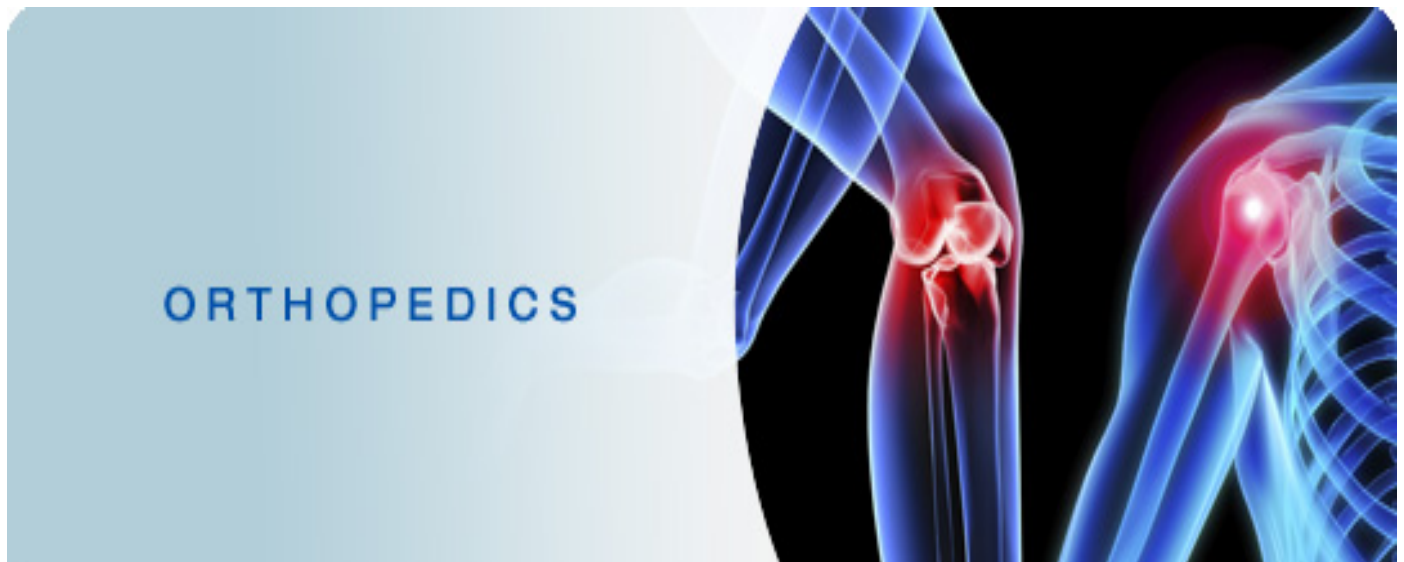


*Isn't it funny how someone can say "I believe in Allah " but still follow the Satan who by the way also, " believes " in Allah...*

## 430 ORTHOPEDICS TEAM



### Lecture: OSTEOARTHRISIS (OA)

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#### Team Leader:

**Ayedah Al-Ruhaimi.**

-429 Slides .They are the same as doctor slides.

-Important notes in **Red**.

-Doctor's notes in **green**.

-Copied slides in **Black**.

- AIOgayel's notes in **orange**.

## Definition:

A non-inflammatory (DEGENERATIVE) disease affecting articular cartilage of joints.

## TYPES:

### ► **Primary**

Intrinsic defect (mechanical, vascular, cartilage, hereditary-generalized O.A)

-usually familial , hereditary.

- Generalized and affects the upper limbs more than lower limbs.

### ► **Secondary**

Secondary to local or systemic disease

## Etiology:

► Increased load: obesity (hips and knees take 3-4 body weight with each step) (the most common movements which can affect the knee is jogging & squatting).

► Trauma: osteochondral, malunion, sport injury

► Congenital/developmental: CDH, multiple epiphyseal dysplasia

► Infection

► Necrosis: Perth's disease, osteonecrosis, steroids

► Hematologic: SCD, hemophilia ( **mostly by osteonecrosis** )

Endocrine: DM (due to neuropathy, it can lead to unorganized remodeling of destroyed painless joint called "Charcot's Joint" which in turns lead to severe secondary OA), acromegaly

► Metabolic: crystalline deposition disease (gout mainly affect small peripheral joint "Feet", CPPD "crystalline pyrophosphate deposition which is pseudo gout, mainly affect the knee "), Paget's disease

► Inflammatory: RA, SLE, Reiter's syndrome

► Neuropathic: DM, tabes dorsalis.

► Occupation (indirect cause of OA).

-The first part affected by the normal aging degeneration process is the cervical spine.

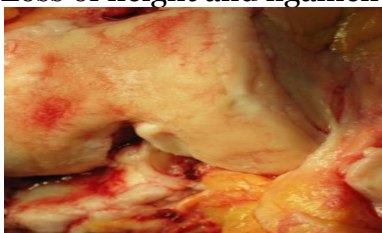
## Epidemiology:

- ▶ Common in our community ( west region ) esp. knees
- ▶ Much more in females ;esp. obese
- ▶ Presents earlier than in West
- ▶ About 90% of those over 40 have asymptomatic degeneration of weight bearing joints
- ▶ Commonest joints are knee, hip, C-Spine & L-Spine, 1<sup>st</sup> CMJ, 1<sup>st</sup> MTPJ (when it affected by osteoarthritis, it called hallux stiffness) and IPJ

## Pathophysiology:

- ▶ Increased water content: swelling and softening of cartilage (normally 80-85% of the cartilage matrix is water).
- ▶ Depletion of Proteoglycans (it's the polysaccharide which gives the cartilage its properties).
- ▶ Chondrocyte damage and synovitis › proteolytic enzymes › collagen disruption
- ▶ Fibrillation (The first sign to be seen by the scope) on weight bearing surfaces
- ▶ Loss of cartilage height and exposed bone › Decreased joint space
- ▶ Attempts of repair:
  - SUBCHONDRAL SCLEROSIS**
  - eburnation (ivory-like bone)
- ▶ Fissuring (cracks): synovial fluid pumped into subchondral bone › **SUBCHONDRAL CYST** (late).
- ▶ Hypervascularity of synovium and subchondral bone
  - › proliferation of adjacent cartilage › enchondral ossification › **OSTEOPHYTE**
- ▶ Synovial (normally its quite viscous but here it becomes watery which make it easily to be compressed) and capsular thickening
- ▶ Progressive bone erosion › BONE COLLAPSE
- ▶ Fragmented osteophyte › LOOSE BODIES
- ▶ Loss of height and ligamentous laxity › **MALALIGNM**

The cartilage of the joint is type 2 cartilage.



Fissuring



Osteophytes & eburnation



Cysts & Sclerosis



Loss of bone & deformity

## Clinical picture:

### SYMPTOMS:

Pain, inability to bear weight, stiffness, limping, deformity.

#### Pain:

- It's the number one indication of management.
- It's also one of the indications of surgery.
- It's important to ask about the Activities Of daily Living "ADL" whenever the patient is complaining of pain.

MCQ: indications of surgery are:

- pain (most common)
- sub-laxation
- severe bone erosion.

#### Deformities:

- Varus mal-alignment and fixed flexion are the most common in OA, while in Rhumatoid it's more common to have valgus and hyperextension.
- Deformity alone by itself is NOT an indication of surgical Rx.
- Acute presentation of OA can mimic Septic arthritis ( red, swollen. Limited range of motion..etc)

### SIGNS:

Effusion, Swelling, tenderness, crepitus, deformity-malalignment.

## INVESTIGATIONS:

- ▶ **X-ray (STANDING in lower limb)**

"Presentations in order as severity increases" :

Loss of space

Sclerosis

Cysts

**Osteophytes** (at the peripheral lines of the joint).

Loose bodies

**Malalignment.**

Subluxation (in advanced cases)

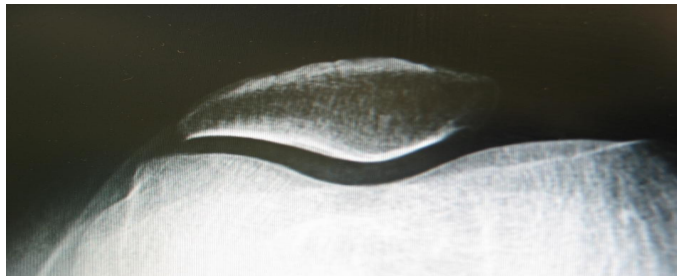
sulux.

Erosion.

► **synovial analysis** (in differential diagnosis)

- Synovial fluid analysis should NOT be performed always, unless there is a massive effusion, otherwise don't do it all the time.

	Protein Level	Glucose Level
<b>Septic Arthritis</b> (>20,000-30,000 polymorph cell count).	High	Low
<b>Inflammatory Arthritis</b>	High	Normal
<b>Osteoarthritis</b>	Normal	Normal



## Diagnosis:

- OA is mainly diagnosed clinically, there is no much need to do many several investigations. X-ray is the best modality for investigation with AP & lateral standing views + Skyline "Axial" view in case of hip or knee OA to show the patella-femoral joint.
- Whenever a patient is complaining of knee joint, you should automatically examine the hip. Because hip disease can transfer to the knee and vice versa.

## Management:

### Case scenarios:

1-a 42 years old female complaining of right leg pain since 6 months . She has the pain after 1 hour of walking & praying. She doesn't have it when she use the stairs up & down. Her weight= 80, Height=165. On examination the patient has mild tenderness at the medial side of the joint, there is no redness. X-ray shows 3 degrees of valgus instead of 7 degrees. Her mother & father have osteoarthritis. She is mildly diabetic on regulatory treatment. No Hx of trauma, previous surgeries or infection. She is on glucophage. How to manage this patient?

-Exercise, reduce weight & modification of the activities. – give her paracetamol.

2-a 47 years old female complaining of left knee pain since 2 years . The pain increase with praying , using of stairs & walking. She has a **Hx of twisting injury** over knee when she was 25 years old. **She had meniscal tear** & she has arthroscopy for meniscal tear. She has been seen by other doctors & **she took NSAID. She did exercise** & she is considered obese & she failed to lose weight. Height=165, weight= 95. X-ray shows subchondral sclerosis, decrease medial joint space osteophytes on the medial side of the joint. Also, she has varus deformity of 10 degrees. How to manage?

- Hyaluronic acid. -Arthroscopic lavage as a second choice if there is no hyaluronic acid available.

3-a 55 years old male, porter complaining of knee pain since 5 years . Height =180, weight=100 **بنية جسمه عضليه**. He loves exercise. X-ray shows 15 degrees of varus , sclerosis & reduced medial joint line. He wants to complete his work & he tried everything. What modalities can be used?

-Arthroplasty (if patient accept to change his job & be careful about exercise).

-Osteotomy "closed wedge osteotomy" (realignment of the joint).

Points to remember from the scenarios: **IMP**

- If the x-ray is only showing mild varus → exercise and weight reduction would be advisable.
- Paracetamol can be used in case of mild pain. NSAID are usually not beneficial in case of OA.
- Activity modification is advisable if the pain gets worse with specific movement or activity.
- Arthroscopic lavage "debridement" used as a temporary Rx and in case of moderate OA.
- Steroid injections has NO effect on OA as a main method of treatment, it's only beneficial in case of acute presentation of OA because its duration of effect = 3 weeks.
- Hyaluronic acid injection has almost similar results of arthroscopy, so it's preferred as it doesn't require anesthesia.
- If patient had arthroplasty, he should restrict his activity after this procedure especially sports & exercise.
- Osteotomy → used to over correct the valgus "overcorrection". Normal Anterior cruciate ligaments + knee stability & range of motion are one of conditions that should be considered before performing this type of surgery.
-

- ▶ **History**
- ▶ **Examination**
- ▶ **Investigations**

**Conservative treatment:**

- ▶ Decrease load (stick, brace, reduce weight)
- ▶ Modify activity
- ▶ Physiotherapy:
  - prevent contractures
  - muscle strengthening
  - range of motion
- ▶ Medications
  - systemic
  - Local

**Surgical treatment:**

- ▶ 1- Joint Debridement → if there are loose body ( bone ) in the joint and it block the movement
- ▶ 2- Corrective Osteotomy ( there are 2 pictures in the slid no. 22 if you want to see them cus I couldn't copy them ) :

**What?** varus/valgus, abd./add.

**Why ?** to realign axis and redistribute weight

**Which joint?** knee/hip

**What joint?** mobile, stable, minimally deformed

**Which patient?** young, thin, active

- ▶ 3- Arthrodesis: ( fusion of the joint )

<b>Why?</b>	Transfer painful stiff into painless stiff joint.
<b>Which joint?</b>	-wrist, ankle, C-Spine, L-Spine, hand (Small joints "hand & foot"). - hips and knees (LESS COMMON)

<b>When?</b>	<ul style="list-style-type: none"> <li>- failed TKR ( <b>Chronic infection &amp; acute infection on post-hip replacement</b>).</li> <li>- Neuropathic joint ( <b>the best treatment for it</b>).</li> <li>- paralytic (flail).</li> <li>- Loss of quad.</li> <li>- Stiff in young.</li> </ul>
<b>When NOT to use it?</b>	<ul style="list-style-type: none"> <li>- Ipsilateral disease.</li> <li>- Contralateral hip disease.</li> <li>- bilateral joint disease.</li> </ul>

## TRANSFER LOAD TO DISTAL and CONTRALATERAL JOINTS

### 4-Arthroplasty:

- ▶ **Excision Arthroplasty ( remove part of the joint to allow movement )**

<b>Disadvantage:</b>	<ul style="list-style-type: none"> <li>-weakness.</li> <li>-shortening.</li> <li>-walking aid</li> </ul>
<b>Which joint?</b>	<ul style="list-style-type: none"> <li>-Hip; post infection (girdle stone)</li> <li>-1<sup>st</sup> MTPJ.</li> <li>-1st.MPJ</li> </ul>

Excisional arthroplasty is indicated for small joints in hand & foot. It's not used for big joints **EXCEPT** in case of chronic infections "TB or Brucella" or acute infection in post-total hip replacement" because joint replacement is contraindicated in case of infection" so we use the excisional instead of it.

-patient with sever varus (25 degrees varus), sclerosis, osteophytes , lose of height , lose of bone = Arthroplasty.



► **Partial Replacement:** one side of the joint

Which joint?	<ul style="list-style-type: none"> <li>- hip (fracture).</li> <li>- knee</li> <li>- shoulder(SCD, RA)</li> </ul>
When?	<ul style="list-style-type: none"> <li>- necrosis</li> <li>- degenerative</li> <li>- trauma</li> <li>- Inflammatory (ONLY SHOULDER)</li> </ul>
When NOT?	<ul style="list-style-type: none"> <li>- infection</li> <li>- young</li> <li>- inflammatory</li> </ul>

-Partial or hemi-arthroplasty is indicated usually for trauma (e.g. femur neck fracture, hip fracture, knee fracture...). **It is CONTRAINDICATED in Rheumatoid Arthritis**

► **5- TOTAL REPLACEMENT** (pictures in slide 33 & 34 which can't be copied also):

Which?	<ul style="list-style-type: none"> <li>- Knees (mainly).</li> <li>- Hips.</li> <li>- Shoulders.</li> <li>- Ankles.</li> <li>- elbow</li> </ul>
When?	<ul style="list-style-type: none"> <li>- painful, deformed stiff joint, old patient!!</li> </ul>

### When NOT?

- Neuropathic
- Infection
- Paralysis (e.g. polio)
- young, active (RELATIVE)

→ Because young and active pt will consume the artificial joint very fast.