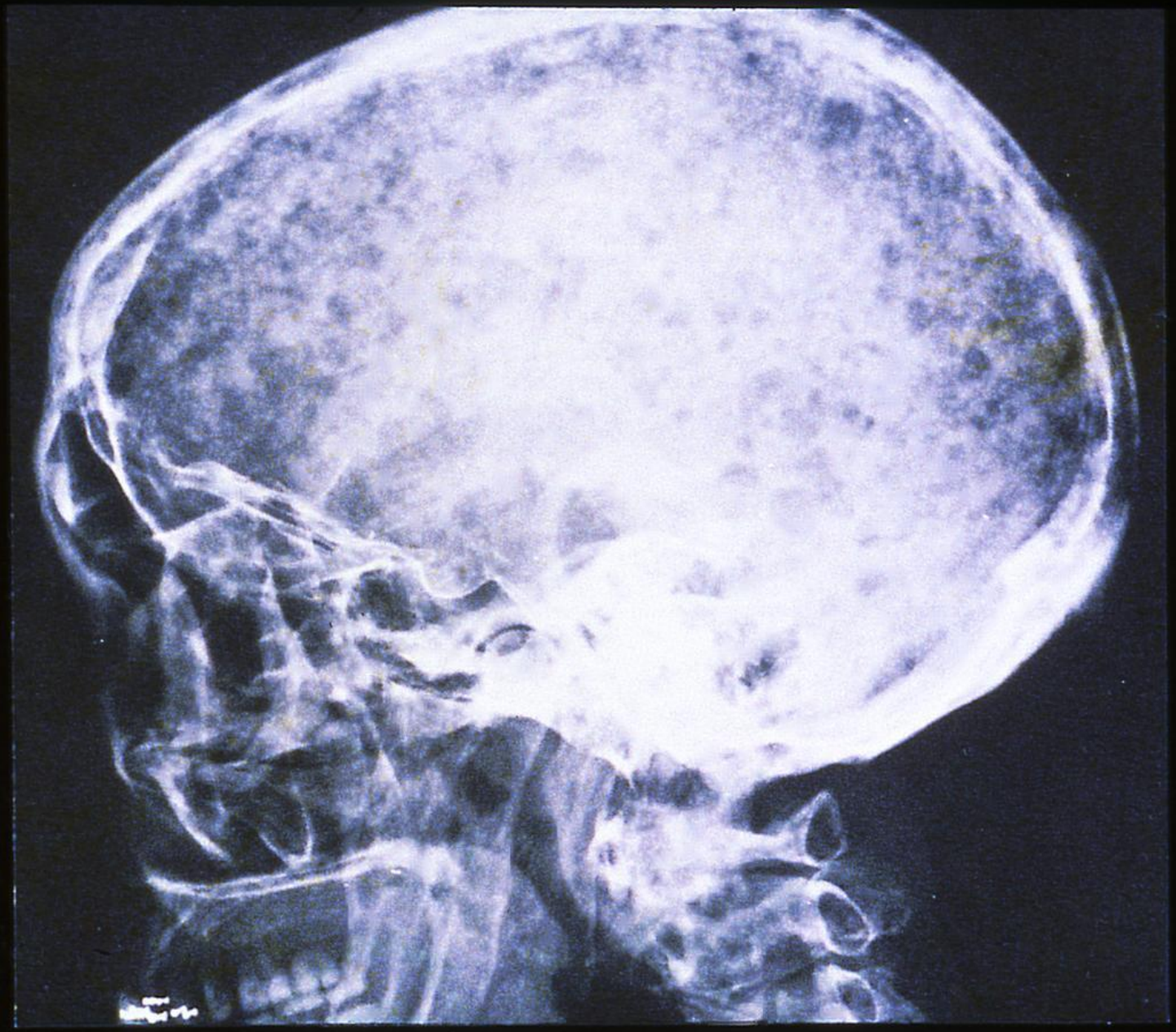

Conventional Osteosarcoma
age: 10–20
M ≥ F
common sites
less common sites

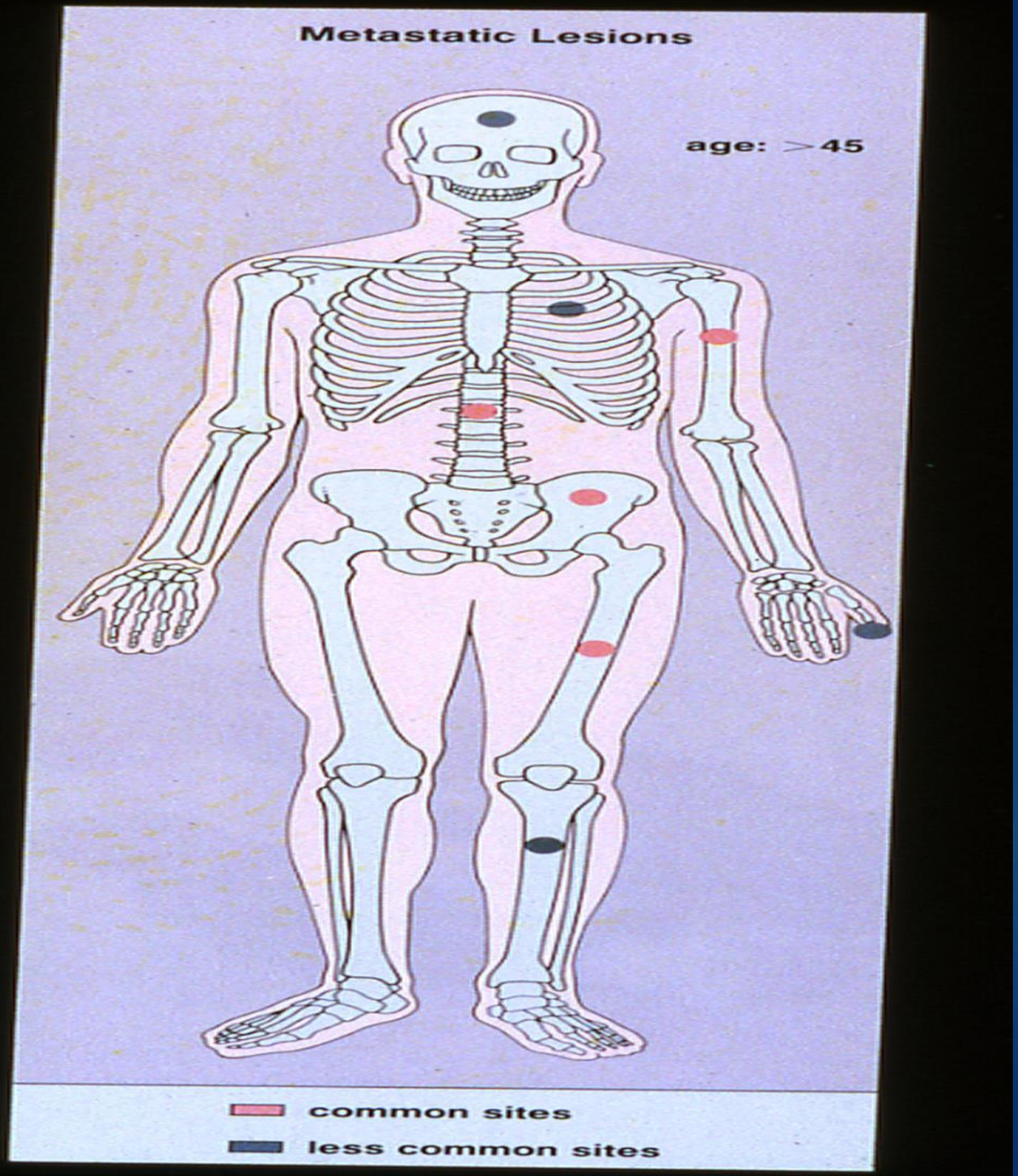



Myeloma
age: ≥50
M > F
common sites
less common sites








Metastatic Lesions
age: > 45
common sites
less common sites