BENIGN BONE TUMOR

Prevalence of benign bone tumors.

Osteochondroma	45%
Osteoid Osteoma	10%
Enchondroma	10%
Haemangioma	10%
Nonossifying fibroma	4%
Osteoblastoma	2%
Chondroblastoma	2%
Chrondromyxoid fibroma	2%

Clinical feature

Pain: Local, Synovitis, Painful scoliosis

Mass

Deformity

Pathological fracture

Incidental finding

Enneking System

I Latent

II. Active

III. Aggressive

Stage I

Discovered incidentally

Do not progress.

May spontaneously resolve.

Need : observation alone.

When surgery: Intralesional excision

Non Ossifying Fibroma

Enchondroma

Simple bone cyst

Fibrous Dysplasia

Osteochondroma

Eosinophilic granuloma

Stage II

These lesions expand the host bone

They may destroy the cortex

Surgery: intralesional curettage.

Simple bone cyst, Enchondroma
Osteoid osteoma
Chrondromyxoid fibroma
Osteofibrous dysplasia

Stage III

Benign but aggressive tumor

Soft tissue involvement

Present with pathologic fracture.

Surgery: en bloc resection

Giant cell tumor
Osteoblastoma
Chondroblastoma
Aneurysmal bone cyst.

X ray

1. Where is the lesion

Epiphyses: Chondroblastoma
Giant cell tumor

Diaphyses: Osteoid Osteoma
Eosinophilic Granuloma
Adamantinoma

Metaphyses: Aneurysmal bone cyst
Simple Bone Cyst
Non ossifying fibroma
Chrondromyxoid fibroma

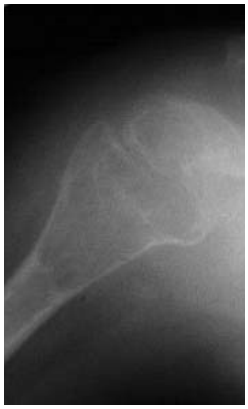
1. **SIMPLE BONE CYST**

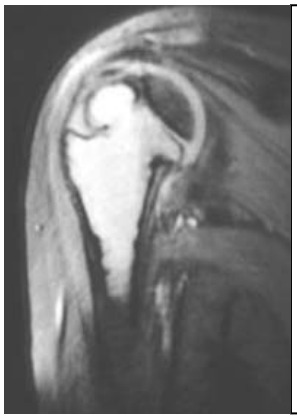
Simple bone cysts occur in young children [6-14 years]

Common site: Proximal humerus and proximal femur

Usually metaphyseal. With age, it can move towards the diaphyses

Radiological





Osteolytic
Metaphyseal
Centric
With or without pathological
No periosteal reaction [when no pathological fracture]
When fractured: fallen leaf sign.

Treatment

1.Proximal humerus: The current standard of care is the injection of corticosteroid

2. For proximal femur: Curettage, bone graft and hip screw and plate

Companacci:

Steroid Vs surgery (170 in each group) 42% healed with one injection and 96% with multiple injection. With bone grafting 46% healed.

2. **ANEURYSMAL BONE CYST**

75% patients are under 20 years. In up to about 50% of cases, a pre-existing lesion can be identified: Giant Cell Tumor, Osteobalstoma, Chondroblastoma

Presentation

Pain and swelling which may have been present for years

Around knee, Hip, Vertebra

In the spine, compression may cause radicular symptoms or paraplegia

Patients may present with a pathologic fracture

Radiography

Metaphyseal

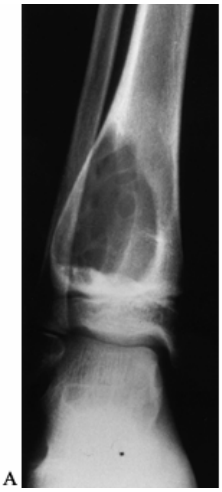
Osteolytic

Eccentric

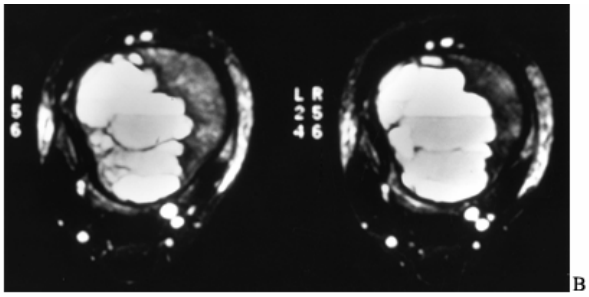
Ballooned out appearance

With or without pathological

Periosteal reaction may be present



A



B

MRI

Increased signal in T2

Classical: “Multiple fluid level”

TREATMENT

The recurrence rates after curettage alone have been reported to be from 50%.

Surgical curettage, use of phenol or liquid nitrogen and bone grafting

Recurrence 25% usually graft resorption seen in 6 months.

Selective embolization of feeder vessels is beneficial in reducing bleeding.

III OSTEOCHONDROMA

Bony outgrowth with stalk or without stalk [sessile] with a cartilage cap

Commonest: Around the knee and shoulder

Clinical

Asymptomatic

Clicking: tendon sliding

Pseudo aneurysm

Fracture of Osteochondroma

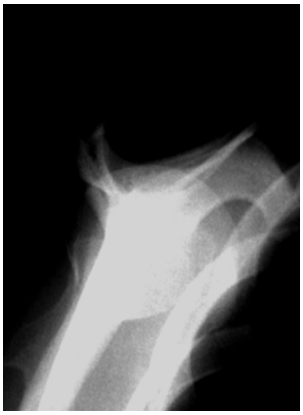
Radiological

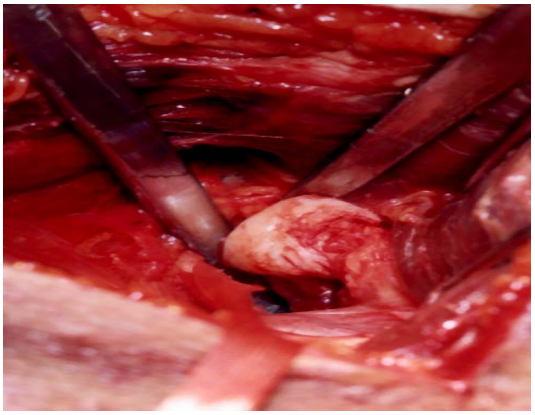
Stalk grows away from the physes

Cortex of the exostosis merges with cortex of the bone

Pedunculated or sessile

Calcification > 10 mm suspect malignancy





Treatment

Asymptomatic: needs only observation

Symptomatic: Needs excision

Secondary sarcoma: usually chondrosarcoma [<1%]. Wide block excision

IV MULTIPLE EXOSTOSES

Is grouped under dysplasia than benign tumor

AD

Incidence of malignancy: 10%

Sites: Around knee > Shoulder

(Scapula & Humerus)

Common Valgus or varus knee deformity:

Madlung deformity (radial bowing)

Valgus knee and ankle

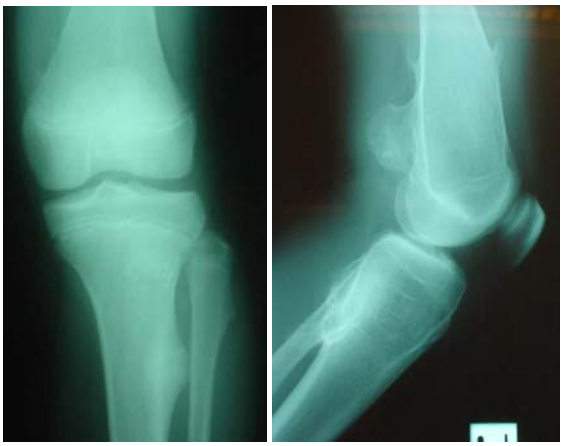
Treatment: observation. Any swelling with a sudden increase in size, suspect a malignant change. It needs, biopsy to rule out sarcoma.

Multiple osteochondroma at metaphyses

Peduculted or sessile

Multiple bone involvement

Evidence of widening of metaphysis



V ENCHONDROMA

In hand and feet

Are always benign

When it occurs in the long bones: Always suspect low grade Chondrosarcoma

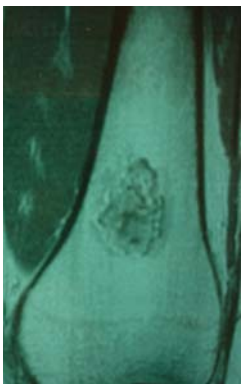
Treatment

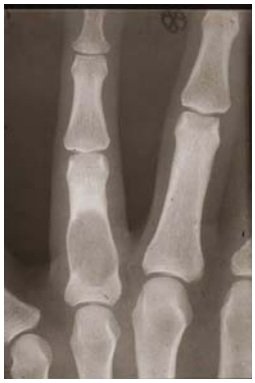
Long bone: X ray assessment every 3 months.

Any increase in size or lesion becomes painful

CT or MRI assessment is indicated. If any suspicion, to be treated like primary tumor..

If no changes: follow up for a year with X ray:





X ray

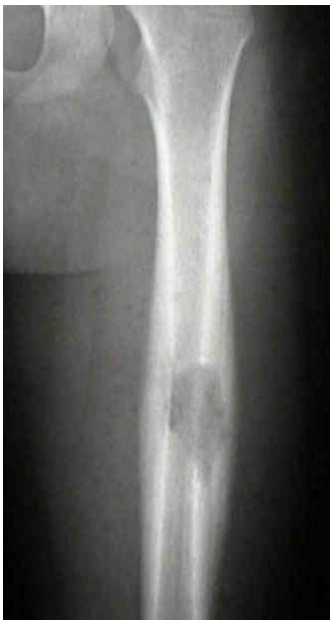
Lytic, centric, expansible, punctate stippling, pathological fracture

MR image of the left humerus shows tumor lobules present

The tumor did not destroy bone and was consistent with an Enchondroma.

In multiple endochondromatosis [Ollier's] and when associated with multiple Haemangioma [Maffucci's] there is increase risk of malignancy.

VI HISTIOCYTOSIS



1.Eosinophilic granuloma

Self-limited disorder of bone seldom involving more than two or three osseous sites

Age: 5-15 Years

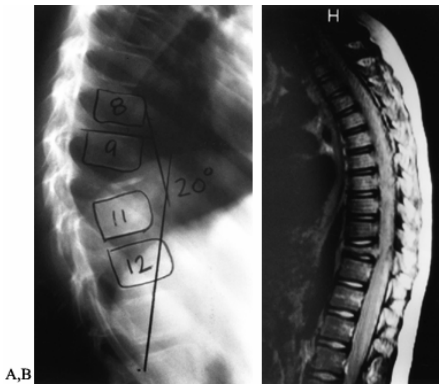
Local pain or pathologic fracture

Lytic, punched out, irregular defects with periosteal reaction.

Wide transition but still benign

Spine: **vertebra plana (Calvé disease).**

2.Hand-Schuller-Christian



A,B

Diabetes insipidus

Proptosis

Exophthalmus

3.Letterer-Siwe disease

Fulminant disease

Hepatosplenomegaly

Lymphadenopathy

Treatment

Pathological fracture, Non-operative treatment is indicated. When fracture heals, curettage and bone graft is indicated.

VII OSTEOID OSTEOMA

Typical: Night pain relieved by Aspirin

Never becomes malignant; recurrence is rare if nidus is removed completely.

Usually in the diaphysis of Femur and tibia

It is most commonly seen in the II & III Decade

When Spine is involved may present with painful scoliosis

Scoliosis disappears if excised within15 months

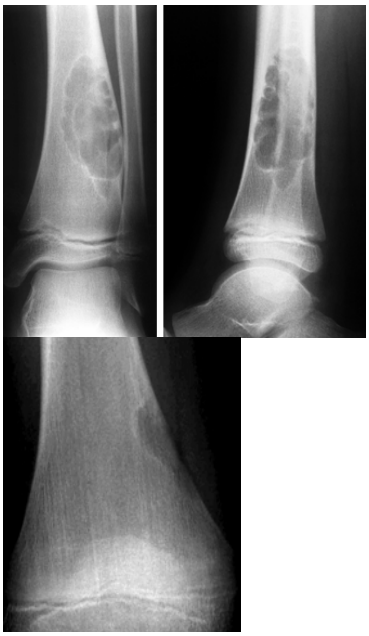
Pathology: Vascularized Osteoid tissue surrounded by sclerotic bone

In osteoid osteoma the nidus is less than 1cm and in osteoblastoma lesion is more than 1.5 Cm

Treatment

- Wide en bloc excision of the nidus
- Unroofing of the nidus by gradual removal of the overlying reactive bone and excision with curettes and burrs
- Percutaneous CT guided core-drill excision or destruction of the nidus by radiofrequency or laser
- Radiofrequency Laser coagulation

VIII NONOSSIFYING FIBROMA [NOF] AND FIBROUS CORTICAL DEFECT [FBC]



FBC: When lesions confined to the cortex are called fibrous cortical defects.

Common and asymptomatic and spontaneous disappears

Some become: NOF [>2cm]

NOF: Multilocular, expansile, sclerotic margin, no periosteal reaction.

This extends into the medullary cavity

They are asymptomatic = Do not touch lesion

They eventually disappears and do not diagnose after 30 years

IX FIBROUS DYSPLASIA

Common, Hamartoma

Types Monostotic 75%

Polyostotic 25%

Mazabraud's syndrome: Poly Dysplasia and myxomas

Albright Syndrome [3%]

Poly-ostotic (one side of the body)

Precocious puberty

Pigmentation ["coast-of-Maine" [irregular]

Clinical Asymptomatic

Pain or Pathologic fracture

Treatment

1. Observation and Patient Education

Avoid contact sports

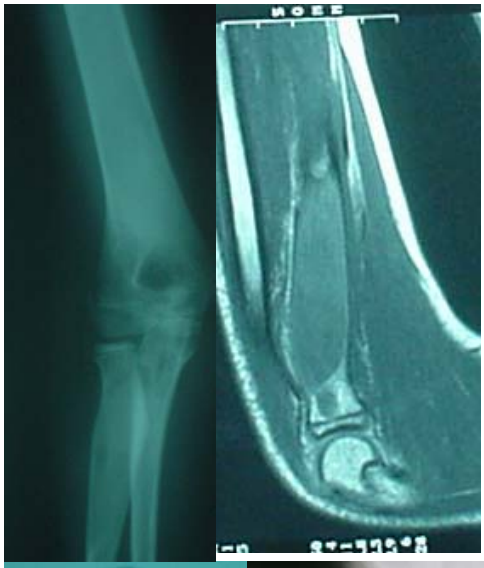
2. When polyostotic : endocrinologist opinion

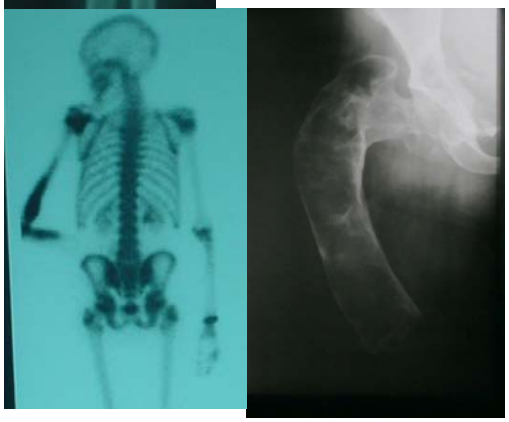
3. Bisphosphonates

Pamidronate strengthens the bone

4 Surgical Indications

Corrective deformity + autogenous cancellous bone-grafting and screw and plate fixation





"Ground glass" appearance

Expansile lesion

Metaphseal or diaphyseal

Endosteal scalloping

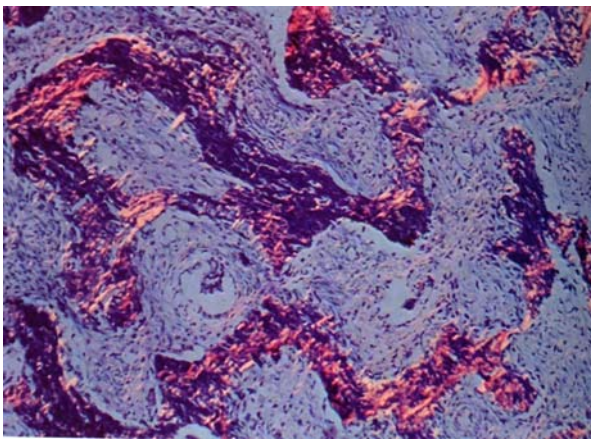
"Shepherd's crook" deformity of femur

Increased uptake with bone scan

MRI: loss of marrow signal

PATHOLOGY

1. Delicate trabeculae of immature bone
2. With no osteoblast rimming
3. Enmeshed within a bland fibrous stroma of dysplastic spindle-shaped cells
4. The ratio of fibrous tissue to bone ranges from fields that are fibrous to those filled with dysplastic trabeculae.



5.. "Alphabet soup.“ or Chinese letters

X. GCT [GIANT CELL TUMOR]

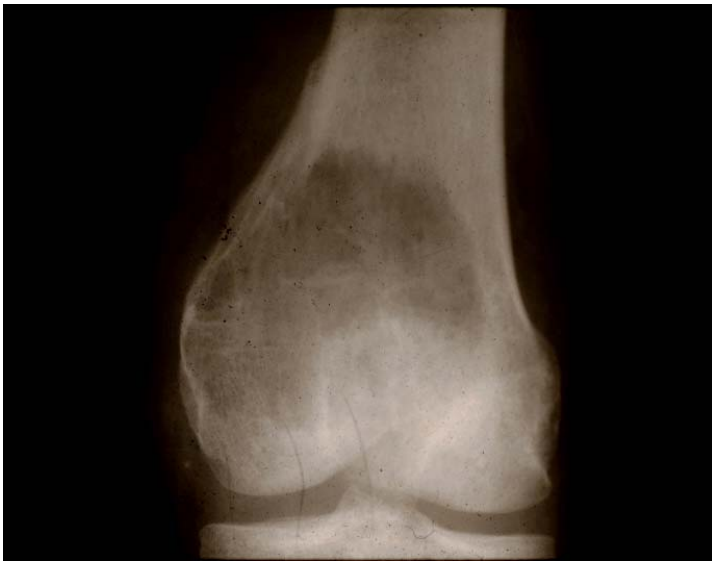
Occurs in skeletally matured [>20 years]

Females 1.5 times more

Commonly around knee [lower femur and upper tibia, lower radius]

Locally aggressive but benign

Clinical: Pain



Eccentric

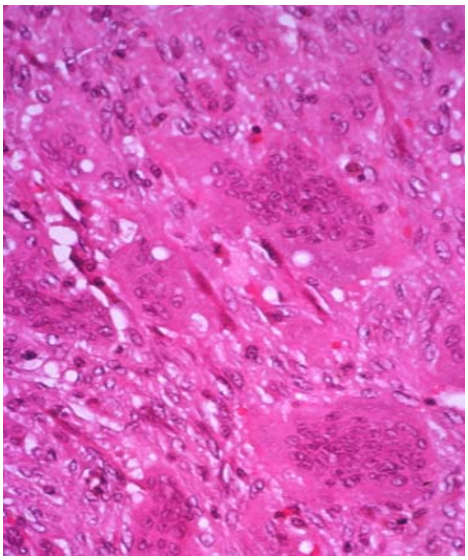
Epiphyseal

Expansile

Osteolytic

No periosteal reaction

No sclerosis



10% malignancy on irradiation at 10 yr

Pathology

Mononuclear with round to ovoid shape, relatively large nuclei with inconspicuous nucleoli

Multinucleated giant cells

Giant cells: is formed from fusion of spindle cells

Resemble osteoclast in phenotype and function

60 u; numerous centrally located nuclei

Mononuclear cells: 2 different cell lines

I: Mononuclear round cells are non-neoplastic and express monocyte Macrophage markers react to CD13 and 68

II: Mononuclear spindle cells are responsible for neoplastic character for GCT

Genetically unstable

Treatment

Curettage and Liquid nitrogen, phenol or bone cement

When there is fracture or recurrence: En bloc resection

Rarely lung metastases [2% and usually are benign]

Course

Benign	80%
Recurrence	30%
Malignancy	10%
Pulmonary metastases	2%