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**Module:** Musculoskeletal system (MSK)

**Session No.** 6

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# Pathology Of Joints

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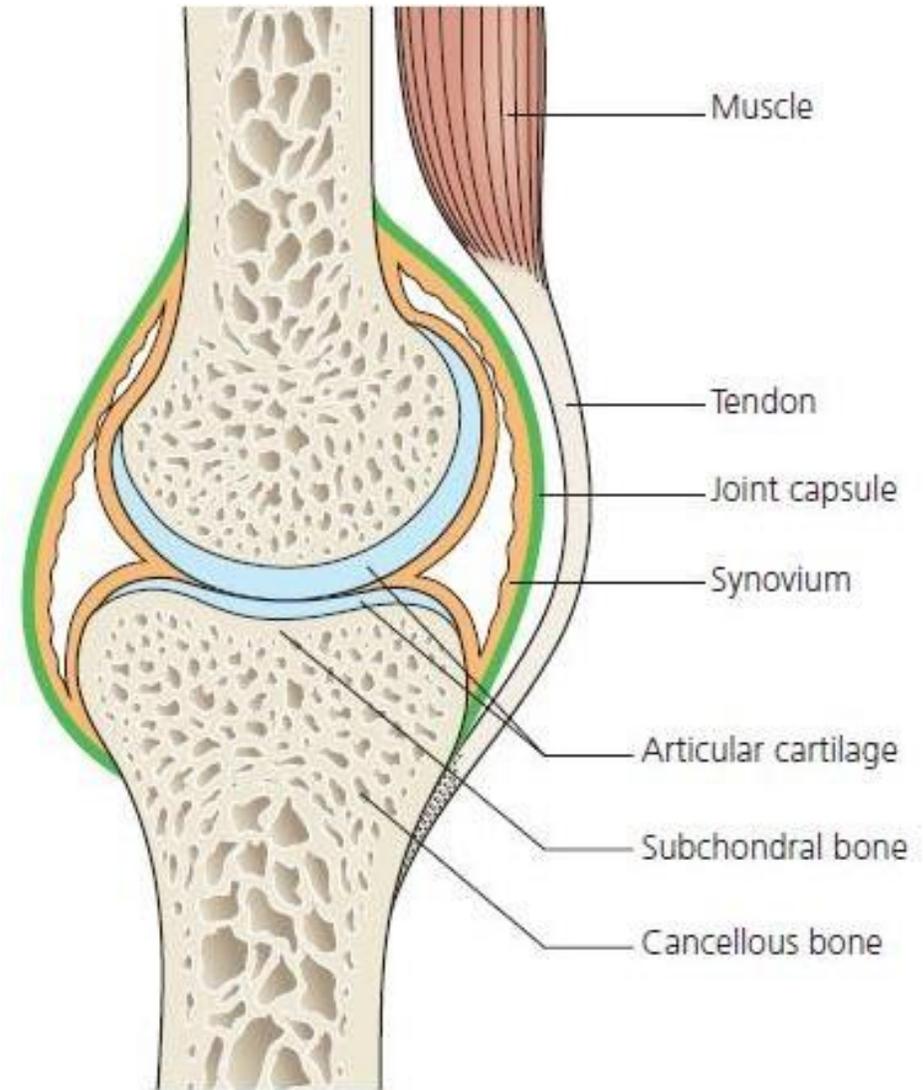
## Learning Objectives: ( L.O. 5 )

- Describe the structures in a normal synovial joint.
- Explain pathological processes of Osteoarthritis and Rheumatoid arthritis, including articular cartilage degeneration and changes in the subchondral bone, synovium and synovial fluid.
- Identify the clinical symptoms and signs of ***osteoarthritis*** and ***rheumatoid arthritis***, including radiological presentation.



# Synovial Joint

- Hyaline cartilage:
- Synovial membrane:
- Synovial fluid:
- Joint capsule:



# Hyaline cartilage:

- It covers bone ends in every diarthrodial joint.
- The function of this cartilage is:  
Shock absorption and transmit the load across the joint to the subchondral region.
- It is covered by a film of synovial fluid.



- Cartilage has **no blood supply**.
- Chondrocytes of **adult** hyaline cartilage have **little capacity** for cell **division**, direct damage to the articular surface is **poorly repaired**, or repaired only with fibrocartilage not by hyaline cartilage.

From where cartilage take its oxygen and nutrient?



# Synovium and synovial fluid:

- **The synovium** is a thin membrane lined the interior surface of the joint capsule. This membrane is richly supplied with blood vessels, lymphatics and nerves.
- The synovium produces synovial fluid
- This fluid **nourishes the avascular articular cartilage** and **reducing friction during movement** ( lubricant ).



- In normal life the volume of synovial fluid in any particular joint remains fairly constant.
- **Effusion** = Increase intra articular joint fluid, .....
- **Synovium is also the target tissue in joint infections and autoimmune disorders such as rheumatoid arthritis.**



# OSTEOARTHRITIS

- **Chronic** disorder of **synovial** joints in which there is **progressive** softening and disintegration of articular **cartilage** accompanied by:
  1. **New growth** of cartilage and bone at the joint margins (**osteophytes**),
  2. **Cyst** formation and
  3. **sclerosis** in the subchondral bone,
  4. **Capsular fibrosis**.
  5. **Narrowing** of joint space



## OSTEOARTHRITIS...

- The functional integrity of articular cartilage in a healthy joint is dependent upon organized synthesis of appropriate amounts of many cartilage matrix components by the chondrocytes.
- In a healthy state, there is a fine balance between synthesis and tissue breakdown with ongoing tissue turnover. When the balance of cartilage matrix synthesis and destruction is upset, there is loss of articular cartilage followed by a degenerative process.



## OSTEOARTHRITIS...

- Commonly affects *weight-bearing* joints such as the vertebral column, hips and knees.
- OA is *asymmetrically* distributed, it is *not systemic* disease (only joints involved)



# Causes of osteoarthritis

- Primary:
  - Genetic**
- Secondary: A common sequelae of many joint pathologies
  - **Trauma**
  - **Infection**
  - **Dysplasia**
  - **Inflammation**
- Risk factors increases chance of OA: **obesity , occupation.**



# Clinical symptoms and signs

## Symptoms:

- Pain: presenting symptom, widespread, It starts insidiously and increases slowly over months or years. It is aggravated by exertion and relieved by rest, although with time relief is less than complete.
- Stiffness.
- Swelling.
- Deformity.
- Loss of function.



## Signs of OA:

- Joint swelling.
- Muscle wasting.
- Deformity.
- Local tenderness.
- Limited movement.
- Crepitus.



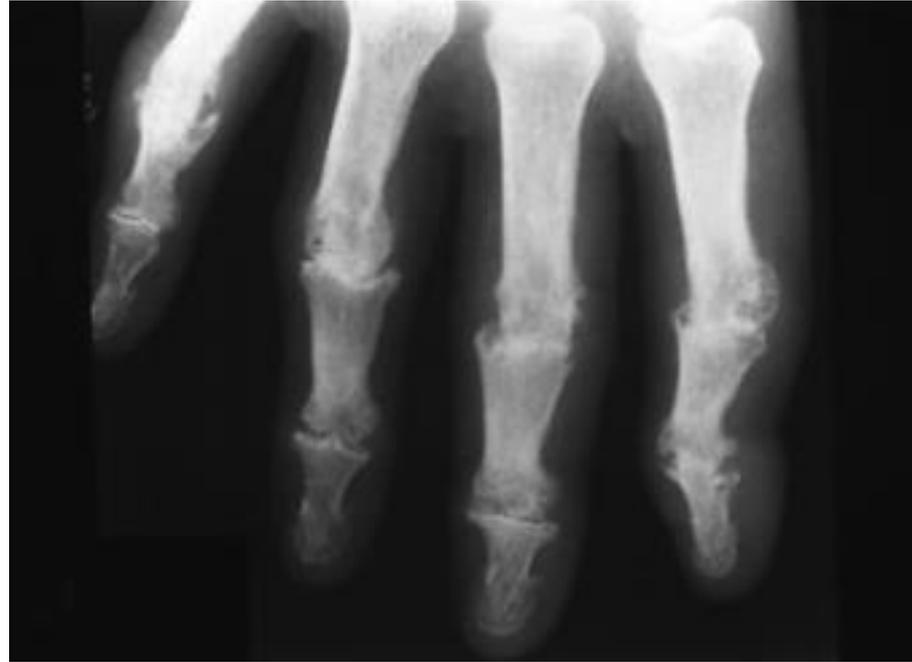
# Radiographic features of OA

1. Narrowing of the 'joint space'.
2. Subchondral sclerosis.
3. Marginal osteophytes.
4. Subchondral cysts.
5. Malalignment (deformity).





# QA of hip



# RHEUMATOID ARTHRITIS

- abnormal activation of *immune* system targeting the *synovial* membrane of joints (OA target articular cartilage).
- *Multi-system* disorder (not only affect the joints).
- Mainly affect *Small joints* synovitis (hands and feet) but also can affect hip, shoulder, knee and spine (OA affect large joints mainly).
- Tendon *tenosynovitis* and rupture.



# Symptoms:

- Typically female present with insidious onset of symmetrical morning stiffness and multiple joint pain ( mainly small joints of the hand , wrist and feet ).



# Signs:

- **Symmetrical swelling** and **tenderness** of the MCP joint, the PIP joint and the wrists with or without other joints.
- Feeling of thickening, tenderness and **crepitation** over the back of the wrist or the palm while passively moving the fingers. (**Tenosynovitis of tendon sheath**).
- Effusion of joints= increased synovial fluids.....swelling.
- **Deformity**
- Tendon rupture= **loss of some movements**.
- **Loss of function**



## ***Extra articular tissue involvement in Rheumatoid arthritis:***

- **RA is a systemic disease.**



- ***Rheumatoid nodules***
- ***Vasculitis***
- ***Visceral involvement*** ( lungs, heart, kidneys, gastrointestinal tract, are sometimes affected ).



# Specific Radiographic features of RA



**1. Peri-articular osteoporosis**



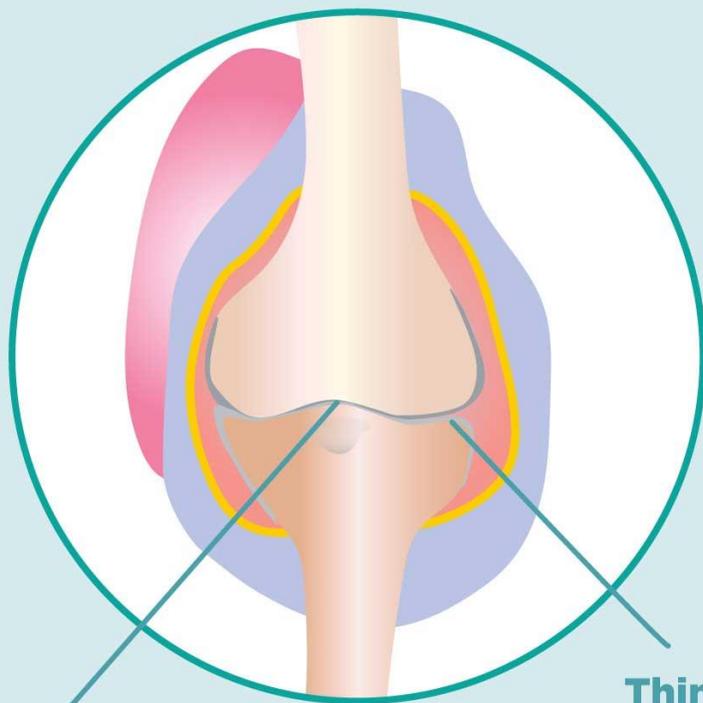
**2. Juxta-articular erosion**



**3. Joint instability and deformity**

# Osteoarthritis vs. Rheumatoid Arthritis in the Joint

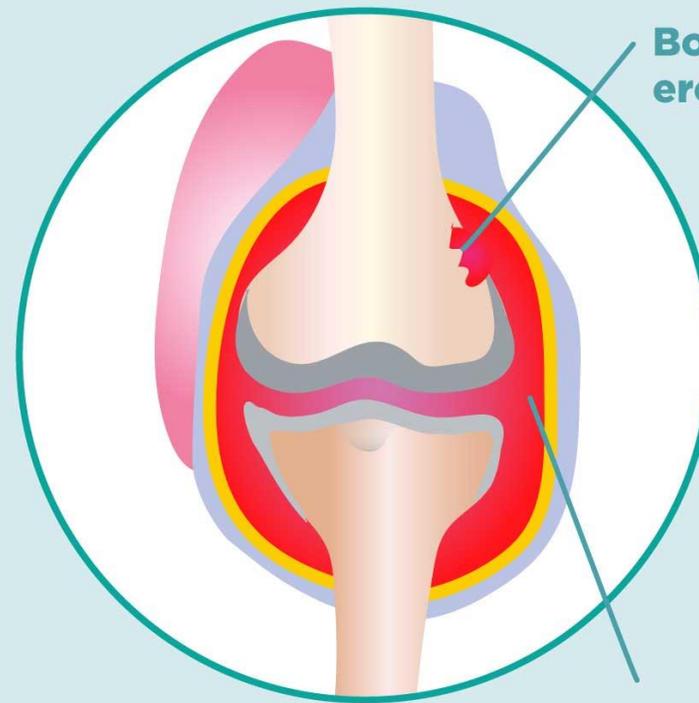
## Osteoarthritis



Bone ends  
rub together

Thinned  
cartilage

## Rheumatoid Arthritis



Bone  
erosion

Swollen inflamed  
synovial membrane

**Mention clinical and radiological differences between OA and RA?**





**THANKS**

