

# Musculoskeletal Block


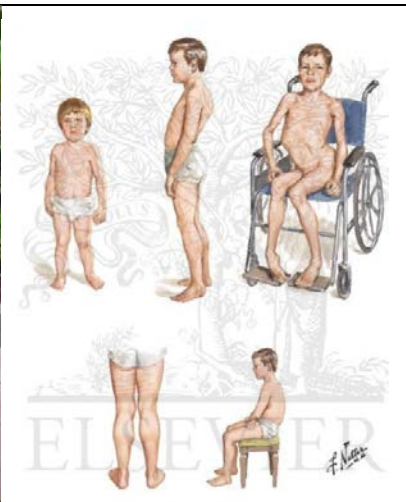
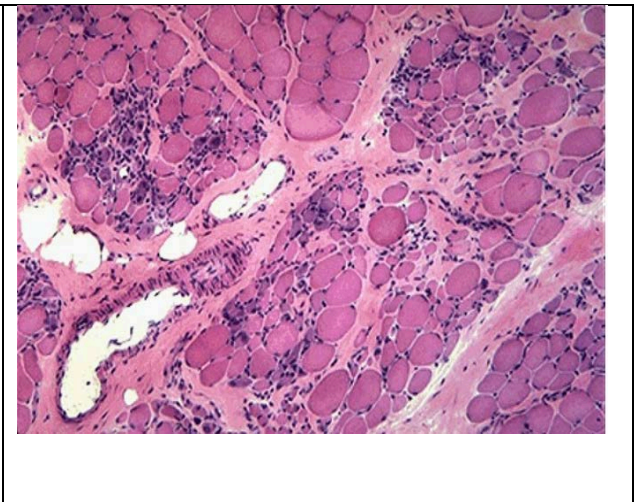
Pathology Practical

Pathology Team 436



# Case #1

## Duchenne Muscular Dystrophy (DMD)

 A photograph of a young boy with dark hair, wearing a grey t-shirt and khaki pants, sitting in a wheelchair. He is smiling and looking towards the camera. A small white card with the number '11' is pinned to his shirt.	 An illustration showing the progression of Duchenne Muscular Dystrophy in a boy. It depicts four stages: a young child walking, a slightly older child walking with a cane, a child in a wheelchair, and a child sitting on a small stool. The word 'ELLEVER' is written at the bottom.	 A histological micrograph of muscle tissue stained with hematoxylin and eosin (H&E). The image shows muscle fibers with varying sizes and increased endomysial connective tissue. Some fibers show a blue tint, indicating regenerating fibers.
<ul style="list-style-type: none"><li>● Gross picture :</li><li>● Difficulty in walking</li><li>● Poor balance</li><li>● Frequent falls</li></ul>	<ul style="list-style-type: none"><li>● Microscopic picture :</li><li>● Variation in muscle fiber size.</li><li>● Increased endomysial connective tissue.</li><li>● Regenerating fibers (blue tint)</li></ul>	

In **DMD** : Dystrophin, an intracellular protein, forms an interface between the cytoskeletal proteins and a group of transmembrane proteins.

### Case :

A 3 - year- old boy presented to his paediatrician with complaint of his parents from difficulty in walking , poor balance , and frequent falls.

#### Laboratory investigation:

Elevated "Creatine kinase" .

#### Muscle biopsy:

Absence of dystrophin by western blot analysis. " **What is your provisional**

diagnosis?"

## #Case2 Dermatomyositis

A 52-year-old woman presents with 6-month history of progressive muscle weakness and a skin rash.

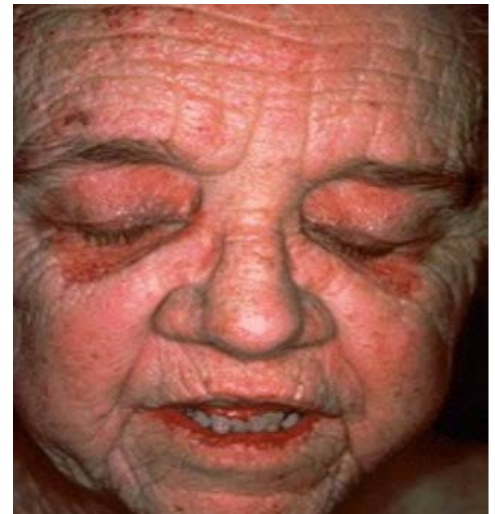
Physical examination is remarkable for a diffuse purple/red discoloration of the skin over her cheeks, nose, and eyelids. Examination confirms proximal muscle weakness.

Laboratory findings show an increase in creatine kinase (10 times the normal).

(it's an autoimmune disease)

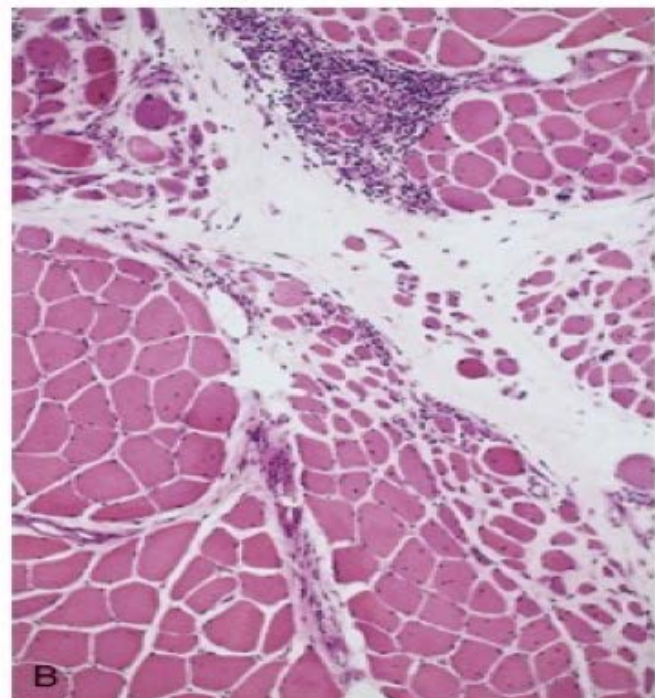
### Gross Picture :

- 1-Serological test that is usually abnormal , are high CK (creatine kinase) and increased anti nuclear antibodies (ANA).
- 2-Clinically: Purple/red colored discoloration mainly around eyelids.
- 3-Can be associated with internal malignancies including a primary in lung ,ovary and stomach.

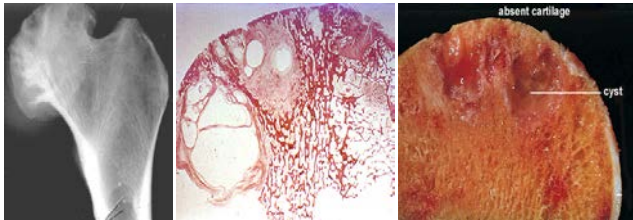


### Microscopically: (very important)

- 1-Perifascicular (around the vesicle) atrophy of muscle fibers.
- 2-Chronic inflammation.



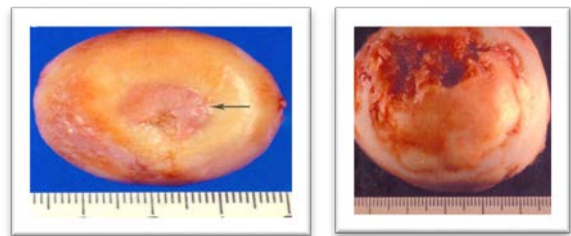
#Case 3  
NON INFECTIOUS ARTHRITIS : Osteoarthritis



Microscopic picture:

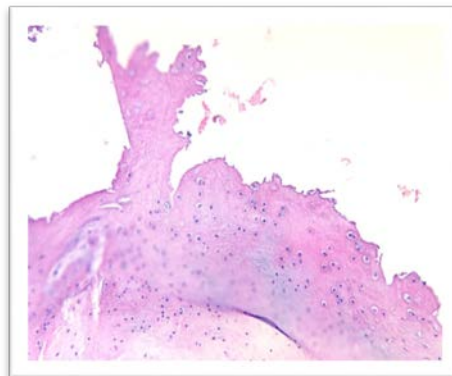
- Osteoarthritis is a degenerative disorder.
- Treatment: joint replacement
- Arthritis is inflammation in joints

*Osteoarthritis - Gross*



- 1) Progressive erosion of articular cartilage.
- 2) eburnated articular surface.
- 3) Subchondral cyst.
- 4) residual articular cartilage.

Case : An obese 56-year-old woman presented with bilateral localized pain to her knees, hands and difficulty in walking .



Osteoarthritis - LPF Histologic description

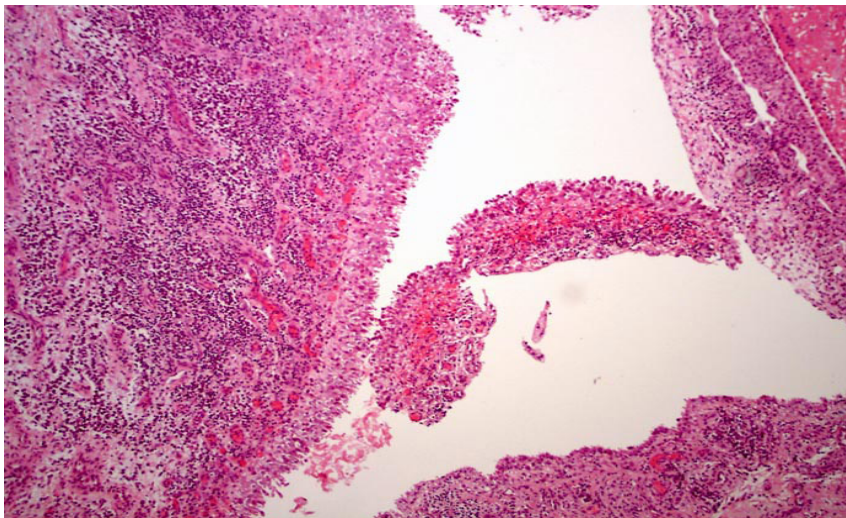
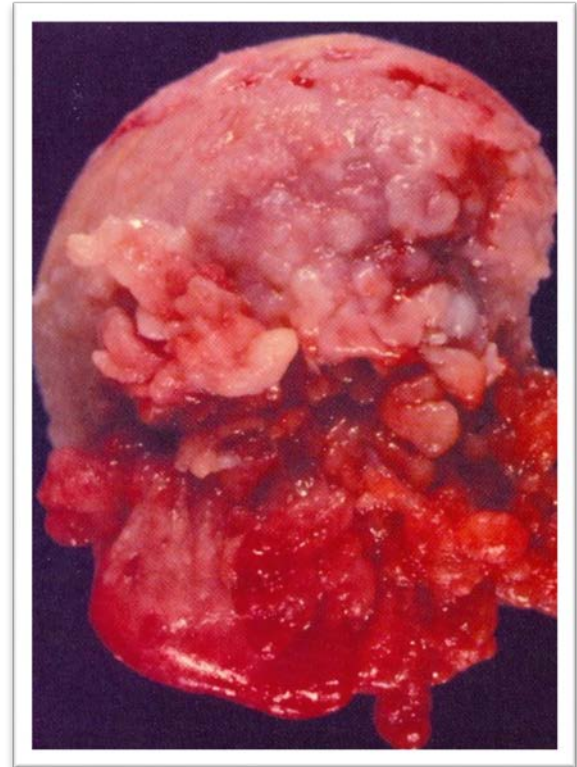
- 1) bony outgrowths (osteophyte) Mushroom-shaped at the margins of the cartilage .
- 2) Absence of inflammation



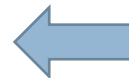
## #Case4 Rheumatoid Arthritis :

A 45 year old woman complains of low grade fever , Malaise and stiffness in her joint every morning .

- **Gross picture :**
- Affecting the head of the femur.
- The synovium becomes edematous, thickened and hyperplastic and transforming its smooth contour to one covered by delicate and bulbous fronds .
- **Serological tests which are somewhat specific for this disease :**
  - 1- Rheumatoid factor (RF)
  - 2- Antibodies to citrullinated peptides in the serum .
  - 3- C-Reactive protein (CRP) and ESR (Non specific)

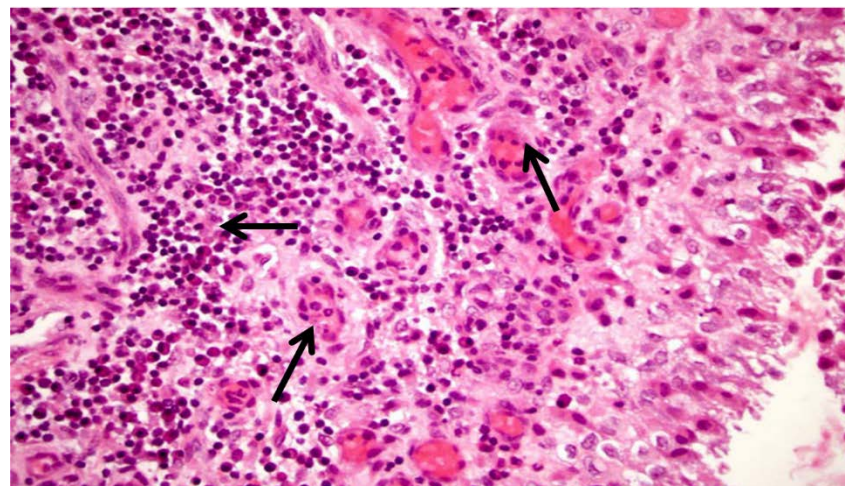


**Hyperplastic Synovium - LPF**  
*Hyperplastic synovial lining with villous like projections*



**Hyperplastic Synovium - HPF**

*Hyperplastic synovium with underlying plasma cells and lymphocytes including many congested blood vessels in Rheumatoid arthritis .*



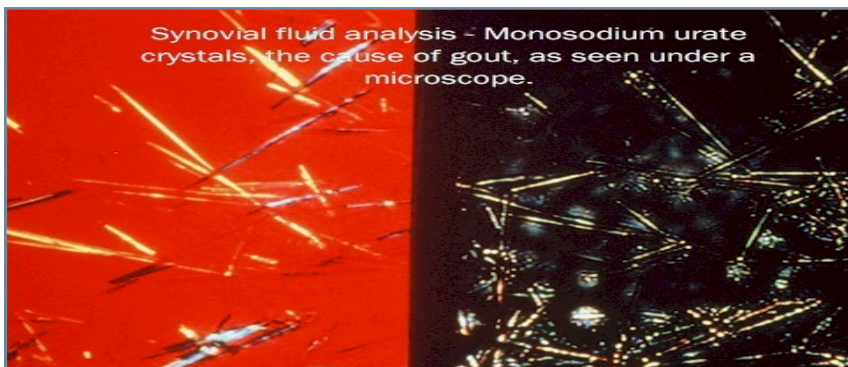
## #Case4 part2 , Gout

Gout is a syndrome caused by the inflammatory response to tissue deposition of monosodium urate crystals (MSU).

Gross picture :



- 1- Severe gout in the fingers resulting in large, hard deposits of crystals of uric acid.
- 2- These deposits are called Tophi (توفي)
- 3- secondary inflammation.
- 4- Swelling, Redness and oedema.



polarized  
microscopy

- 1- Needle-shaped monosodium uric acid crystals.
- 2- acutely inflamed joint.

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Gouty Arthritis can be secondary to

- 1- Leukaemia
- 2- Chronic renal diseases
- 3- post chemotherapy
- 4- drugs like thiazide diuretics.

Syndrome which is responsible for the inherited form of gouty arthritis is:



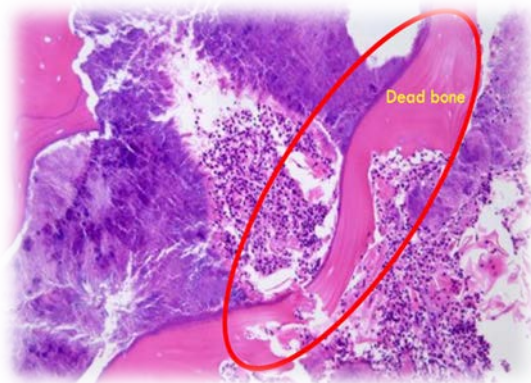
Lesh-Nyhan ( لیش یا نیهان ) syndrome due to lack of HGPRT( HuG PaRTy) enzyme.

### Osteomyelitis Case # 5

A 22- year- old male presented with localized pain above his right knee joint with recurrent fever. Later, he had a discharging sinuses from the skin overlying the right knee.

- What is the most likely diagnosis ?

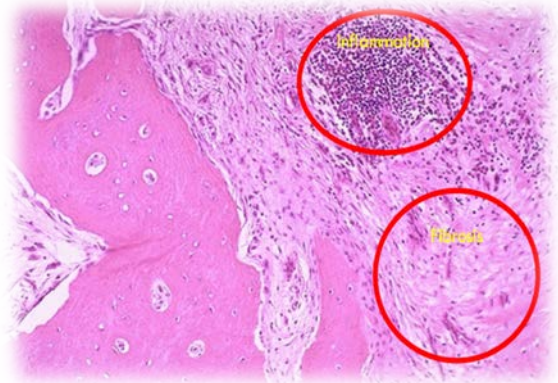
#### Acute Osteomyelitis –Lpf



Sequestrae surrounded by :

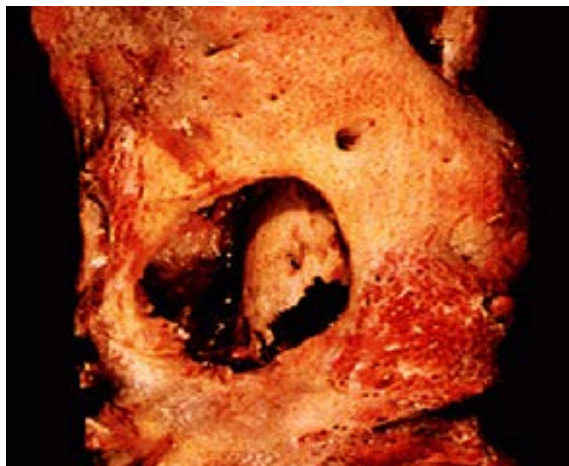
- 1-colonies of bacteria .
- 2-purulent infiltrate .

#### Chronic Osteomyelitis-Lpf



Sequestrae surrounded by :

- 1-Fibrosis of the marrow space .
- 2-Chronic inflammatory cells .
- 3-bone destruction with remodeling .

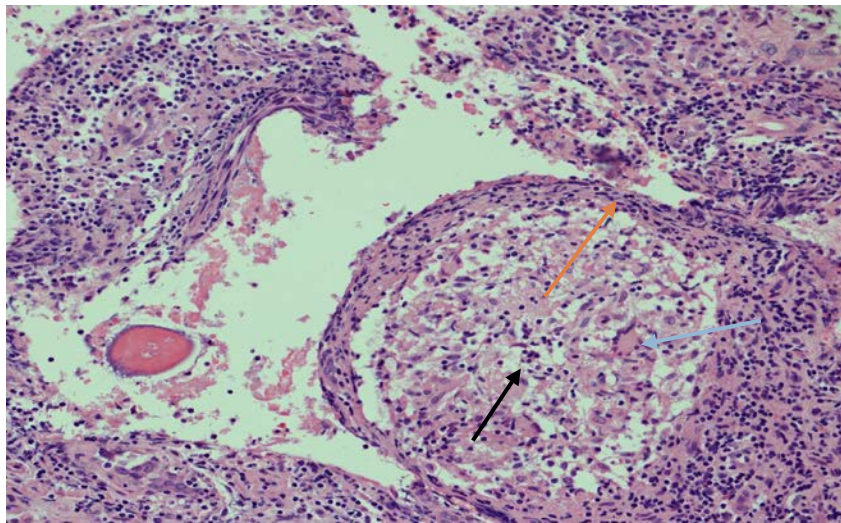


The drainage tract in the subosteal shell of viable new bone (**involucrum**) reveals the inner native necrotic cortex (**sequestrum**)  
**(sequestrum) = out**  
**involucrum = new**

- Bacterial most often
  - Staphylococcus
  - **Salmonella**
    - **Sickle Cell Disease**
  - Tuberculosis
    - Spine first

## #case 6 Tuberculous arthritis

- CASE: A 30 -year-old debilitated man presented to the orthopedic clinic with increasing swelling and pain in right knee joint, low grade fever, marked elevation of sedimentation rate. The patient has history of coughing up blood , fever , chills , night sweats , weight loss , pallor and often tendency to fatigue very easily . “the biopsy is taken from the synovium” .



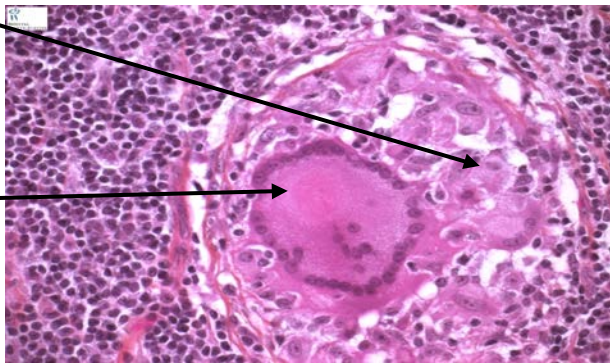
It shows granuloma formation with epithelioid like cells , langhans-type giant cells , and rim of lymphocytes .

Rim of lymphocytes

Langhans cell

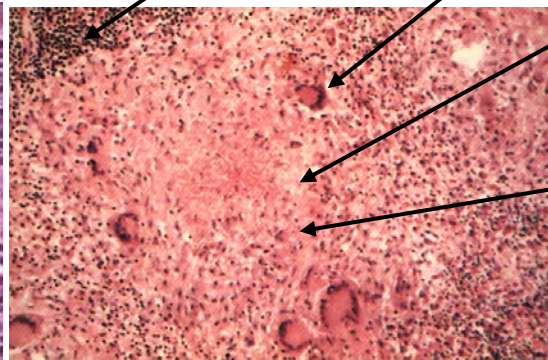
Foreign body type giant cell

Langhans-type giant cell



Caseous necrosis

Epithelioid macrophage



- *Epithelioid cells fuse to form giant cells containing 20 or more nuclei. The nuclei arranged either peripherally (Langhans-type giant cell) or haphazardly (foreign body-type giant cell). These giant cells can be found either at the periphery or the center of the granuloma.*

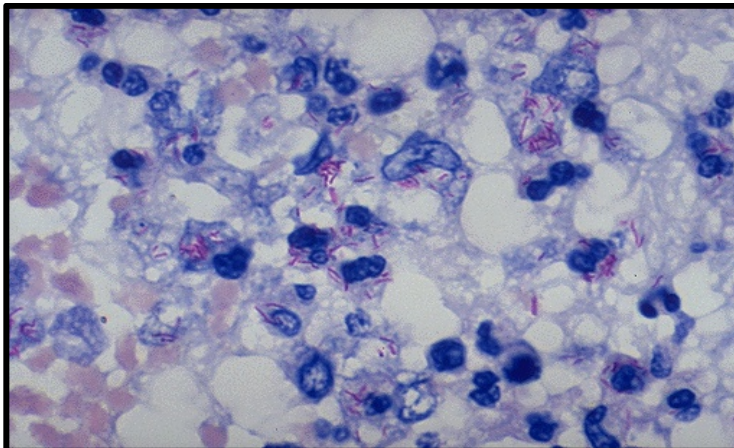
*Section of bone shows granuloma formation with epithelioid like cells , langhans-type giant cells and rim of lymphocytes*



**Gross pathology of T.B  
Osteomyelitis  
of the vertebral Column (Pott's  
Disease)**



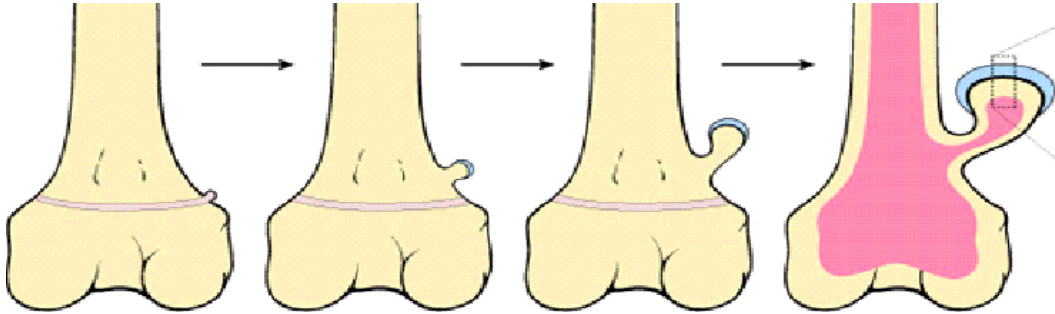
Granulomatous necrosis of vertebral column .



**A stain for Acid Fast Bacilli (AFB stain) also called Zeil Nelson stain is done to find the mycobacteria . The mycobacteria stain as red rods, as seen here at high magnification. Molecular test → PCR (Polymerase chain reaction) is also done for acid fast bacilli**

## #Case7 Bone tumors “Chondroma” -OsteoChondroma Exostosis-

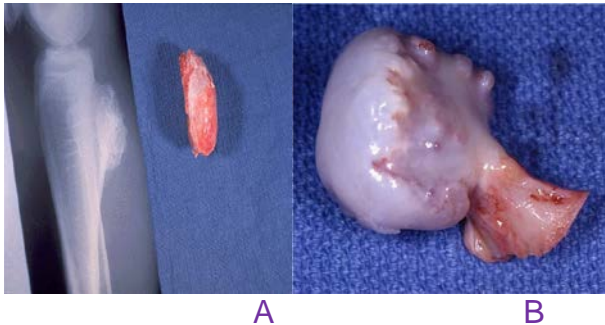
gross Picture :



- The solitary osteochondroma is the most common benign bone tumors
- Seen in patients aged from 10-30 years
- Arise during skeletal growth
- Equally in males and females
- Etiology is unknown

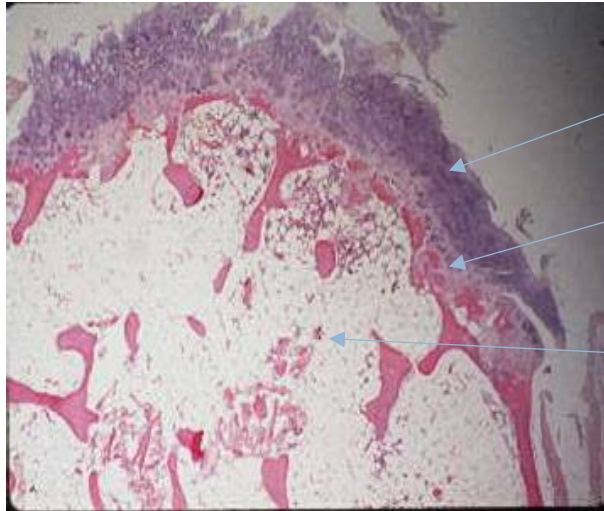
case:

A 16 -year-old male was found to have a small swelling protruding from upper part of his leg with local pain .



**Gross & X-ray :**

1. Most are solitary (**both A and B**)
2. Incidental lesions that may be excised if they cause local pain. (**A**)
3. Osteocartilagenous protrusion arising from the upper tibial bone (**X-ray**)
4. one stalk and overlying membrane on cartilage cap. (**B**)



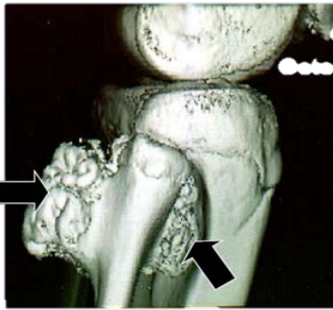
Fibrous cap

Cartilaginous layer

bone

The microscopic appearance:

- 1- Benign cartilaginous cap in the 1<sup>st</sup> layer.
- 2- Bony Cortex in the lower left side .



Prognosis is excellent

Possible complication : -  
Chondrosarcoma may occur if  
these lesions are multiple

**MRI picture showing :**

two osteochondromatous  
exostosis which are arising from  
the upper third of fibula .



## Case #8

- An 18-year-old female presented to the rheumatology clinic with 2 months history of pain and swelling in her upper thigh with weight loss.

## Osteosarcoma of the upper end of the tibia



The *tan-white tumor* fills most of the medullary cavity of the metaphysis and proximal diaphysis.

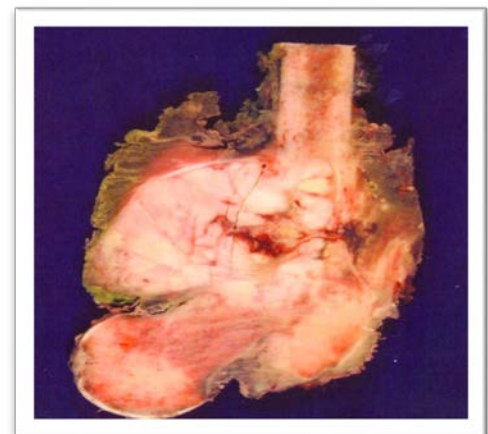
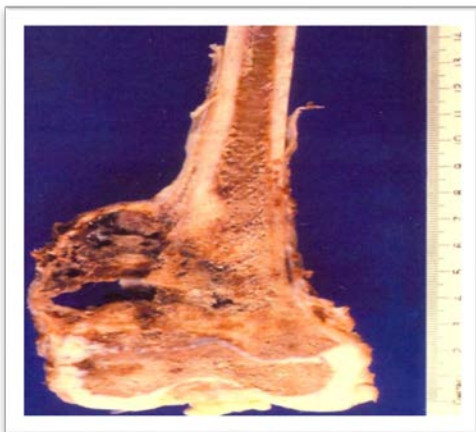
It has infiltrated through the cortex, lifted the periosteum, and formed soft tissue masses on both sides of the bone.

### Malignant tumor:

1. Necrosis
2. Intramedullary irregular bone .
3. Inflated cortex.
4. Metaphysis and epiphysis of tibia.

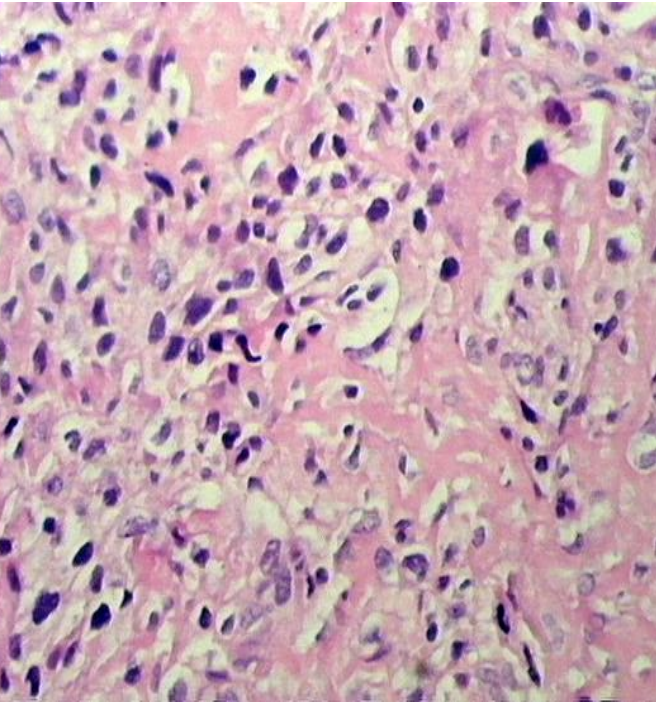
- Malignant tumor of mesenchymal origin
- 2<sup>nd</sup> most common primary bone tumor
- *RB gene mutation is seen in 60% of these cases.*
- *In elderly patient, paget's disease and previous radiation exposure are predisposing factors.*
- *Classical radiological feature seen is CODMAN triangle*

## Conventional Osteosarcoma - Gross



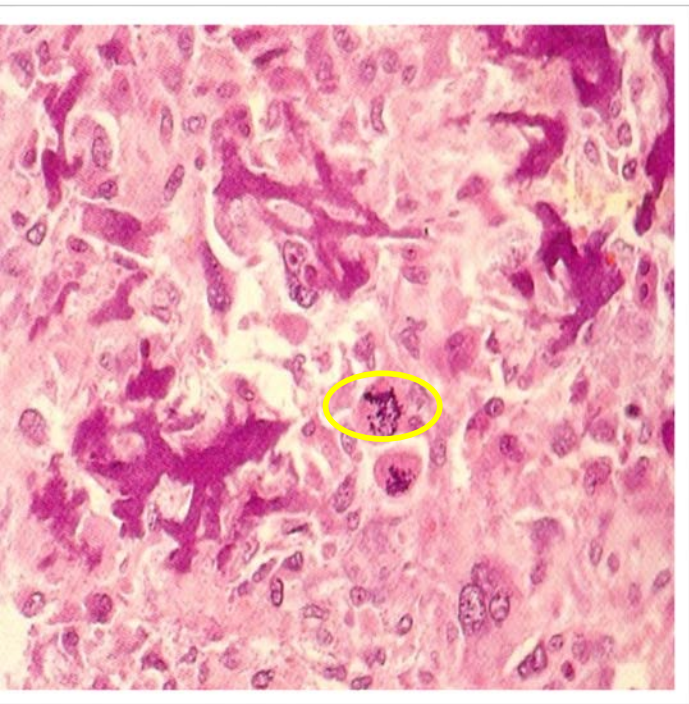
1. *Mixture of osteoid, fibrous, cartilaginous, necrotic, hemorrhagic, cystic areas*

## ***Osteosarcoma - LPF***



1. ***Pleomorphic and hyperchromatic nuclei of malignant cells.***
2. ***Osteoid formation by the tumor cells.***

## ***Osteosarcoma - HPF***



1. ***Malignant osteoid producing Spindle cells, giant cells.***
2. ***Abnormal Mitosis***
3. ***Prominent nuclei.***

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Thank you

