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# Patient **case study.**

## Osteoarthritis

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PM-GL-PAN-24-00009

# Alex

## 67 years.

Alex presents with right knee pain and stiffness.

She had diffuse, aching pain over the right knee with periodic sharp exacerbations for two years.

She says pain aggravates on walking and relieves with rest.

She has joint stiffness in the mornings that lasts for less than 15 minutes and disappears on resuming activities.

She has experienced slight swelling of the right knee joint for the past week.

## Past history and family history:

**No history of:**

- Fever or loss of weight or appetite.
- Trauma, injury, fall, sprain or surgery.

**No history of:**

- Chronic disease, ailment or drug allergy.
- Gout, rheumatoid arthritis, degenerative joint disease.

**Prolonged history** of dyspepsia and often complains of acidity.

In the past, has taken some pain killers 'on and off'.

**Family history** revealed that her mother had osteoarthritis (OA).

OA, osteoarthritis.

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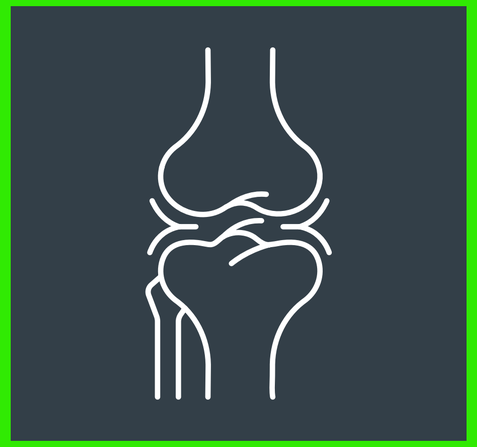
# Clinical examination.

- General appearance:
  Well-nourished lady with mild limping gait.
- BP: 130/80mmHg, PR: 78bpm.
- Temperature: 98.6°F.
- BMI: 27.6.
- Lungs/CVS/Abdomen: NAD.
- CNS: Higher mental function-normal.
- ESR and CRP were normal.
- X-ray of knee shows narrowing of joint space, mild effusion and osteophytic projections.



BMI, body mass index; BP, blood pressure; CNS, central nervous system; CRP, C-reactive protein; CVS, cardiovascular system; ESR, erythrocyte sedimentation rate; NAD, nothing abnormal detected; PR, pulse rate.

## What are the possible causes for Alex's stiffness and pain?[1,2]

### Rheumatoid arthritis

- Predominantly affects small joints, and more than one joint.
- Associated symptoms like fever and weight loss.

### Bursitis

- Swelling, redness, and tenderness on pressure.
- Pain aggravates on moving.
- History of injury.
- No morning stiffness.

### Primary OA

- Pain aggravates with activity and relieves with rest.
- Stiffness that lasts for less than 30 minutes each morning.
- Bony joint enlargement.
- Loss of function.

### Psoriatic arthritis

- Features of psoriasis.
- Distal interphalangeal joints commonly affected.
- Typical X-ray findings.

OA, osteoarthritis.

1. Sen R, Hurley J. *Treasure Island (FL): StatPearls Publishing* 2021. Available at: www.ncbi.nlm.nih.gov/books/NBK482326 (last accessed May 2021). 2. Sankowski A. *Pol J Radiol* 2013;78(1):7-17.

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Differential diagnosis

# What are the possible causes for Alex's stiffness and pain?

**PRIMARY OA**

**RHEUMATOID ARTHRITIS**

**BURSITIS**

**PSORIATIC ARTHRITIS**

OA, osteoarthritis.

## Differential diagnosis

**Alex was diagnosed by an orthopaedic surgeon as grade-3 OA, based on the following radiological investigation criteria.**

### Radiological features for grading[1]

- Formation of **osteophytes** on the joint margins or, in the case of the knee joint, on the tibial spines.
- **Periarticular ossicles**; these are found chiefly in relation to the distal and proximal interphalangeal joints.
- **Narrowing of joint cartilage** associated with sclerosis of subchondral bone.
- Small **pseudocystic areas with sclerotic walls** situated usually in the subchondral bone.
- **Altered shape of the bone ends**, particular in the head of the femur.

**Radiographic criteria for assessment of OA[1]**

| | | |
|---|---|---|
| **Grade 0** | None | No features of OA |
| **Grade 1** | Doubtful | Minute osteophyte, doubtful significance |
| **Grade 2** | Minimal | Definite osteophyte, unimpaired joint space |
| **Grade 3** | Moderate | Moderate diminution of joint space |
| **Grade 4** | Severe | Joint space greatly impaired with sclerosis of subchondral bone |

**Reproduced from Spector and Cooper (1993. Osteoarthritis and Cartilage 1:203-206) with permission.**
OA, osteoarthritis.
1. Arden N, Nevitt M. *Best Pract Res Clin Rheumatol* 2006;20(1):3-25.

## Possible reasons for development of primary OA.

### Oestrogen deficiency-related

- Alterations in chondrocytes and extracellular matrix.
- High subchondral bone turnover.
- Loss of bone mass.
- Loss of muscle mass, strength and functional capacity.
- Increased joint laxity.
- Increased fat mass associated to higher adipokine levels.

### Genetically-induced

- Susceptibility genes for OA, bone mass density and skeletal shape.
- Heritability-determined cartilage volume and OA progression.
- Gene mutations causing alterations in chondrocytes and extracelular matrix.
- Premature OA and dwarfism in skeletal dysplasias.

### Aging-related

- Alterations in chondrocytes and extracellular matrix.
- Decreased subchondral thickness and density.
- Sarcopenia and decline in regenerative capacity.
- Tendon stiffness.
- Loss of proprioception and balance.
- Increased joint laxity.

# Osteoarthritis[1]

OA, osteoarthritis.

1. Sen R, Hurley J. *Treasure Island (FL): StatPearls Publishing* 2021. Available at: www.ncbi.nlm.nih.gov/books/NBK482326 (last accessed May 2021). 2. Sankowski A. *Pol J Radiol* 2013;78(1):7-17.

## What are the risk factors for OA?[1]

### Modifiable local risk factor

1. Muscle strength
2. Physical activity/ occupation
3. Joint injury
4. Joint alignment
5. Leg length inequality

### Modifiable systemic risk factors

1. Obesity
2. Diet
3. Bone metabolism

### Unmodifiable systemic risk factors

1. Age
2. Sex
3. Genetics
4. Ethnicity

**Susceptible joint**

**Predisposed individual**

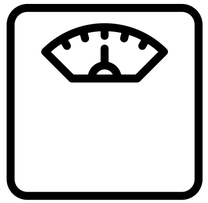
# Increased risk of incident OA

OA, osteoarthritis.

1. Johnson V, Hunter D. *Best Pract Res Clin Rheumatol* 2014;28(1):5–15.

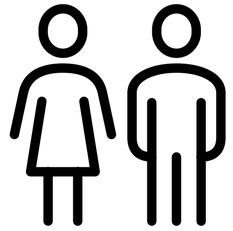
# Risk factors for OA in Alex.[1]

Older age



Obesity

Heredity

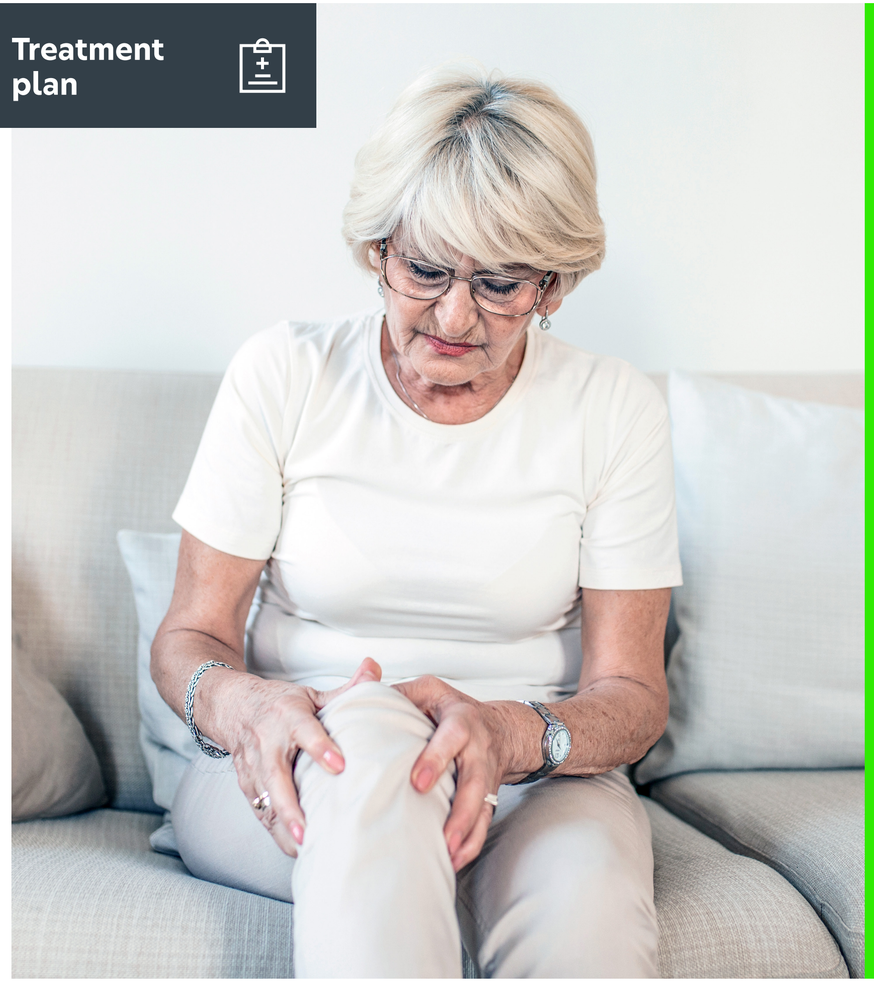


Gender

OA, osteoarthritis.

1. Johnson V, Hunter D. *Best Pract Res Clin Rheumatol* 2014;28(1):5–15.

Treatment plan



# Clinical recommendations for Alex, based on ACR guidelines.

## Lifestyle modification

- Exercise.
- Weight loss.

## Non-pharmacologic

- Heat, therapeutic cooling.
- Tibiofemoral knee brace for stability.
- Balance training.
- Yoga.

## Pharmacologic

- Topical NSAID.

  **or**

- Oral NSAIDs.

NSAID, non-steroidal anti-inflammatory drug.

1. Kolasinski S, *et al. Arthritis Care Res* 2020:72(2):149-162.

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Treatment plan

# What **modalities** can be used to treat Alex?

**WEIGHT LOSS**

**EXERCISE**

**PHYSIOTHERAPY**

**PHARMACOLOGICAL MANAGEMENT**

**ALL OF THE ABOVE**

# Lifestyle modification for Alex[1]

**Regular walking**

**Exercise therapy:** muscle strengthening and range of motion

**Balance training and yoga**

**Healthy diet for weight loss**

1. Johnson V, Hunter D. *Best Pract Res Clin Rheumatol* 2014:28(1):5-15.

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Treatment plan

# What are the possible therapeutic options for Alex?

**TOPICAL DICLOFENAC**

**ORAL PARACETAMOL**

**ORAL IBUPROFEN**

**ALL OF THE ABOVE**

Clinical evidence

# What do guidelines recommend?

## Topical NSAIDs

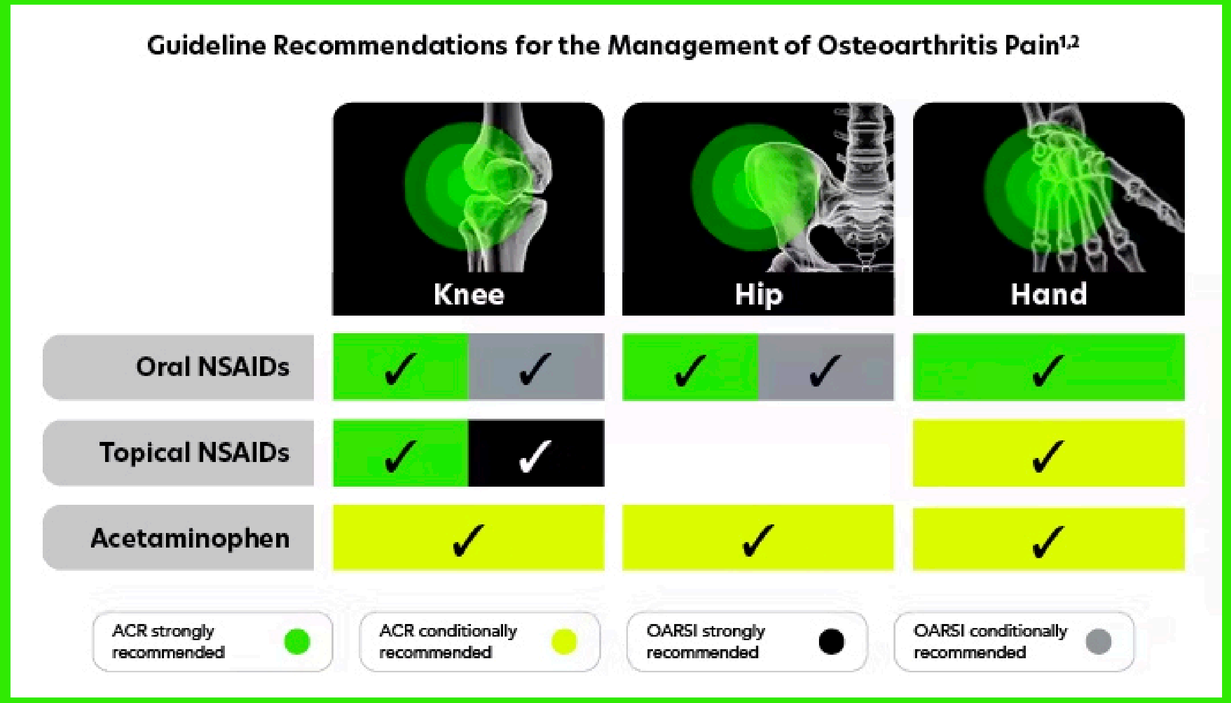
There is strong-grade evidence from over 13 clinical guidelines & systematic reviews recommending use of topical NSAIDs over systemic treatments due to a more favorable safety profile.

## Acetaminophen for OA

Based on guidelines & peer-reviewed literature, the role of acetaminophen in OA has been downgraded to neutral or weak recommendation.

ACR, American College of Rheumatology and the Arthritis Foundation; NICE, National Institute for Health and Care Excellence; NSAID, non-steroidal anti-inflammatory drug; OA, osteoarthritis; OARSI, Osteoarthritis Research Society International; PANLAR, Pan American League of Associations for Rheumatology; RACGP, The Royal Australian College of General Practitioners.

# Guideline Recommendations for the Management of Osteoarthritis Pain




According to the most recent OA treatment guidelines from the ACR and OARSI, healthy habits like exercising and losing excess weight are first-line defenses against OA.[24,25]

**ACR and OARSI guidelines favor NSAIDs like Voltaren and Advil as a first-line treatment of OA pain:**

- **The ACR strongly recommends NSAIDs** like Voltaren and Advil for first-line relief of OA pain
  - Strongly recommends a topical NSAID like **Voltaren** for OA of the knee[24]
  - Strongly recommends an oral NSAID like **Advil** for OA pain of the knee, hip, and/or hand[1]
- **The OARSI strongly recommends a topical NSAID** like Voltaren for OA of the knee[25]
  - Conditionally recommends an **oral NSAID** like Advil for OA pain of the knee for patients without comorbidities[25]

**The guidelines have doubts about acetaminophen**

- The ACR conditionally recommends acetaminophen for OA pain of the knee, hip, and/or hand[24]
  - However, ACR also states that for most individuals, acetaminophen is ineffective for treating the symptoms of OA[24,26]
- The OARSI has no recommendation for acetaminophen. Evidence summarized in an updated meta-analysis suggests that acetaminophen has little to no efficacy in individuals with OA, with a signal for possible hepatotoxicity.[25]

ACR=American College of Rheumatology.
NSAIDs=nonsteroidal anti-inflammatory drugs.
OARSI=Osteoarthritis Research Society International.

# Summary

**A 67-year-old lady** presented with right knee pain and stiffness each morning for the last 2 years.

- **Symptoms have worsened over the last 5-6 months,** affecting her daily activities. Pain tends to worsen throughout the day, whereas stiffness tends to improve. She had also noticed slight swelling of the right knee joint for the past 1 week.
- **She has a prolonged history of dyspepsia** and often complains of acidity. X-ray of knee shows narrowing of joint space, mild effusion and osteophytic projections.
- Based on the clinical features and radiological findings **a diagnosis of primary OA was made.**

**Application of topical diclofenac 1% gel (4g), four times a day for this patient.**

OA, osteoarthritis; SOS, as necessary.

1. United States Food & Drug Administration (FDA). Voltaren Gel (diclofenac sodium topical gel). Highlights of prescribing information. Available at: www.accessdata.fda.gov/drugsatfda_docs/label/2009/022122s006lbl.pdf (last accessed May 2021).

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23. Witten PJ, Xia J. *Curr Med Res Opin* 2020;36(4):637-650.

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