

PASSION ACADEMIC TEAM

*YU - MEDICINE*

# MUSCULOSKELETAL SYSTEM

Sheet#4 - Pharmacology

Lec. Title : Pharmacotherapy of  
Osteoarthritis

Written By : Rahma Marie

Abdallah AL-Qashi

If you come by any mistake , please  
kindly report it to  
[shaghafbatch@gmail.com](mailto:shaghafbatch@gmail.com)



# Pharmacotherapy of osteoarthritis

*Dr. Romany Helmy Thabet, PhD*

# Osteoarthritis symptoms to **never** ignore

Clicking or cracking sounds

Slow onset of symptoms

Mild swelling

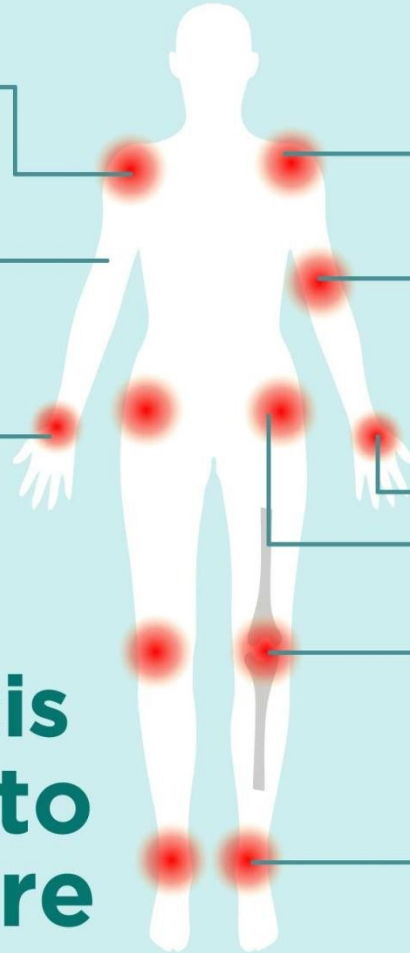
Asymmetry (affects a joint on one side but not the other)

Stiffness

Pain in a joint (hips, knees, and hands are most common)

Bone spurs

Reduced flexibility (hard to bend down or climb stairs)



## Distinction between rheumatoid arthritis and osteoarthritis

Feature	Rheumatoid arthritis	Osteoarthritis
Primary joints affected	Metacarpophalangeal	Distal interphalangeal
	Proximal interphalangeal	Carpometacarpal
Heberden's nodes	Absent	Frequently present
Joint characteristics	Soft, warm, and tender	Hard and bony
Stiffness	Worse after resting (eg, morning stiffness)	If present, worse after effort, may be described as evening stiffness
Laboratory findings	Positive rheumatoid factor	Rheumatoid factor negative
	Positive anti-CCP antibody	Anti-CCP antibody negative
	Elevated ESR and C reactive protein	Normal ESR and C reactive protein

CCP: cyclic citrullinated peptide

# Sheet# 1

Osteoarthritis must be differentiated from rheumatoid arthritis.

- Wear and tear of joints due to cartilage wearing down. This leads to bones rubbing against each other and cracking joints.
- Osteoarthritis mostly presents in females, obese. Focuses on large joints.

Rheumatoid : symmetrical

Osteoarthritis : asymmetrical

In hands, distal interphalangeal joints are NOT involved in rheumatoid but are in osteoarthritis.

movement worsens pain in osteoarthritis = night stiffness

Movement eases pain in rheumatoid = morning stiffness

Soft joints = rheumatoid

Hard joints = osteoarthritis (due to bone on bone)

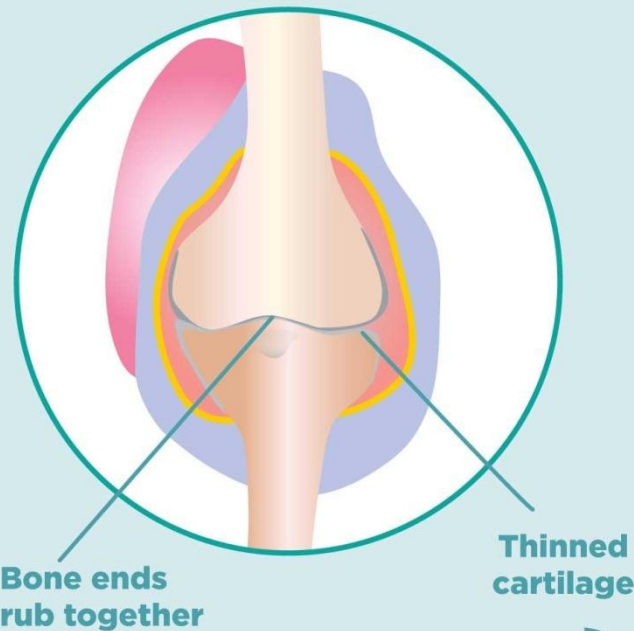
Check immune system to check if immune system has attacked the joints.

If yes = rheumatoid

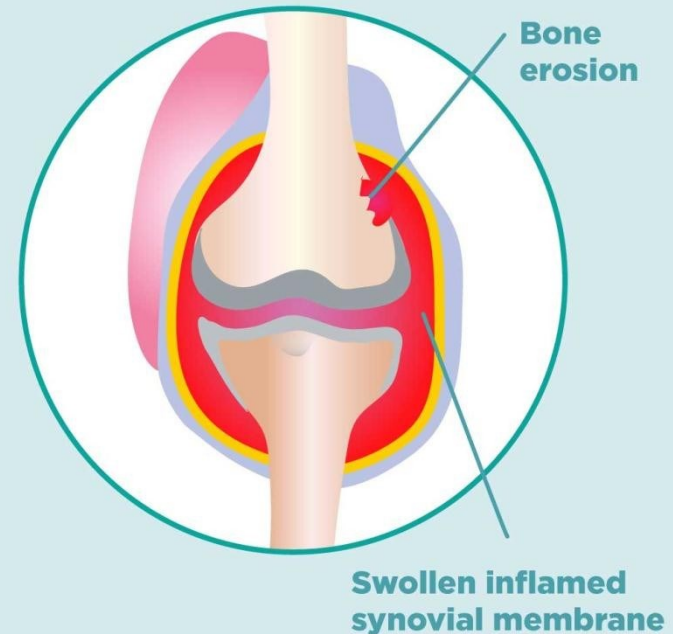
If no = osteoarthritis

# Osteoarthritis vs. Rheumatoid Arthritis in the Joint

Osteoarthritis



Rheumatoid Arthritis



→ Rheumatoid : synovial membrane undergoes hypertrophy leading to erosion.  
→ Osteoarthritis : synovial membrane doesn't undergo hypertrophy.

# Management of OA

---

- Establish the diagnosis of OA on the basis of history and physical and x-ray examinations
- Decrease pain to increase function
- Prescribe progressive exercise to
  - Increase function
  - Increase endurance and strength
  - Reduce fall risk
- Patient education: Self-Help Course
  - Weight loss
  - Heat/cold modalities

**The pain in o  
osteoarthritis is  
what needs to be  
addressed.**

**We deal with it  
using analgesics +  
nonpharmacologic  
therapy.**

# Pharmacologic Management of OA

---

- Nonopioid analgesics
- Topical agents
- Intra-articular agents
- Opioid analgesics
- NSAIDs
- Unconventional therapies



# Sheet# 2

- Nonpharmacologic Therapy :
1. Exercise ( low pressure like walking , swimming )
  2. Cold packs for acute joint pain ( = vasoconstriction )
  3. Warm packs for chronic joint pain

Irritant on irritated joint = no pain ( counter irritant topical creams )

Worn away cartilage ( hyaluronic acid ) can be replaced with injections that will act as nutrition for the cartilage. Not long-lasting. Needs frequent treatment.

There is no permanent treatment. These are only symptomatically treatment.

# Nonopioid Analgesic Therapy

---

- First-line—Acetaminophen
  - Pain relief comparable to NSAIDs, less toxicity
  - Beware of toxicity from use of multiple acetaminophen-containing products
  - Maximum safe dose = 4 grams/day

**Paracetamol is the first drug we use.  
Has no anti-inflammatory , nonsteroidal , non opioid.**

# Sheet# 3

First Line : paracetamol (acetaminophen)

For Example : Panadol

It works by inhibiting cox 2 (central)

Might also inhibit cox 3

Has no peripheral effects in therapeutic doses.

Has no anti-inflammatory effects

Analgesic alone

No over 4mg a day.

# Nonopioid Analgesic Therapy (cont'd)

---

- NSAIDs
  - Use generic NSAIDs first
  - If no response to one may respond to another
  - Lower doses may be effective
  - Do not retard disease progression
  - Gastroprotection increases expense
  - Side effects: GI, renal, worsening CHF, edema
  - Antiplatelet effects may be hazardous

# Sheet# 4

Second Line : conventional NSAIDS.

A. Ibuprofen

B. naproxen

They are non-selective.

They are harmful for GI , kidney , blood ( anti platelet effect ) so, we start at lower doses.

Does not retard disease progression!!!

# Nonopioid Analgesics in OA

---

- Cyclooxygenase-2 (COX-2) inhibitors
  - Pain relief equivalent to older NSAIDs
  - Probably less GI toxicity
  - No effect on platelet aggregation or bleeding time
  - Side effects: Renal, edema
  - Older populations with multiple medical problems not tested
  - Cost similar to generic NSAIDs plus proton pump inhibitor or misoprostol

# Sheet# 5

Third Line : Cox-2 inhibitors

Different from paracetamols due to lower GIT toxicity so no need for proton pumps.

can harm kidneys ( cox-2 inhibitors inhibit the cox-2 in kidneys )

# Nonopioid Analgesics in OA (cont'd)

---

- Tramadol
  - Affects opioid and serotonin pathways
  - Nonulcerogenic
  - May be added to NSAIDs, acetaminophen
  - Side effects: Nausea, vomiting, lowered seizure threshold, rash, constipation, drowsiness, dizziness



# Sheet# 6

Fourth Line : Opioid analgesics

1. Tramadol is a weak opioid analgesic

can be added with paracetamol

has a lower seizure threshold

can cause constipation and fatigue , dizziness and depression

only in very severe pain.

2. codeine and oxycodone are also weak opioid analgesics.

3. propoxyphene , a morphine

4. morphine and fentanyl patches ( under the clavicle )

morphine and fentanyl are only given in cases of pain that stops daily activities.

# Opioid Analgesics for OA

---

- Codeine, oxycodone
  - Anticipate and prevent constipation
  - Long-acting oxycodone may have fewer CNS side effects
- Propoxyphene
- Morphine and fentanyl patches for severe pain interfering with daily activity and sleep

# Topical Agents for Analgesia in OA

---

- Local cold or heat: Hot packs, hydrotherapy
- Capsaicin-containing topicals
  - Use well supported by evidence
  - Use daily for up to 2 weeks before benefit
  - Compliance poor without full instruction
  - Avoid contact with eyes
- Liniments = methyl salicylates
  - Temporary benefit

**Capsaicin is an irritant ( leads to counter irritant ).  
Daily use. two weeks to work.**

# OA: Intra-articular Therapy

---

- Intra-articular steroids
  - Good pain relief
  - Most often used in knees, up to q 3 mo
  - With frequent injections, risk infection, worsening diabetes, or CHF
- Joint lavage
  - Significant symptomatic benefit demonstrated
- Hyaluronate injections\*
  - Symptomatic relief
  - Improved function
  - Expensive
  - Require series of injections
  - No evidence of long-term benefit
  - Limited to knees

# Sheet# 7

Intra- articular Therapy :

steroid injections can cause cartilage damage so only use it 3 times/year maximum. only after severe flare of disease. Can be systemically absorbed. no evidence of long-term benefits. needs frequent injections.

Hyaluronic injections can only be injected into the knees.

Joint lavage : doctor who cleans the bone fragments from the cartilage

# OA: Unconventional Therapies

---

- Polysulfated glycosaminoglycans—nutriceuticals
  - Glucosamine +/- chondroitin sulfate:  
Symptomatic benefit, no known side effects,  
long-term controlled trials pending
- Tetracyclines as protease/cytokine inhibitors
  - Under study
  - Have disease-modifying potential

**Nutriceuticals : nutritional injections for the cartilage.  
For Example : glucosamine + Chondroitin sulfate.  
No proof of being 100% curative.**

# OA: Management Summary

---

- First: Be sure the pain is joint related (not a tendonitis or bursitis adjacent to joint)
- Initial treatment
  - Muscle strengthening exercises and reconditioning walking program
  - Weight loss
  - Acetaminophen first
  - Local heat/cold and topical agents

# OA: Management Summary (cont'd)

---

- Second-line approach
  - NSAIDs if acetaminophen fails
  - Intra-articular agents or lavage
  - Opioids
- Third-line
  - Arthroscopy
  - Osteotomy
  - Total joint replacement

→ Osteotomy : they remove a piece of bone from the top or bottom bone to align the joints and relieve the pressure off destroyed areas.



Discuss total joint replacement for osteoarthritis of the hip, knee, or shoulder if steps below are unsuccessful

Consider hyaluronic acid injection for persistent knee osteoarthritis

Consider corticosteroid injection for acute exacerbation of knee osteoarthritis

Consider opioid therapy, but monitor carefully for dependence and abuse

Add combination glucosamine and chondroitin for moderate to severe knee osteoarthritis; discontinue if no change after three months, but continue if effect is noted

Start NSAID therapy, beginning with over-the-counter ibuprofen or naproxen; switch to different NSAID if initial choice is not effective; use generics if possible

Begin with acetaminophen and continue if still effective, or step up to NSAID

Encourage regular exercise throughout treatment and encourage weight loss if patient is overweight or obese  
Consider physical therapy referral for supervised exercise (land- or water-based); consider bracing and splinting

Mild osteoarthritis

Moderate osteoarthritis

Severe osteoarthritis

