Osteomyelitis & Arthritis

Colors of text:
Definitions: Blue.
Examples: Green.
Important: Red.
Extra explanation: Gray. . It is only there to help you understand. If you feel that it didn't add anything to you just skip it.
Diseases names: Underline.

CONTENTS: (numbers are pages in Robbins book)

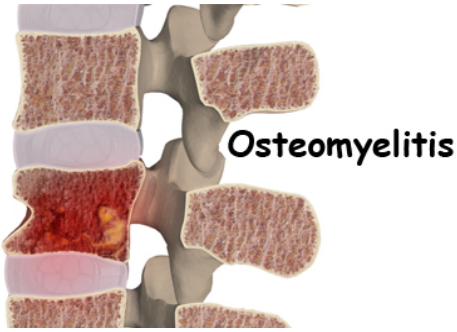
Note: this lecture has lots of information related to microbiology, immunology, biochemistry, and pharmacology. Take it easy and try to understand the diseases to be able to link the information between the subjects. Focus on the big picture and don't waste your precious time on small details.

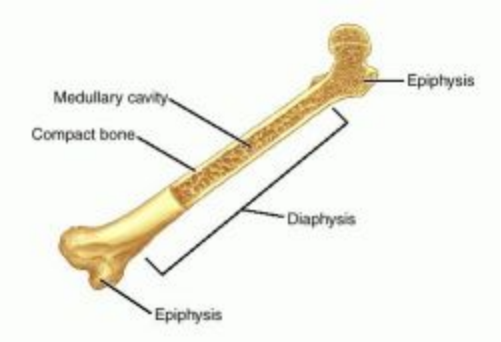
Osteomyelitis

(Robbins page 773)

Osteomyelitis , Osteomyelitis (Acute and Chronic)

Osteomyelitis: inflammation of the bone and bone marrow spaces, it's common and it can start as a primary disease or secondary to systemic infections.





Remember: **E**piphysis is at the **E**nds of the bone.

Primary osteomyelitis: Most cases of acute osteomyelitis are caused by bacteria. It can be seen usually in children, and the bacteria is usually transmitted by the **bloodstream**. Osteomyelitis is common in **vertebral bones**. It begins in long bone in **Metaphysis** then it can spread to **Diaphysis** especially in children.

- Osteomyelitis classically manifests as an acute systemic illness, with malaise, fever, leukocytosis, and throbbing pain over the affected region.

Secondary osteomyelitis: Mixed bacterial infections (aerobes and anaerobes) are responsible for osteomyelitis secondary to bone trauma. The organisms usually reach the bone through the bloodstream.

Mostly, osteomyelitis is secondary to :

- **Compound fractures.**

When fragments of bone are protruding[1] through the skin and soft tissue, there is an increased risk of contamination and development of osteomyelitis. In this type of fracture, we have to reduce [2]the fracture very quickly, treat it adequately[3] with antibiotics, and close the wound.

Certain surgical procedures such as prosthetics installation [4]could cause osteomyelitis. This foreign body might have some microorganisms that might produce an infection. Of Course, if there is an infection, all of the prosthetics must be removed by surgery and the debris formed by the bacteria should be removed. This type of infection is considered a **secondary infection**.

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[1] بارز أو ناتئ من الجلد

[2] fracture reduction: alignment of the bones.

[3] على نحو كاف

[4] Metals that stabilize the bones and joints.

- **TB.**

The organisms usually reach the bone through the **bloodstream** from the lungs. It usually infects **diaphysis of long bone** and **vertebrae**. **Tuberculosis (TB)** of the **vertebral bodies** is a clinically serious form of **osteomyelitis**, It is called **Pott's Disease.**

Pott's Disease causes **vertebral deformity**, **collapse**, and **posterior displacement** leading to neurologic deficits.

> Why are there neurological defects? Because the spinal cord is in the vertebrae, and it would be compressed in Pott's disease.

Pott's Disease (Vertebral Tuberculosis).

Case: A patient has osteomyelitis of the metatarsal bone of his foot and there is a **sinus formation** (tract lined by vascular granulation tissue with one opening).

- **Osteomyelitis is commonly known to cause sinuses and fistulas[5] but most commonly sinuses.**

This patient is probably **diabetic** and he has infection of the feet and has developed osteomyelitis and sinus formation.

Diabetic patients have problems with their vasculature and this makes them with an increased risk of developing infections.

What are the most common organisms that cause osteomyelitis?

Staphylococcus Aureus	**Adults and Children**
Salmonella	**Patients with sickle cell disease**
Neonates (28 days>)	**Group B streptococcus and E.Coli**

[5] A Fistula is a permanent abnormal passageway between two organs in the body or between an organ and the exterior of thebody.(it can have one or more opening depending on it's type).

Some extra info about the organisms (quickly go through this as it is more related to microbiology):

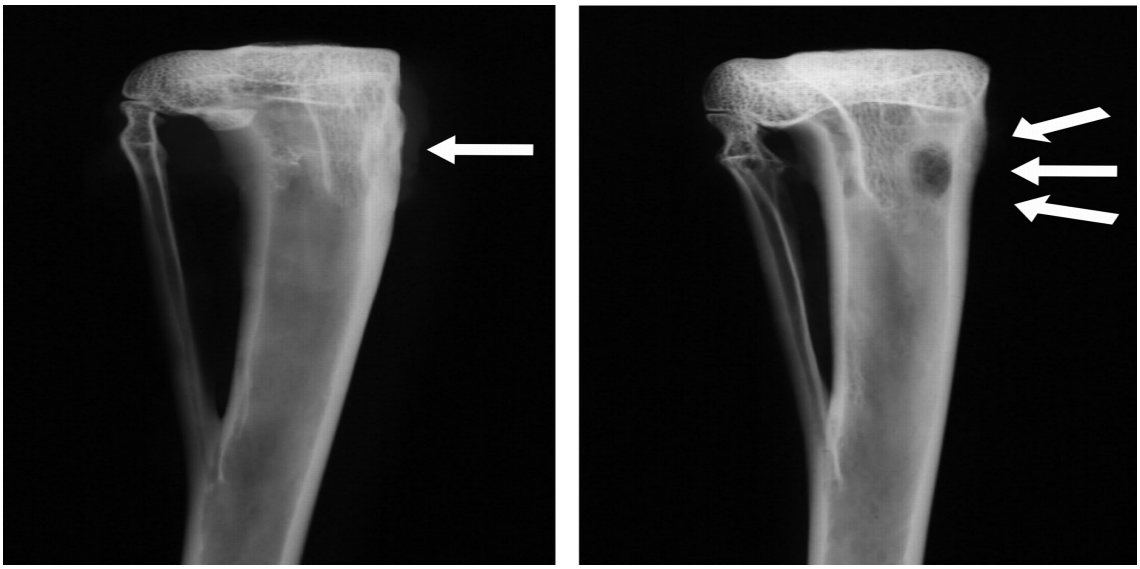
Staphylococcus aureus is the most common cause of Osteomyelitis in children and adults. It usually affects the **vertebral bones**; it can also extend to the bone matrix (usually in the metaphysis[6]).

In neonates, the most common microorganisms are **group A strep**. and **E. Coli**. **Why is that?** This is because these organisms may be found as normal flora in the vagina and neonates might acquire them passing through it.

What is sickle cell disease? Abnormal hemoglobin in RBCs which lead to reduced oxygen carrying capacity. Most common organism affecting these patients is **salmonella**.

> Please note that these are the most common etiology. Osteomyelitis can be caused by other organisms.

X-rays show lesions, and given the systemic manifestations of inflammation, it becomes clear that the diagnosis is osteomyelitis.

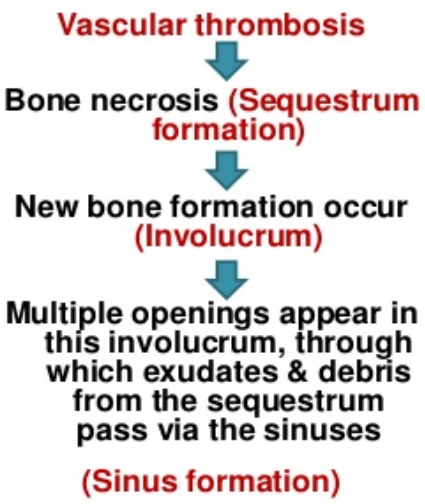


[6]It is located between the epiphysis and diaphysis.

Pathogenesis of osteomyelitis:

Inflammation in the metaphysis of the bone causes micro abscesses. These abscesses usually occur beneath (under) the periosteum; so it is called subperiosteal abscesses.
Inflammation activates the coagulation cascade and this will lead to the formation of thrombi. Since these thrombi are caused by bacterial infection, it is called septic thrombi.
These thrombi cause the death of the bone and form what is called sequestrum (sequestra is the plural).
After the sequestrum is formed, some reactive bone (new bone) is formed around it, and this is called involucrum. This new bone actually tries to repair the damage.

This involucrum leads to the formation of sinuses.



Joints

(Robbins page 782)

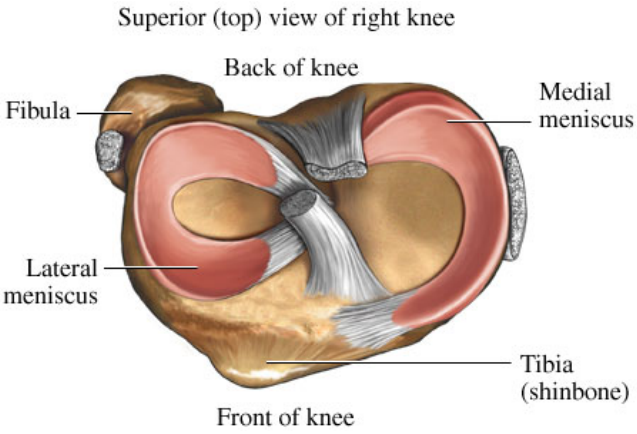
Joints: Articulation between two bone surfaces. Most joints are mobile, allowing the bones to move.

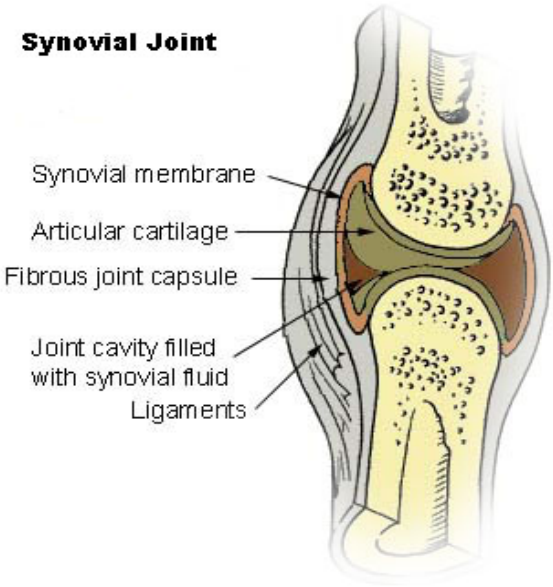
Classification of Joints:

1. **Solid** (stable) → skull.
2. **Synovial** (movable) → back, fingers, knee.

Classical Synovial joint structure:

- **Articular cartilage:** Connective tissue **Collagen Type I** that covers the surface of a bone at a joint. It helps reduce the friction of movement within a joint.
- **Ligaments:** Tough, elastic bands of connective tissue surround the joint to give support and limit the joint's movement. Their names are different from place to another (ACL in the knee).
- **Meniscus** (Lateral and Medial menisci in the knee).
- **Capsule (**Synovial Cavity)**:** lined by Synovial Cells (**Synovial Membrane**).
- **Synovial fluid:** A clear, viscous (sticky) fluid secreted by the synovial membrane. Prevents adhesion.
- **Muscles are attached to the bone by Tendons.**
- **Bursae:** Fluid-filled sacs, called bursae, between bones, ligaments, or other adjacent structures help cushion the friction in a joint.





Synovial Fluid Used for Diagnosis (under sterile condition):

1. **Aspiration** of Synovial fluid by a needle Arthroscopy and study the fluid "Cytology"
2. **Culturing** for example **Septic arthritis** which is a bacterial infection "Microbiology"
3. **X-ray** for joint assessment "Radiology"
4. **Serological Test** in case we suspect a systemic autoimmune disease (we take the blood and look for Antibodies). Ex. Rheumatoid Arthritis & Rheumatoid factor in the blood.

Septic (infectious) Arthritis

(Robbins page 789)

Note: please focus on the pathologic point of view of this topic as it heavily covered in microbiology lectures.

How can microorganisms reach the joints?

1) Hematogenous spread: by the blood.
2) Direct inoculation: by trauma to the joint where organisms go directly to the joint.
3) Contagious spread: it moves from the bone (osteomyelitis) to the joint.

Septic arthritis is *serious* because it can cause **rapid joint destruction** and **permanent deformities**.

The classical presentation: sudden onset of pain, redness and swelling of affected joints with restricted range of movement. Fever, leukocytosis and elevated ESR are common.

Types of septic arthritis:

- Bacterial arthritis.
- Viral arthritis.
- Tuberculous arthritis (TB).

Why do we do aspiration to the synovial cavity?

To identify the causal agent.

As a doctor, you should think of the possible causes of this pathology in the joint. Let us say that your differential diagnosis is between gout and septic arthritis. How could you be sure?

In septic arthritis: there are numerous neutrophils with no crystals (this would exclude gout). Culture of the aspiration would show microorganisms such as gonococcus or S. aureus.

Tuberculous arthritis: Caused by hematogenous spread of mycobacterium tuberculosis from somewhere else (usually the lungs). The vertebral column is commonly involved. When there is an associated osteomyelitis, vertebral collapse may result (pott's disease of the spine).

This patient has septic arthritis but in this condition it is TB. TB is a cause of chronic osteomyelitis. This boy has got a cold abscess caused by TB in the spine. TB of the spine causes lytic bone lesion, **granuloma formation**, with caseous necrosis in the vertebrae. (always chronic).

The pus produced by TB goes through the **inguinal muscles**. So they'll a have big tumor in the inguinal area.

Let us go through the pathogenesis of tuberculous osteomyelitis as a clinical scenario:

CASE:

A patient came to the clinic with mild fever. His complaint was about a mass in his inguinal region. Cytological tests revealed thick yellowish pus in this abscess. A biopsy showed a granuloma with caseation. The doctor decides to do some extra tests and finally reached his final diagnosis and explained to the patient that he has **Pott's disease** caused by mycobacterium tuberculosis.

Some information we already studied about TB:

- It is a chronic disease.
- It doesn't cause high fever.
- **Contents of a granuloma:** giant cells, epithelioid cells, with or without caseation. A rim of T lymphocytes surrounding the area.
- **Ziehl Neelsen stain** is used to identify the **acid fast bacilli**.

Non-infectious Arthritis

Non-infectious Arthritis is a large group of diseases we'll discuss 4 of them in brief:

1. Osteoarthritis "Degenerative Bone Disease"
2. Rheumatoid Arthritis
3. Gout "Gouty arthritis"
4. Pseudogout "Chondrocalcinosis"

Osteoarthritis

(Robbins page 782)

Osteoarthritis , also referred to as degenerative joint disease (degenerative: because of aging , tear and wear processes). Occurs as a result of degeneration of articular cartilage.

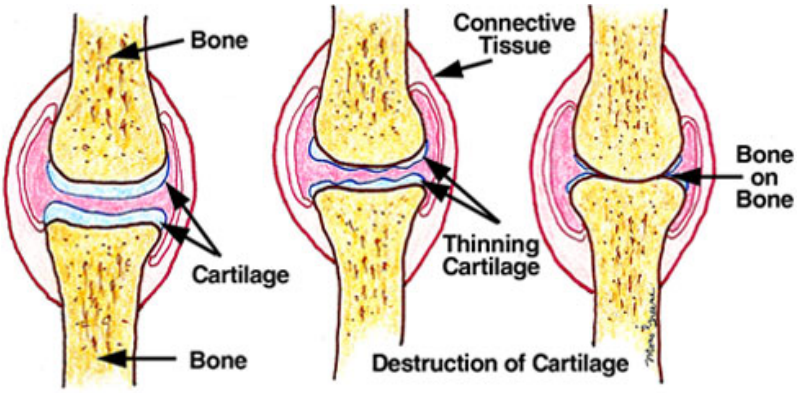
- **Although the term *osteoarthritis* implies an inflammatory disease, osteoarthritis is primarily a degenerative disorder of articular cartilage in which the chondrocytes respond to biomechanical and biological stresses in a way that results in breakdown of the matrix.**

Causes:

- **primary**: due wear and tear (increase in age)
- **secondary**: trauma , informants factor , obesity , surgery

Joint involved: weight bearing joints, knees and hands are more commonly affected in women, whereas hips are more commonly affected in men. In this case, we advise patients to reduce their weights " because obesity is one of the common reason" , it is more common in females after the age of 50 but we can also see it in males, also it affects other joints in the body.

pathogenesis:



Space between the bones becomes less because of articular cartilage loss→ bone eburnation[7] → bones will react →new bone formation (proliferation of bone), so it will become wider and more dense and the bone become **sclerotic**[8].

- as a result of these we will have **osteophyte**.

Osteophyte: is bony outgrowth .

- it is formed by the proliferation of bone and remaining of cartilage. If it grew on vertebrae the osteophytes will irritate the **spinal cord** causing pain .

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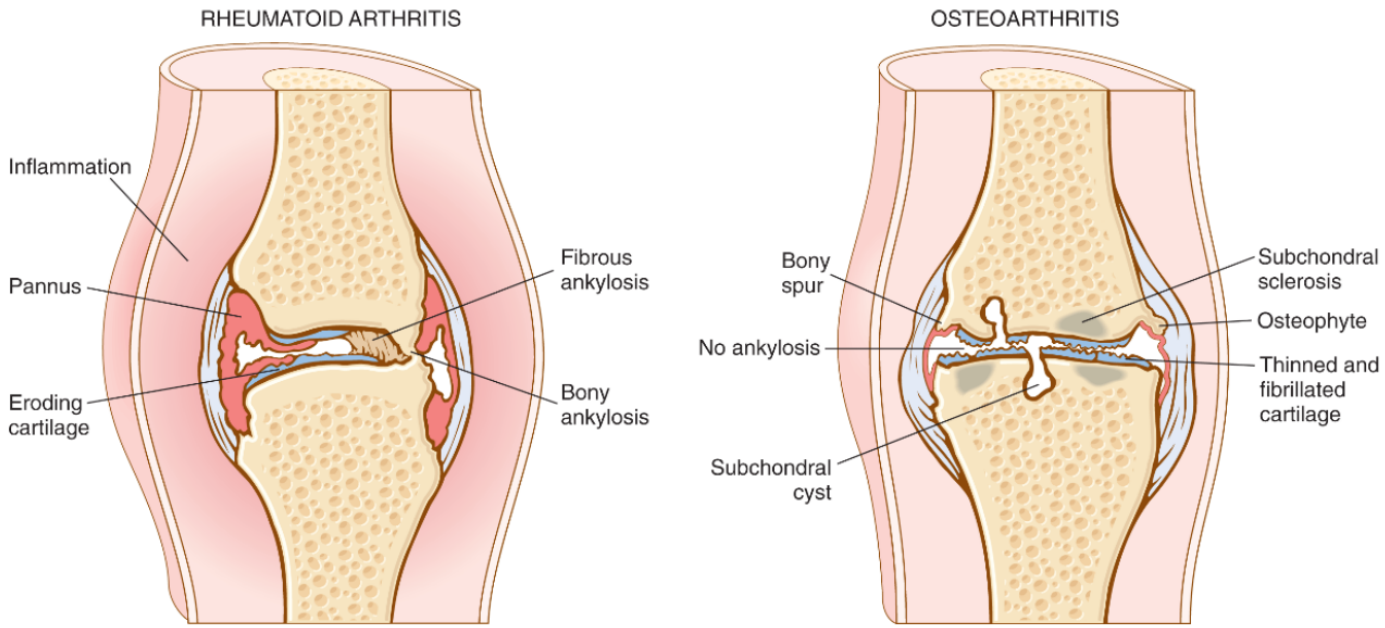
[7] انعواج
[8] متصلب

morphology of osteoarthritis:

1. eburnation
2. subchondral cyst
3. joint mice (we will talk about them shortly)
4. osteophytes formation

clinical presentation: joint pain , difficulty in joint movement.



- **important**: here in osteoarthritis the inflammation is **mild** unlike rheumatoid arthritis.

Ankylosis: abnormal stiffening and immobility of a joint due to fusion of the bones.

Definition of Mice joint:

It is a piece of Osteophyte in a patient with osteoarthritis, the osteophyte has **detached** and it is swimming inside the joint synovium causing **irritations**.
The articular surface is diminished as a result of this bone start frictioning on each other without any protection by articular cartilage and this causes pain.

NOTE: Osteoarthritis is an articular cartilage disease NOT Synovial disease.

Pathological Changes:
Mainly seen in the cartilage NOT the synovium, such as: mild inflammation, **Fibrillation, irregularity in the cartilage,** sclerotic bone & some chondral cyst formation.

- Almost everybody over the age of 50 will have some degree of osteoarthritis, some complain from severe pain, or mild pain, and some don't have any pain.

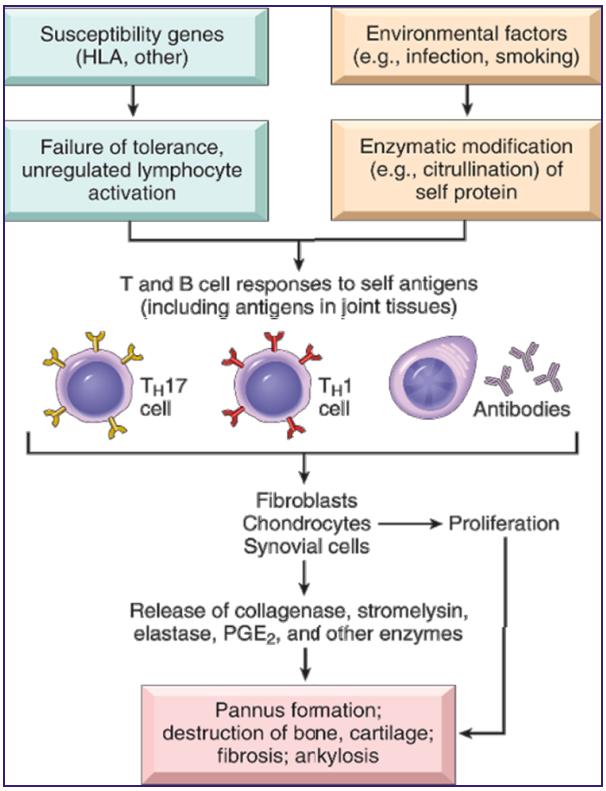
Bouchard's nodes: are found on the proximal interphalangeal joint (PIP)
Heberden's nodes: are found in the distal interphalangeal joint (DIP)

These nodes are formed in patients with osteoarthritis in their hand.

Rheumatoid Arthritis

Youtube http://www.youtube.com/watch?v=Yc-9dfem3lM

Rheumatoid arthritis (RA): is a **systemic, chronic inflammatory autoimmune** disease affecting many tissues but principally attacking the joints. It can affect the eyes, skin, spleen, vessel, liver and the lung. It may form Rheumatoid Nodules. Also it can cause ulceration of skin, or Inflammation & in the Eye (Episcleritis), and interstitial lung disease. it's common diseases between the age **20-50**.



Causes by:

1- Genetic predisposition: people with special "**HLA**[9]" receptors such as **HLA DR4** or **HLA B1**, are more prone to develop Rheumatoid Arthritis.

2-Stimulation of CD4 T cells: it can be caused by an unknown **Antigen** that stimulates CD4 T Cells, as a result of this **CD4 T Cells** are activated and start secreting **Cytokines** and activated B lymphocytes, plasma cells, and macrophages, as well as other inflammatory cells type 4 hypersensitivity which cause tissue injury & Incite the inflammation "**Synovitis**[10]" in comparison with Osteoarthritis which has mild inflammation, Rheumatoid arthritis causes inflammation in the synovium mediated by **CD4 T Cells Cytokines** such as "IL-1, IL-6 and **TNF**"

Pathological Changes:

The pathologic changes are caused mainly by cytokine-mediated inflammation, with CD4+ T cells being the principal source of the cytokines.
Primarily seen in **Synovium** and NOT in the cartilage, but if the cartilage is affected it's considered **secondary** after destruction of joint. Synovium (chronic papillary synovitis) where it becomes hyperplastic, thickened, inflamed and very painful.

Chronic papillary synovitis characterized by (just go through it for your info):

(1) synovial cell **hyperplasia** and proliferation.
(2) dense perivascular inflammatory cell infiltrates (frequently forming lymphoid follicles) in the synovium composed of CD4+ T cells, plasma cells, and macrophages.
(3) increased vascularity due to angiogenesis.
(4) neutrophils and aggregates of organizing fibrin on the synovial surface and in the joint space.
(5) increased osteoclast activity in the underlying bone, leading to synovial penetration and periarticular bone erosion.

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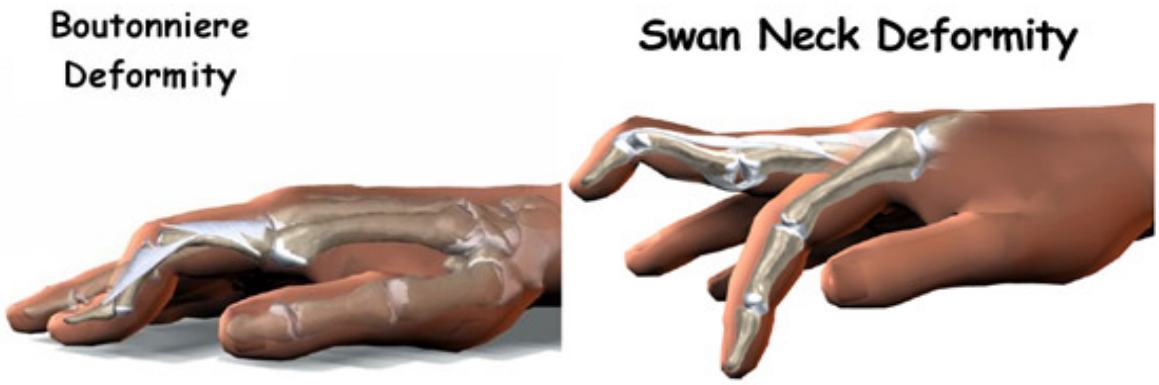
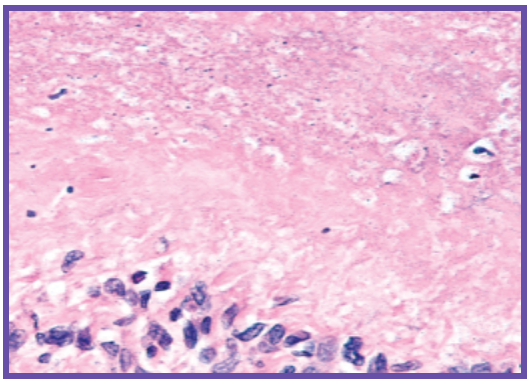
[9] hla (human leukocyte antigen): are receptors and determinants on surfaces of leukocytes giving the person characteristics.
[10] inflammation of a synovial membrane, usually painful, particularly on motion, and characterized by fluctuating swelling, due to effusion in a synovial sac.

Pannus[11] is formed. A pannus is a chronically inflamed fibrocellular mass of synovium and synovial stroma which develops over the articular cartilage. It slowly spreads and degrades the underlying cartilage, causes **erosions**[12] and the development of subchondral cyst underlying bone. The fibrous pannus eventually bridge the opposing bones causing limitation of movement. Ossification of the fibrous tissue leads to **bony ankylosis**. Destruction of tendons, ligaments, and joint capsules happen. All these outcomes causes the **swan shaped deformities** and **boutonnière deformity**.



Muscles between metatarsals may undergo **atrophy** causing loss of function or limited motion

Rheumatoid subcutaneous nodules:
firm, nontender, oval or rounded masses 2 cm in diameter occurring along the extensor surface of the forearm or **rarely:** they can form in the lungs, spleen, heart, aorta, and other viscera.



Characterized microscopically by :
Central focus of fibrinoid necrosis surrounded by a palisade of macrophages, which in turn is rimmed by granulation tissue and lymphocytes.

Clinical Features

Patients complain:

- pain (It comes in the **morning**, after a long rest and feel stiffness in small joints)
- swelling
- deformity "depends on degree of disease", with time we have erosion in the bone, and destruction of a little bit of cartilage, in addition of secondary osteoporosis in the bone "bone resorption" .

[11] an inflammatory exudate overlying the synovial cells on the inside of a joint.

[12] تقرحات

Picture of normal Synovium "No inflammation" Vs patients with Rheumatoid Arthritis Synovium "very dense, lympho-spasmasitic infiltration "

How to Diagnose?

Since it is an Autoimmune disease, we do mainly a **Serological Test** and look for antibodies in the blood. Also, we can do:

1- **ESR** "Erythrocyte Sedimentation Rate": because it an inflammatory process, ESR should be high.

2- **Rheumatoid Factor Test:** It is an IgM antibody attacking the Fc portion of IgG antibody. This test is not specific, some people (around 10%) might have it positive with not having RA.

3- **CCP** "Cyclic Citrullinated Proteins" patients with Rheumatoid arthritis form antibodies against this protein, it is a **very specific test** and positive in more than 70% of people with Rheumatoid Arthritis. It is a metabolite of Arginine "amino acid", these proteins found in the structure of Synovium itself, so patients form antibodies against them.

4- **Characteristic radiographic findings.**

- We can use joint space to inject Steroids to stop the pain and inflammation.

This link has a nice table comparing osteoarthritis and rheumatoid arthritis. It is a good way to review what you have read:
http://www.webmd.com/rheumatoid-arthritis/tc/comparing-rheumatoid-arthritis-and-osteoarthritis-topic-overview

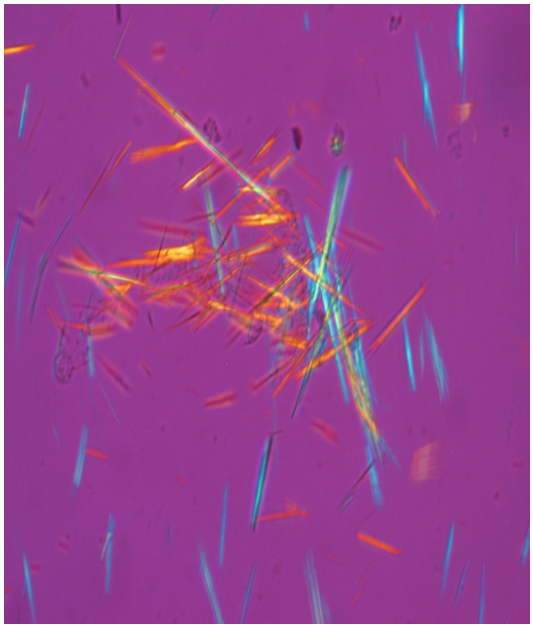
Gout "Gouty Arthritis"

- **It is recommended that you study Gout lecture in biochemistry before this section.**

Gout: metabolic disease occur when there is an error in **purine metabolism** which lead to accumulation of uric acid.

- It usually affects the big toe joint (metatarsophalangeal joint) causing pain and swelling .
- Uric acid accumulates in the joints as crystals (**monosodium urate crystals**)

Causes:



Primary

1- **overproduction** of uric acid.
2- **decreased excretion** due to renal problems.
3- known enzyme defects e.g (partial HGPRT[13] deficiency).
4- error in metabolism of purine .

Secondary

1- Patient with lymphoma , leukemia , adenocarcinoma we treat them by **cytotoxic drugs** "**chemotherapy**" (these drugs will kill the tumor cell with the nuclei) But (the nuclei of those tumor cells has **purine** so the purine will go out of the nucleus) then they will have increase of uric acid (overproduction of uric acid).
2- People who takes thiazide diuretics (which are used for treatment of hypertension and heart failure) can increase the uric acid (decrease excretion of uric acid)

pathogenesis.

when the crystal come to the joint it does three things:

1. The monosodium urate crystals **stimulate leukotriene B4** "Chemotactic" mediating inflammation.
2. The monosodium urate Crystals get **Opsonized by Neutrophils** "but cannot digest them" and release lysosomal enzyme which cause **tissue damage** and **irritation** .
3. The monosodium urate Crystals **get engulfed by Macrophages** which are capable to secrete cytokines like **IL-1, IL-6 & TNF** which will also aggravate the tissue damage and contribute to the inflammatory reaction.

Morphology: uric acid crystals are **needle** shaped under polarized light

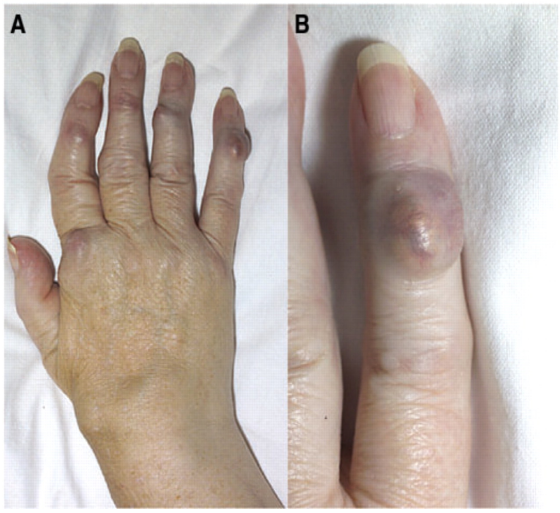
Sometimes, we can see urate crystals accumulation in **soft tissue**, forming nodules called "**Tophi Nodules**" which are soft tissue swelling in people with hyperuricemia causing accumulation of crystals in areas adjacent to the joint .

[13] **Hypoxanthine-guanine phosphoribosyltransferase** (**HGPRT**) is an enzyme encoded in humans by the *HPRT1* gene. HGPRT is a transferase that catalyzes conversion of hypoxanthine to inosine monophosphate and guanosine to guanosine monophosphate.

Pseudogout

(Robbins page 789)

Also known as **Chondrocalcinosis** because it is caused by accumulation of **Calcium Pyrophosphate crystals** in small joints. it occurs in persons 50 years of age or older.



Although pathways leading to crystal formation are not understood, they are likely involve the *overproduction or decrease breakdown of* **pyrophosphate**, resulting in its accumulation and eventual crystallization with calcium in the matrix surrounding chondrocytes. When the deposits enlarge enough, they may rupture, inducing an inflammatory reaction.

in pseudogout patients the uric acid is normal, but the crystals are **rhomboid**[14] in shaped **NOT** needle shaped as in gout, they cause pain and they are **idiopathic**[15].

GOUT	PSEUDOGOUT
Monosodium urate crystals	**Calcium Pyrophosphate crystals**
affect small joints usually big toes	**affect small joints**
Male>Female	**Male=Female**
middle aged males, postmenopausal females.	**elderly**

[14] معينة الشكل
[15] مجهول السبب

SUMMARY

Arthritis

- *Osteoarthritis (degenerative joint disease)* is by far the most common joint disease; it is primarily a degenerative disorder of articular cartilage in which matrix breakdown exceeds synthesis. Inflammation is secondary. The vast majority of cases occur without apparent precipitating cause except increasing age. Local production of pro-inflammatory cytokines and other mediators (IL-1, TNF, nitric oxide) may contribute to the progression of the joint degeneration.
- *Rheumatoid arthritis (RA)* is a chronic autoimmune inflammatory disease that affects mainly the joints, especially small joints, but can affect multiple tissues. RA is caused by an autoimmune response against self-antigen(s) such as citrullinated proteins, which leads to T cell reactions in the joint with production of cytokines that activate phagocytes that damage tissues and stimulate proliferation of synovial cells (synovitis). The cytokine TNF plays a central role, and antagonists against TNF are of great clinical benefit. Antibodies may also contribute to the disease.
- *Gout and pseudogout*. Increased circulating levels of uric acid (*gout*) or calcium pyrophosphate (*pseudogout*) can lead to crystal deposition in the joint space. Resulting inflammatory cell recruitment and activation lead to cartilage degradation, fibrosis, and arthritis.
- Either direct infection of a joint space (*suppurative arthritis*) or cross-reactive immune responses to systemic infections (e.g., in some cases of *Lyme arthritis*) can lead to joint inflammation and injury.

MCQ's

CASES:

1- **A 72-year-old man presents with an acutely painful right knee. On examination, he had a temperature of 37C with a hot, swollen right knee. Aspiration of the fluid was performed and there was Calcium crystals. What is the most likely diagnosis?**
   a- Septic arthritis
   b- Rheumatoid arthritis
   c- Osteoarthritis
   d- Pseudogout

Answer: d

2- **40 years-old Businessman present with severe pain and redness in his first metatarsophalangeal joint. The doctor ordered a blood test and the results show a high level of uric acid. What is the most likely diagnosis?**

a- Osteoarthritis
b- Rheumatoid arthritis
c- pyogenic arthritis
d- Gouty arthritis

Answer : d

3- **30 years-old women she is suffering from pain in 4 joints (3 fingers joints and knee joint) and the pain** is **worse** at night **when she's trying to relax. On examination, the joints appear warm and swollen . An x-ray was performed and there was a radial deviation of the wrist. What is the type of arthritis ?**

a- Rheumatoid arthritis
b- Gout
c- Osteoarthritis
d- Tuberculous arthritis.

Answer: a

Multiple choices :

1- Which of the following is impaired in a case of gout?

a- Protein metabolism
b- Ketone metabolism
c- Purine metabolism
d- Pyrimidine metabolism

answer : c

2- Which of the following is the most specific test for Rheumatoid arthritis?

a- Anti CCP antibody
b- Anti lgM antibody
c- Anti IgA antibody
d- Anti IgG antibody

answer : a

3- Heberden's Arthropathy affects:

A. Lumbar spine
B. Symmetrically small joints
C. proximal interphalangeal joints
D. Distal interphalangeal joints

Answer: d Heberden's nodes seen in distal interphalangeal joints is a characteristic feature of idiopathic osteoarthritis.

4- All are inflammatory arthritis except:

a- Osteoarthritis
b- Rheumatoid arthritis
c- Gouty arthritis

Answer: a

5- Rheumatoid arthritis is a systemic disease ?

a- true
b- false

answer: a

6- Rheumatoid arthritis is :

a- Auto-immune disease
b- Inflammation
c- Degenerative disease
d- Both a and b Answer: d

7- Which part of a joint does osteoarthritis usually affect?

A. Bone
B. Cartilage
C. Tendon
D. All of the above

Answer: b

8- Formed by proliferating synovial-lining cells admixed with inflammatory cells, granulation tissue, and fibrous connective tissue?

A. Osteophyte
B. Heberden nodes
C. Pannus
D. eburnation

Answer : c

9- Which of these is a treatment for osteoarthritis?

A. Exercise
B. Bed rest
C. Cast
D. None of the above

Answer: a Exercise is one of the best treatments for osteoarthritis. It can decrease pain, increase flexibility, and help you maintain a healthy weight. Also, in Rheumatoid arthritis Doctors recommend a balance between rest and exercise

10- Osteoarthritis is "wear & tear" disease affecting wide range of patients due to all the following EXCEPT:

A. Aging process
B. Obesity
C. Joint hypomobility
D. Prolonged stress on joint

answer : c

CASES:

1- An otherwise healthy 44-year-old man with no prior medical history has had increasing back pain and right hip pain for the past decade. The pain is worse at the end of the day. On physical examination he has bony enlargement of the distal interphalangeal joints. A radiograph of the spine reveals the presence of prominent osteophytes involving the vertebral bodies. There is sclerosis with narrowing of the joint space at the right acetabulum seen on a radiograph of the pelvis. Which of the following diseases is he most likely to have?

A Gout
B Rheumatoid arthritis
C Osteoarthritis
D Osteomyelitis

(C) CORRECT. Degenerative osteoarthritis is a common and progressive condition that becomes more frequent and symptomatic with aging. There is erosion and loss of articular cartilage with joint space narrowing. There is minimal inflammation.

2- A 14-year-old African man has a history of multiple episodes of sudden onset of severe abdominal pain and back pain lasting for hours. Each time this happens, his peripheral blood smear demonstrates numerous sickled erythrocytes. A hemoglobin electrophoresis shows 94% Hgb S, 5% Hgb F, and 1% Hgb A2. He now has a painful right hip that is tender to palpation. A radiograph reveals irregular bony destruction of the femoral head. Which of the following infectious agents is most likely responsible for his findings?

A TB
B Clostridium perfringens
C Salmonella, not typhi
D Group B Streptococcus

(C) CORRECT. Salmonella osteomyelitis is a feature seen in patients with sickle cell anemia. Other organisms that are frequent causes for osteomyelitis with sickle cell anemia include Staphylococcus aureus and gram negative bacilli.

3- A 56 your old diabetic female came to the hospital complaining of a sever pain in her ankle with a little swelling .she didn't go through any surgery and she didn't experience any acute fever of inflammation last three months . clinical examination and laboratory findings have found that she has an acute Osteomyelitis which of the following etiologies is the most probably in this case :

a- Ischemia
b- Bacterial infection
c- Autoimmune disease
d- Non
(A)CORRECT : because she is a diabetic patient

Multiple choices :

1- People with Sickle cell anemia may develop Arthritis by unusual bacteria like :
a- Streptococci aureus
b- Salmonella
c- E.coli
d- T.B

2- Osteomyelitis can present as a secondary disease . which of the following cases is an example of secondary osteomyelitis :
a- Compound fracture of the bone
b- After an orthopedic surgery .
c- A and B
d- Otitis media

3- Which of the following is the most commonly site-of the bone - involved of osteomyelitis :
a- Diaphysis
b- Periosteum
c- Epiphysis
d- Metaphysis

4- Which of the following is an differential sign between bone tumors and O.M ?!
a- Lytic foci of bone –Xray-.
b- Swelling
c- Elevated body temperature
d- Sclerosis

5- OSTEOMYELITIS inneonatescancausedmostly by:
A. S.aureus.
B. E.coli.
C. Staphylococcus.
D. StreptococcusgroupA

6- WhenTB affected bone that called:
A. Osteomyelitis.
B. Sicklecellanaemia.
C. Diabetesmellitus.
D. Pott'sdisease.

7- OSTEOMYELITIS is an inflammatory disease which occur in:
A. Bone.
B. Bone marrow space.
C. Muscles.
D. Both A&B.

8- Deadpieces of bone known as:
A. Involucrum.
B. Sequestrum.
C. Fistula.
D. Allanswers are correct

9- Involucrum is resulted from :
A. Osteoclastic activates
B. Osteoblastic activities
C. Osteocytic activities
D. Inflammatory cascade

1- B
2- C
3- D
4- D
5- B
6- D
7- D
8- B
9- B

TRUE AND FALSE:

1- Infectious Arthritis:
a- It is more common in males than females
b- Generally caused by Gonococcus
c- It may caused by serious chronic disease
d- Manly caused by viral infection .

Answers:
A- FALSE : equal for both gender
B- FALSE : S.aureus
C- TRUE : like renal diseases and cancer
D- FALSE : more common reason is bacterial infection

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“Start by doing what's necessary; then do what's possible; and suddenly you are doing the impossible.”

Good Luck!

DONE BY

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