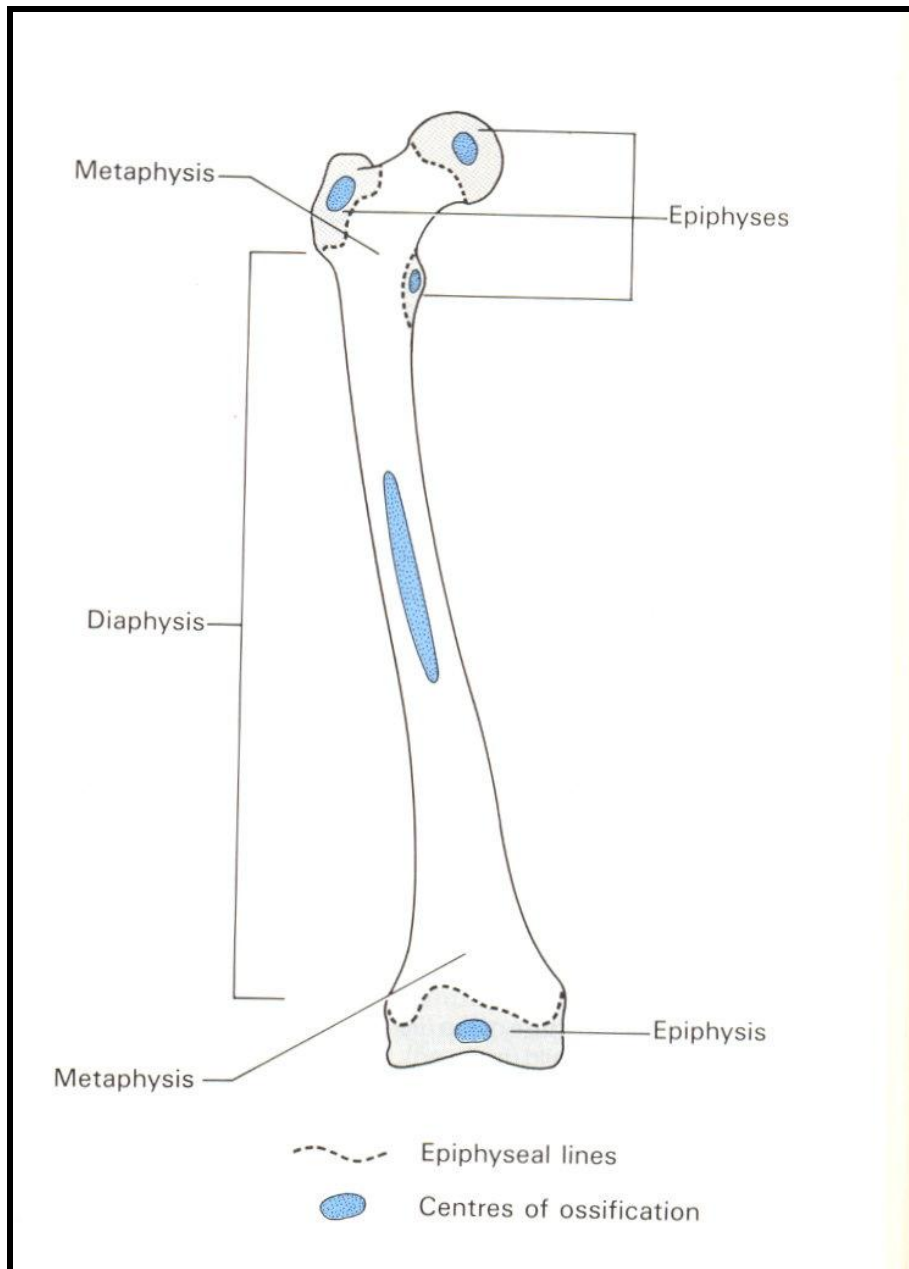


Musculoskeletal block

Pathology Practical



Overall structure of long bones

It is important to know the structures of bones. There are common cancers that affect bones in certain sites and depending on the person's age.

Case one

- ▶ A 22 years 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 ?

Osteomyelitis

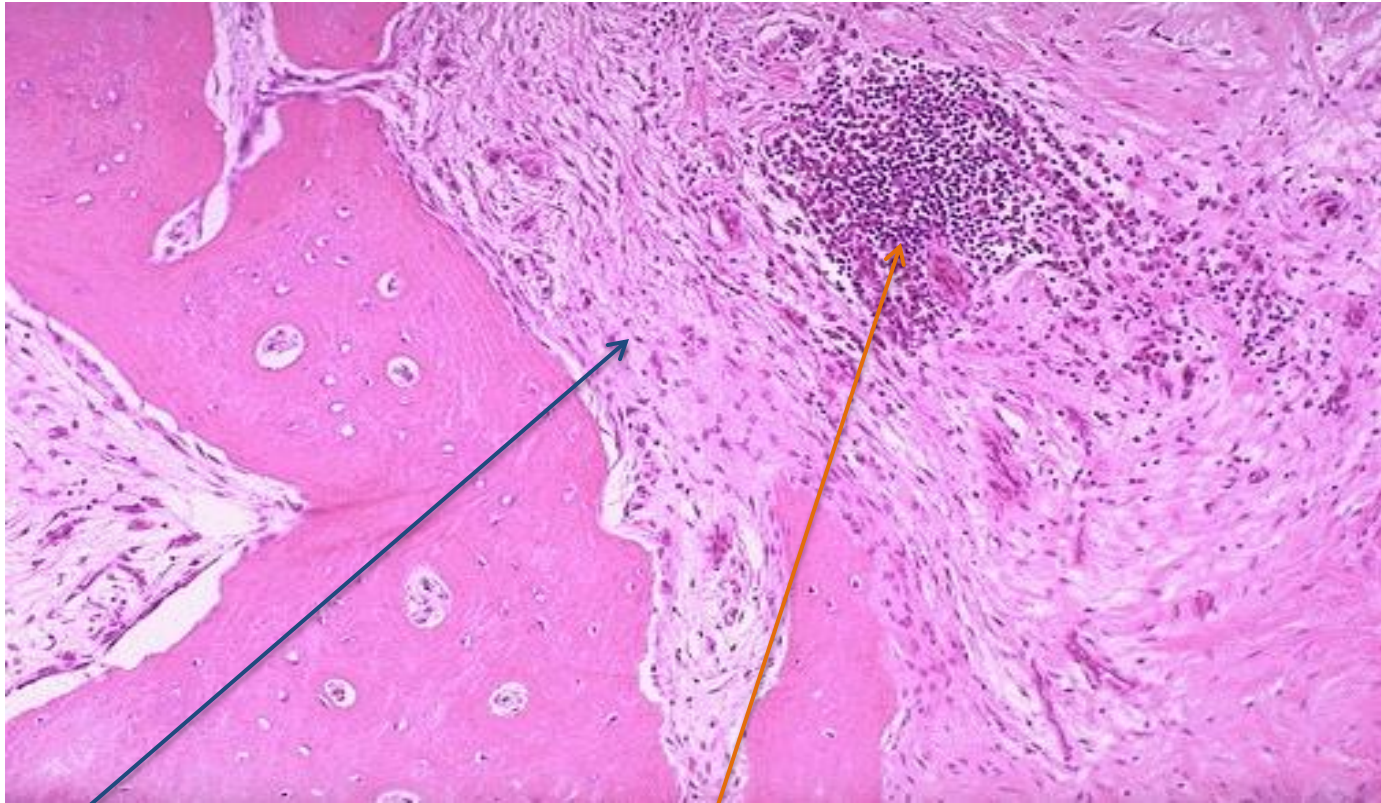
Gross



- ▶ Involucrum: the viable new bone.
- ▶ Sequestrum: the old inner necrotic bone.



Microscopic



Fibrosis in the bone marrow spaces and infiltration of chronic inflammatory cells, lymphocytes. Bone destruction may be seen as necrosis.

Note: osteomyelitis is very difficult to treat.



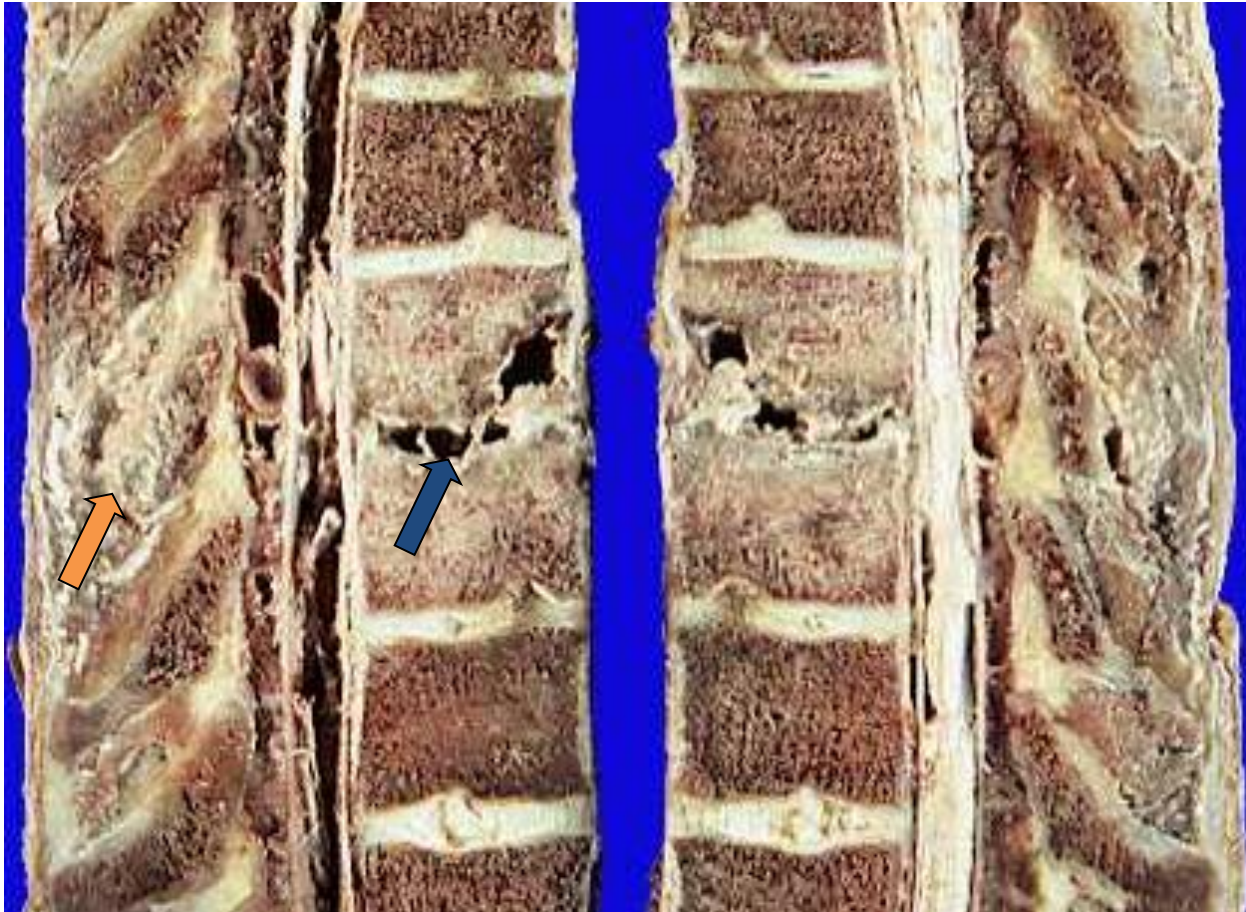
Case two

- ▶ A 35 years old debilitated man presented to the orthopedic clinic with back pain, low grade fever, marked elevation of sedimentation rate and recent kyphosis and scoliosis.
- ▶ The patient has a history of coughing up blood, fever, chills, night sweats, weight loss, pallor, and often a tendency to fatigue very easily.

Potts Disease
(Tuberculous
osteomyelitis)



Gross

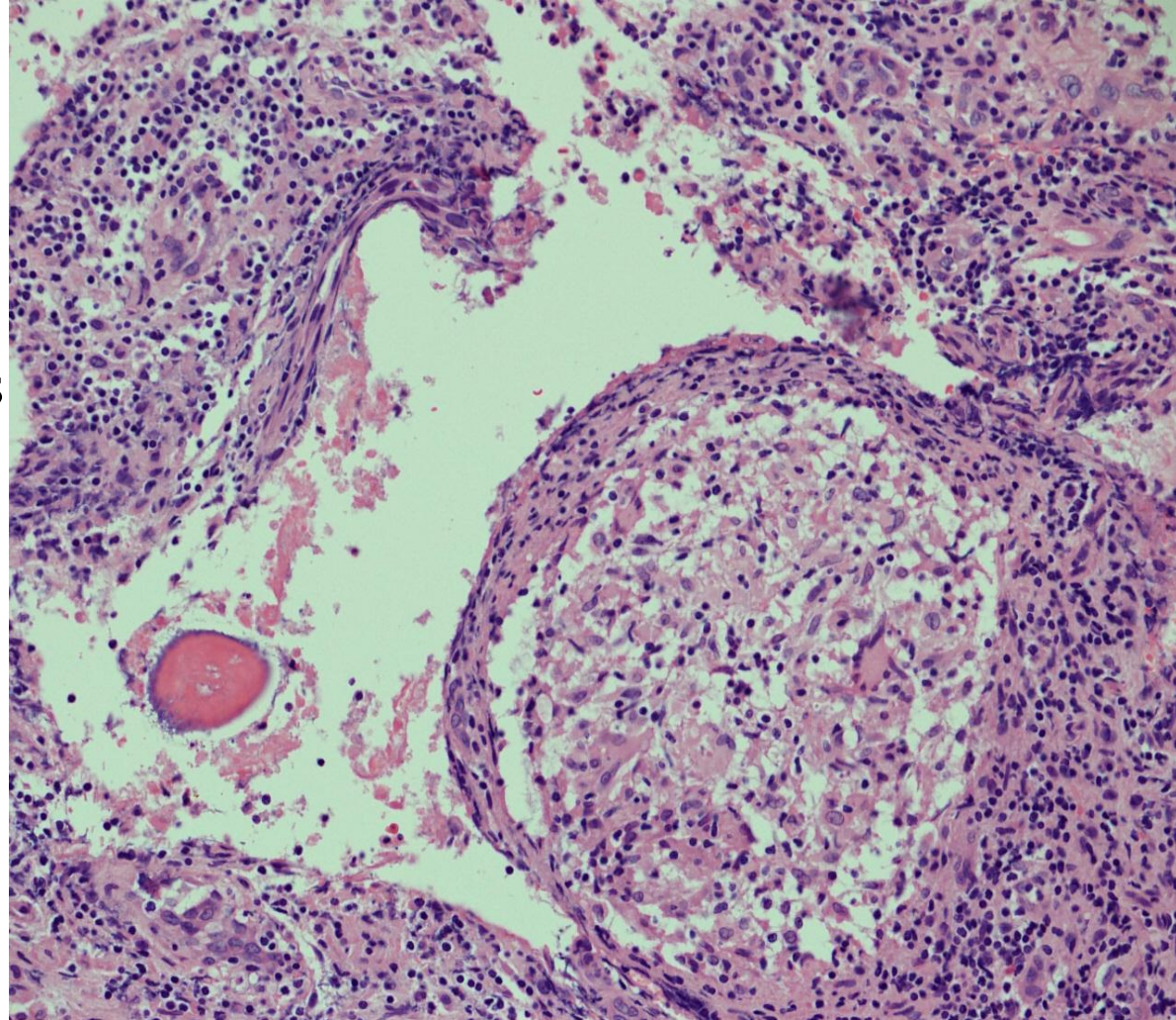


- ▶ Fracture of vertebrae and **caseation** in surrounding tissue.
-



Microscopic Granuloma Formation

- ▶ Epithelioid macrophages (histiocytes).
- ▶ Langhan's giant cell.
- ▶ Rim of lymphocytes.



Some additional information related to case no.2 :

- ▶ T.B and cancer cause marked elevation of E.S.R (Erythrocytes Sedimentation Rate).
- ▶ Hemoptysis = Coughing with blood.
- ▶ Hematemesis = Vomiting with blood.
- ▶ In pott's disease, pathological fracture occurs with cheesy white material.
- ▶ T.B can affect any organ in the body.
- ▶ Secondary T.B is characterized by cavitary necrosis.

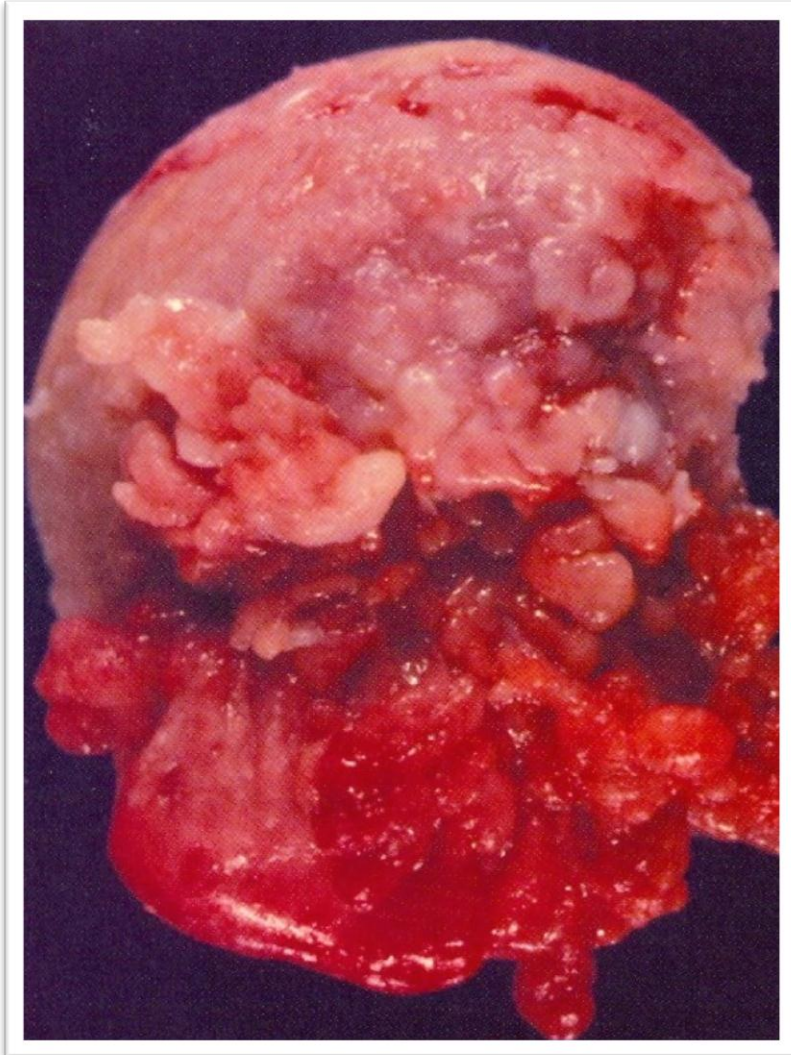


Case three

- ▶ A 40 years old woman complains of low grade fever, malaise and stiffness in her joints each morning.

Rheumatoid
arthritis

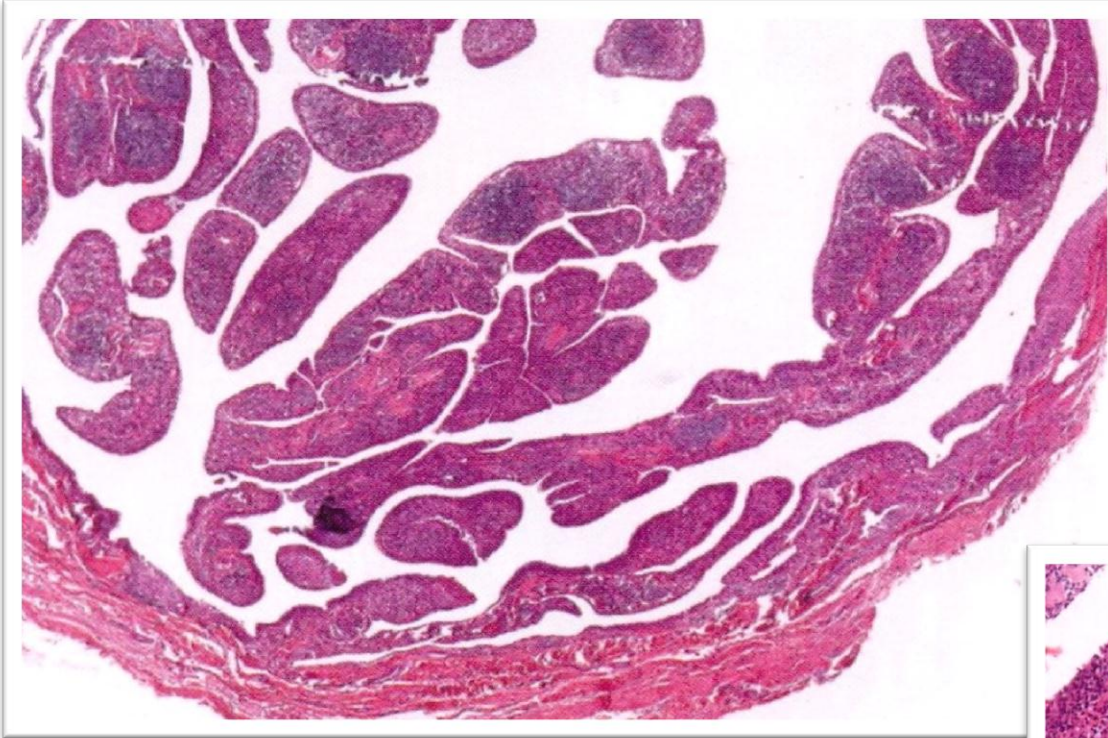
Gross



- ▶ Site: head of the femur. (**Synovial tissue**).
- ▶ Synovium is edematous, thickened by inflammation, and hyperplastic.
- ▶ It's normally smooth surface is now covered with delicate and bulbous fronds (finger-like projections).

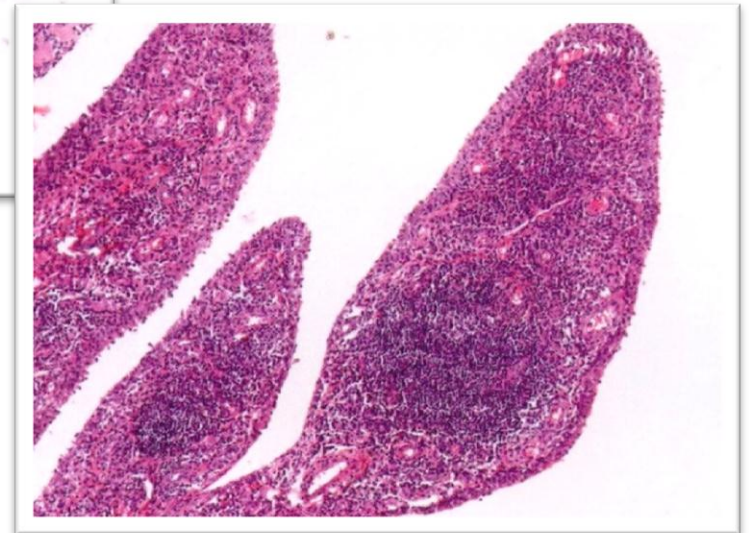


Microscopic



- ▶ Synovial hypertrophy forming finger-like projections, villi.

- ▶ Villi are filled with inflammatory cell, lymphocytes.



Case four

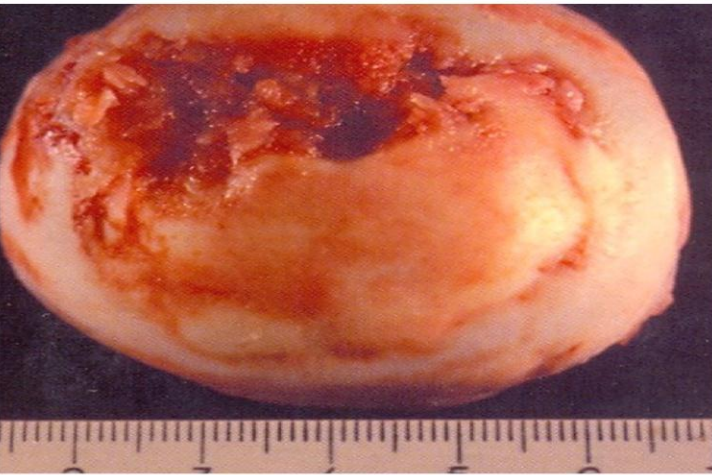
- ▶ An obese 56 years old woman presented with bilateral localized pain to her knees, hands and difficulty in walking.
- ▶ Predisposing risks:
Old age, obesity, diabetes, joint deformities, previous joint injuries

Osteoarthritis

Gross : Hyaline cartilage.



- ▶ Erosion of articular cartilage.
- ▶ It's destruction in certain areas causes the eburnation of the articular surface of the bone (becomes abnormally visible).
- ▶ Also, this leads to the formation of subchondral cysts. (breaks in articular cartilage > leaking of synovial fluid > it's accumulation in the cyst)



Microscopic

- ▶ Development of bony mushroom-shaped outgrowths called **osteophytes**, which are capped by fibrocartilage and hyaline cartilage that gradually ossify.



- ▶ With these projection, the smooth surface is lost.

- ▶ At later stages, cartilage surrounding the osteophytes break away, accumulating in the synovial cavity as loose bodies which obstruct movement.

- ▶ Absence of inflammation (as osteoarthritis progresses, inflammation can occur).

- ▶ **Splitting** within the articular cartilage.

Comparison between: (very important)

RHEUMATOID ARTHRITIS

- Autoimmune disease
- Morning stiffness
- Common in small joints
- In finger joints

OSTEOARTHRITIS

- Degenerative disease
- Stiffness occurs later in the afternoon
- Common in large weight-bearing joints
- In the knees



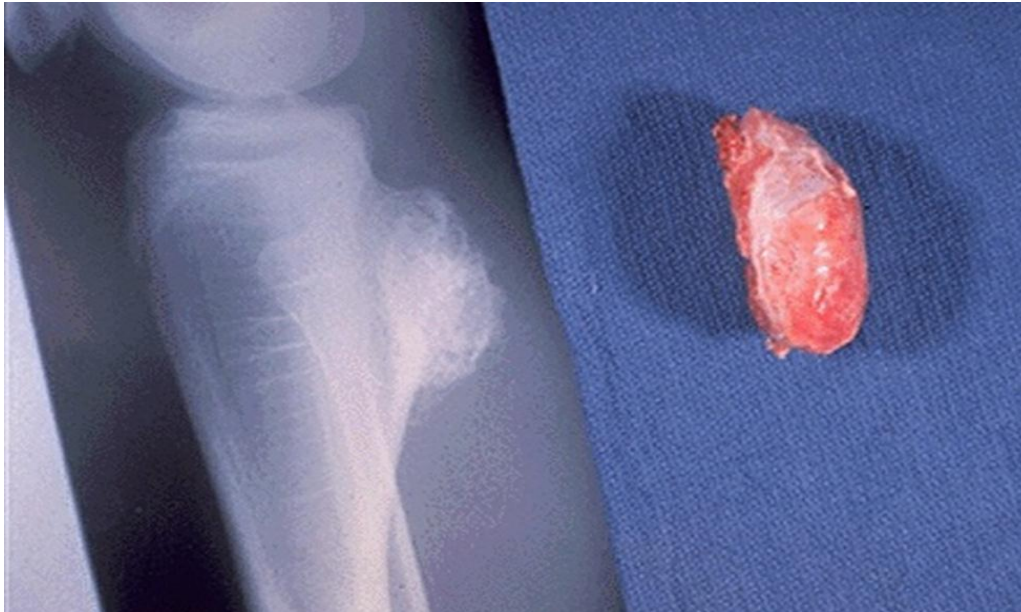
Case five

- ▶ A 16 years old male was found to have a small swelling protruding from upper part of his leg with local pain.
- ▶ Is a benign tumor with very rare incidence of malignant transformation.

Osteochondroma
(exostosis)

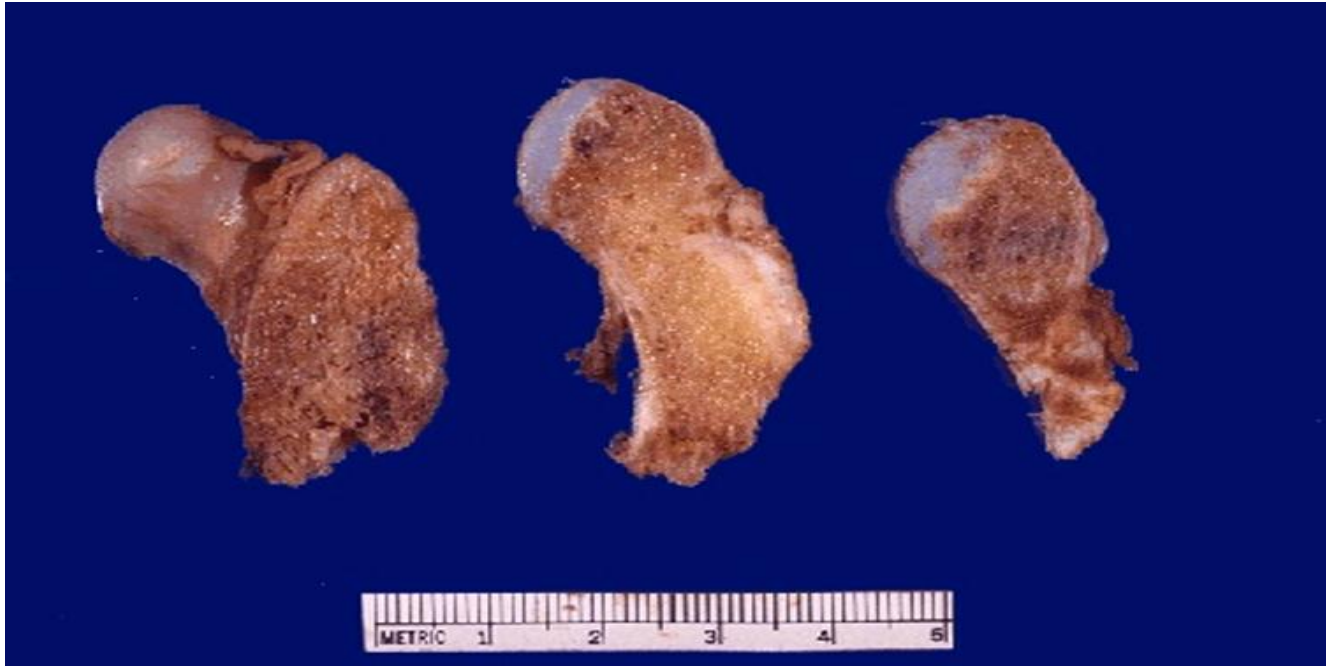


Gross



- ▶ Bony projection with a cartilage cap.
 - ▶ It's important to note that there is no invasion of the underlying tissue. (benign)
-
- ▶ Most are solitary. However there is a rare condition in which multiple osteochondroma lesions form resulting in bone deformity and increased susceptibility to developing chondrosarcoma.
 - ▶ Lesions may be excised if local pain exacerbates.
-

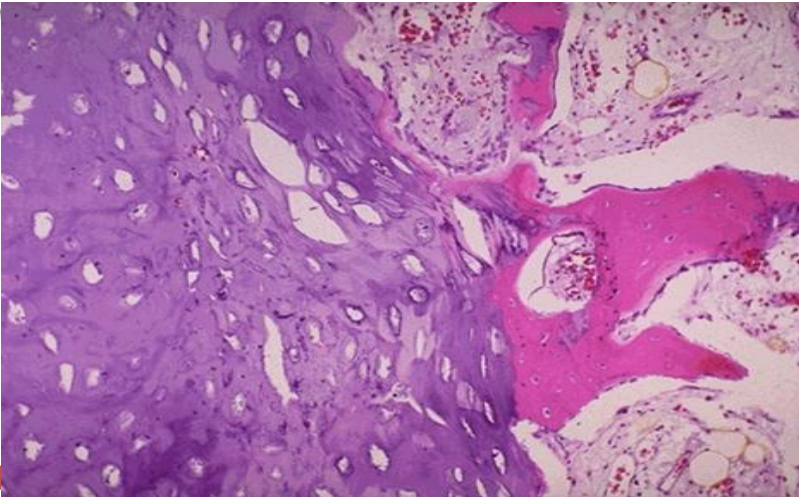
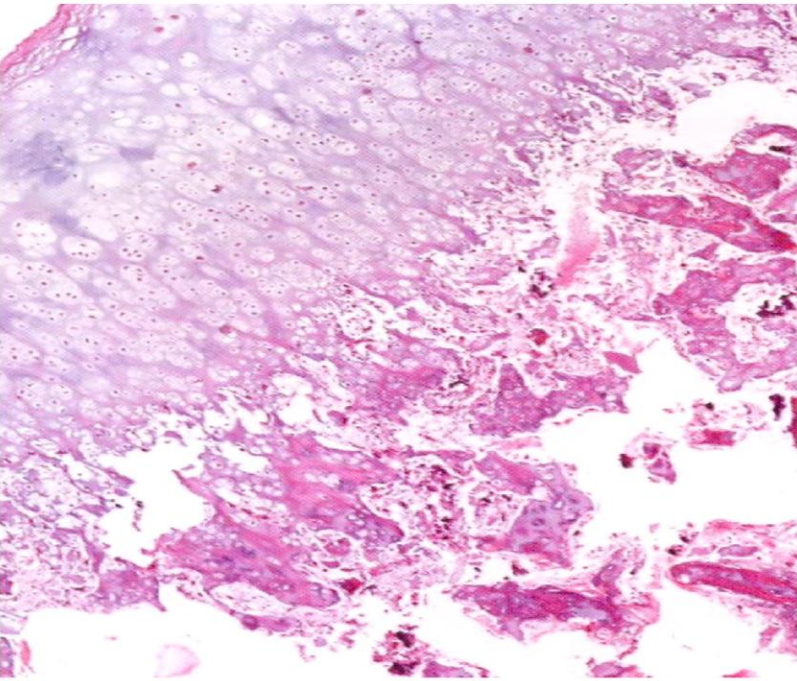




They extend outwards from the metaphysial region.



Microscopic



- ▶ We see bone bone and cartilage elements.
- ▶ Normal bony matrix with a (blue-ish) cartilaginous cap.
- ▶ May cause pain and irritation, requiring surgical removal.
- ▶ The thickness of the cap is important in diagnosis.

Case six

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

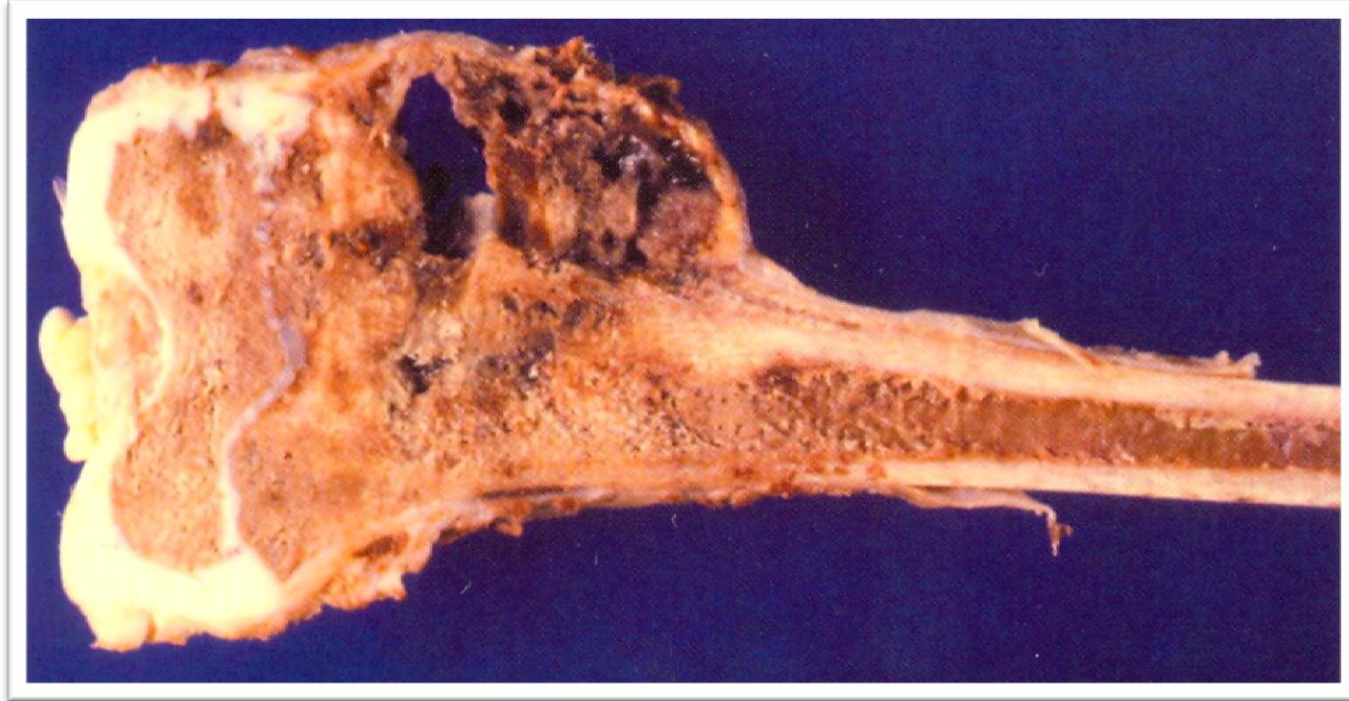
Osteosarcoma

Mostly affects the knee joint (60%) but can also include the hip and shoulder joints.

Osteosarcoma peaks at teen years and elderly.



Gross:

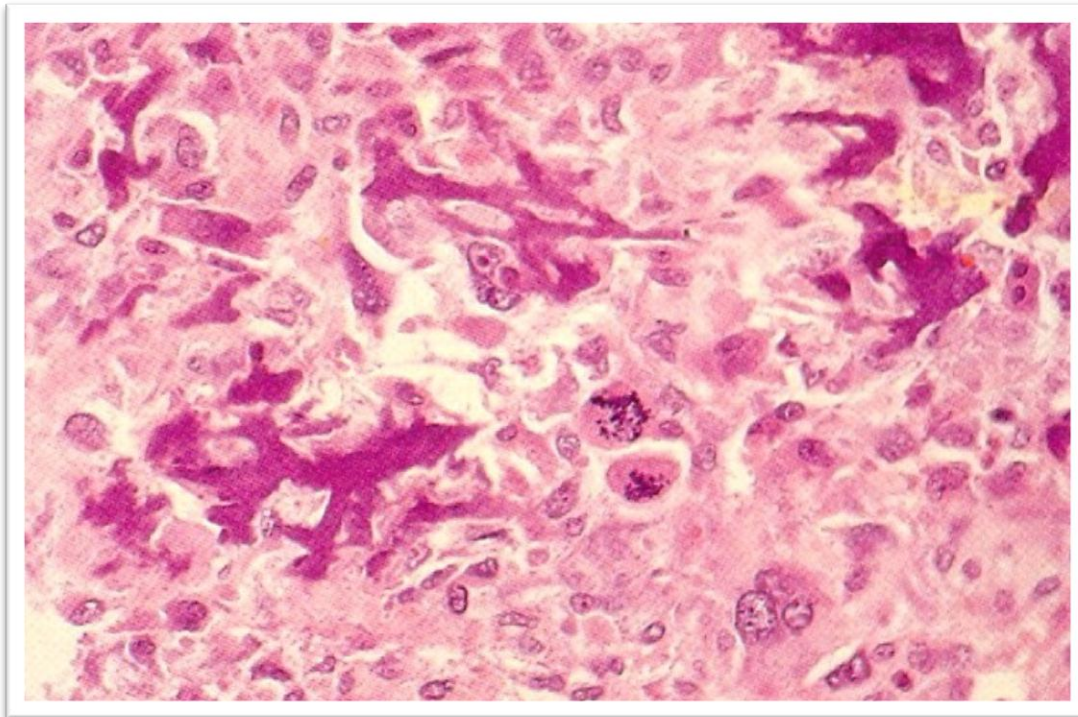


- ▶ To differentiate between osteosarcoma and osteochondroma
We look at the position of the periosteum. Since it is elevated but not affected in size itself we can interpret that the origin of the tumor is in the underlying bone. We also see areas of hemorrhage and necrosis.
-



Microscopic

- ▶ Production of osteoid matrix (eosinophilic red lace-like) by malignant cells, (not from the osteoblasts), they come from the stroma of the bone.



- ▶ Note the 4 malignancy characteristics:

1. Increased (abnormal) mitoses
2. Increased N/C ratio
3. Hyperchromasia
4. Pleomorphism

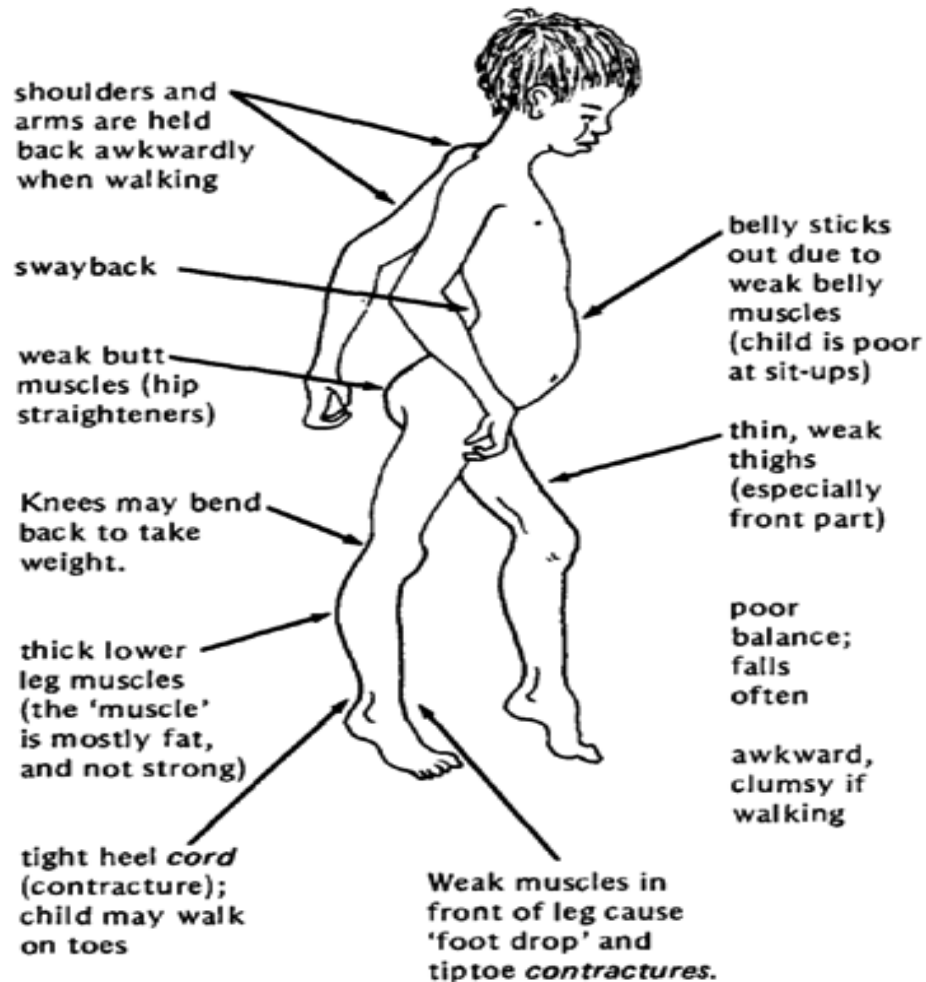


Case Seven

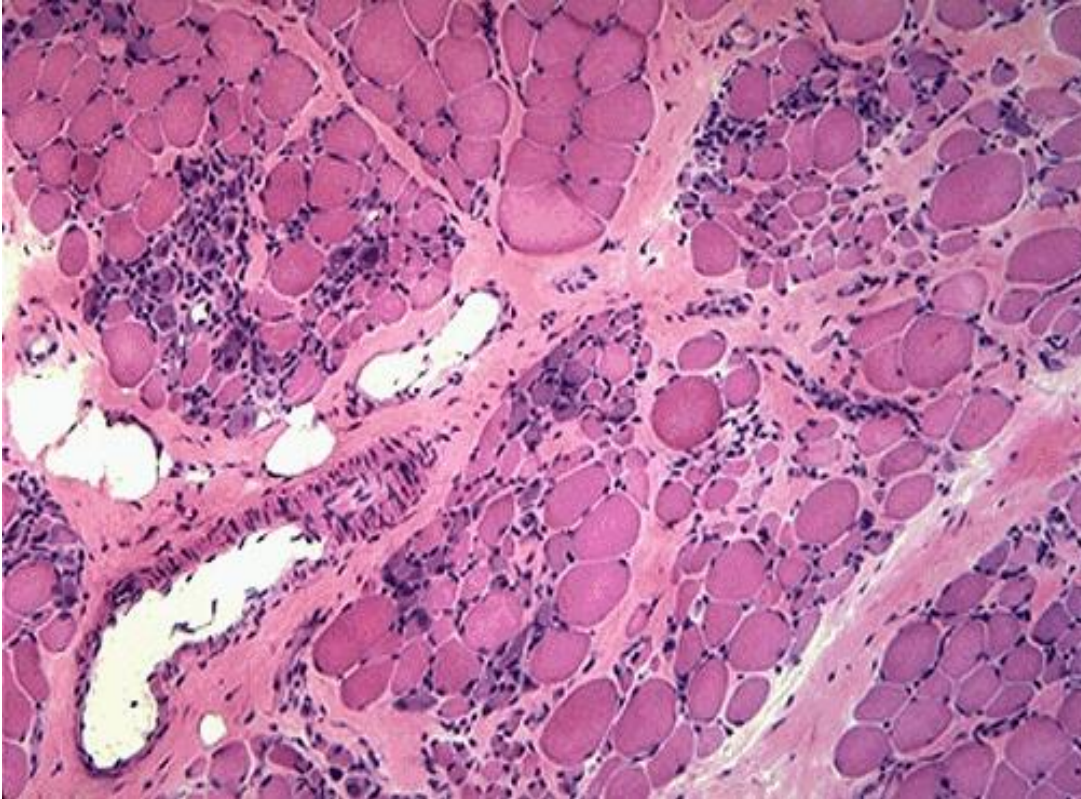
- ▶ A 3 years old boy presented to his pediatrician with complaint of his parents from difficulty in walking , poor balance , and frequent falls . Laboratory investigation shows elevated creatine kinase. Muscle biopsy show absence of dystrophin by western blot analysis.

Duchenne
muscular
dystrophy

Clinical presentation



Microscopic



- ▶ Variation in size of muscle fibers (Atrophy and hypertrophy)
- ▶ Degenerating muscle fibers
- ▶ Evident fibrosis
- ▶ Increase in C.T. endothelium



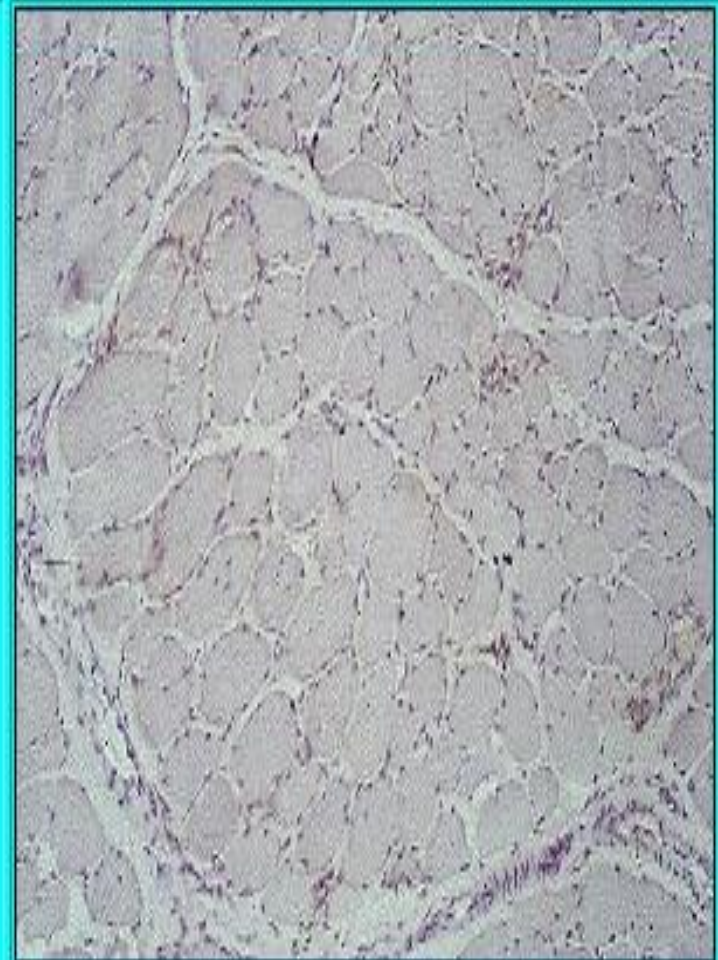
- ▶ Contact fibers

- ▶ Loosely attached due to increased fibrosis and CT

Normal



Abnormal



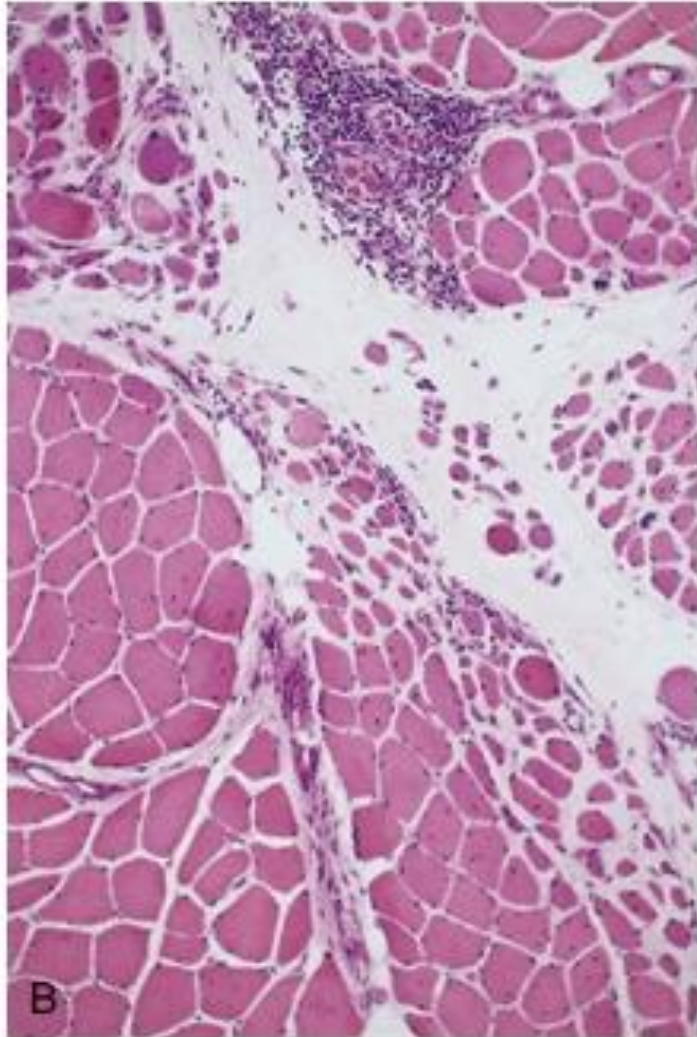
Case Eight

- ▶ 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).
- ▶ Patient usually have positive antinuclear antibody (ANA) and increased creatine kinase.

Dermatomyositis



Microscopic



- ▶ Inflammation
- ▶ Perifascicular atrophy of muscle fibers, meaning that the fibers in the periphery are affected while the fibers in the center remain normal



Good Luck
Everyone

