



Osteoarthritis Pathways: A Comprehensive Approach to a Multifaceted Condition

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Disclosures:

- None

Objectives

- Understand the breadth and depth of knee and hip OA
- To be able to discuss the pathophysiology of OA
- To feel confident in developing a patient centered, evidence-based OA management plan
- Understand the timing and role of joint replacement

Case 1	Case 2	Case 3
<ul style="list-style-type: none">• Gravity of OA• Pathophysiology• Risk factors• Diagnosis• Imaging• Core strategies	<ul style="list-style-type: none">• Pain in OA• Assessment• Medication• Injections• Nutrition• MI	<ul style="list-style-type: none">• Lifeline of a joint• Low yield therapy• Joint arthroplasty• Therapeutics

Case 1

Mary is a 51 F

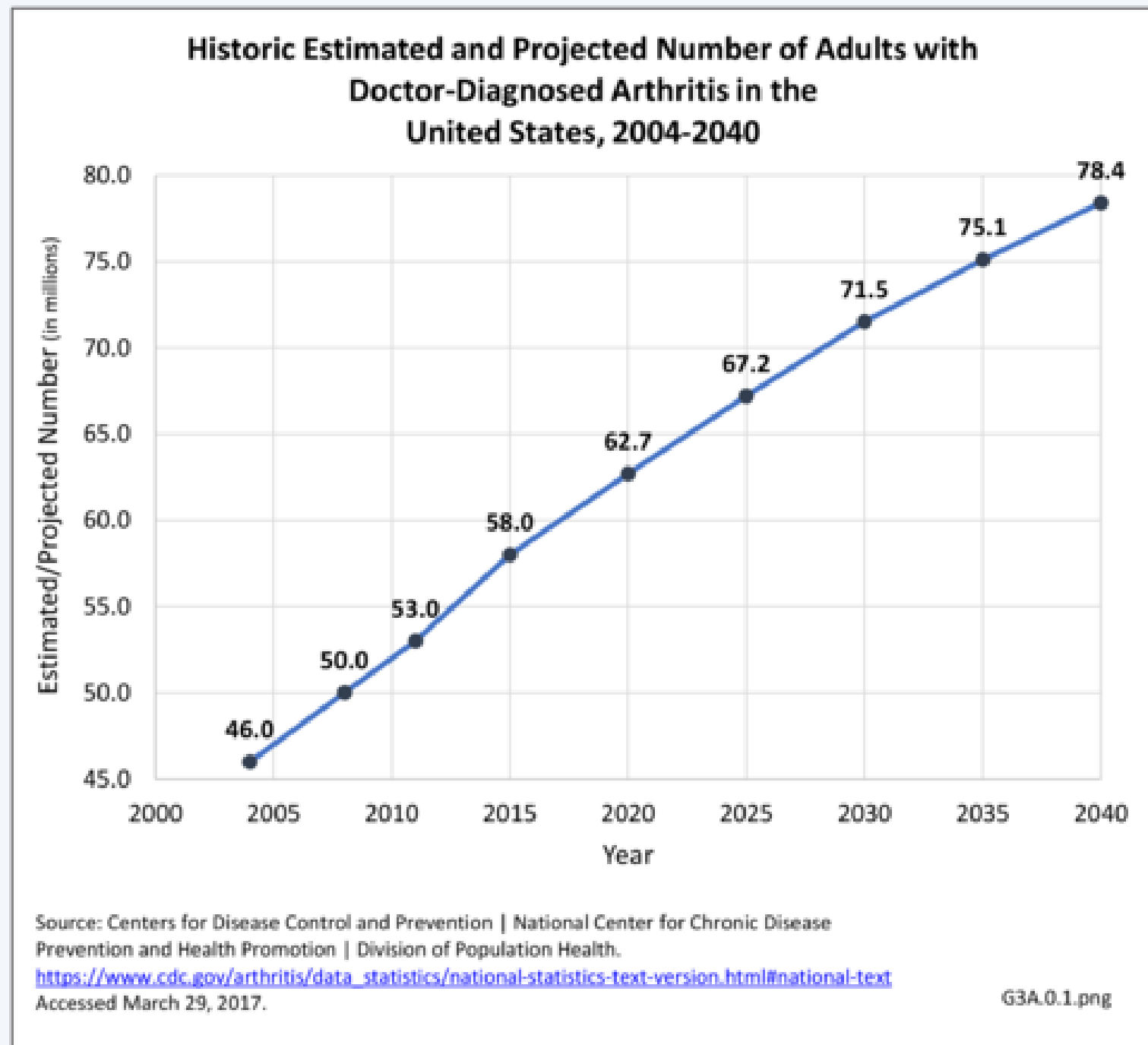
PMH: HTN, prediabetes, GERD, BMI of 37

- L knee pain x 3 months without injury
- gardening
- intermittent L knee pain in the past
- improved, uncomfortable on stairs + uneven ground.

Case 1 continued

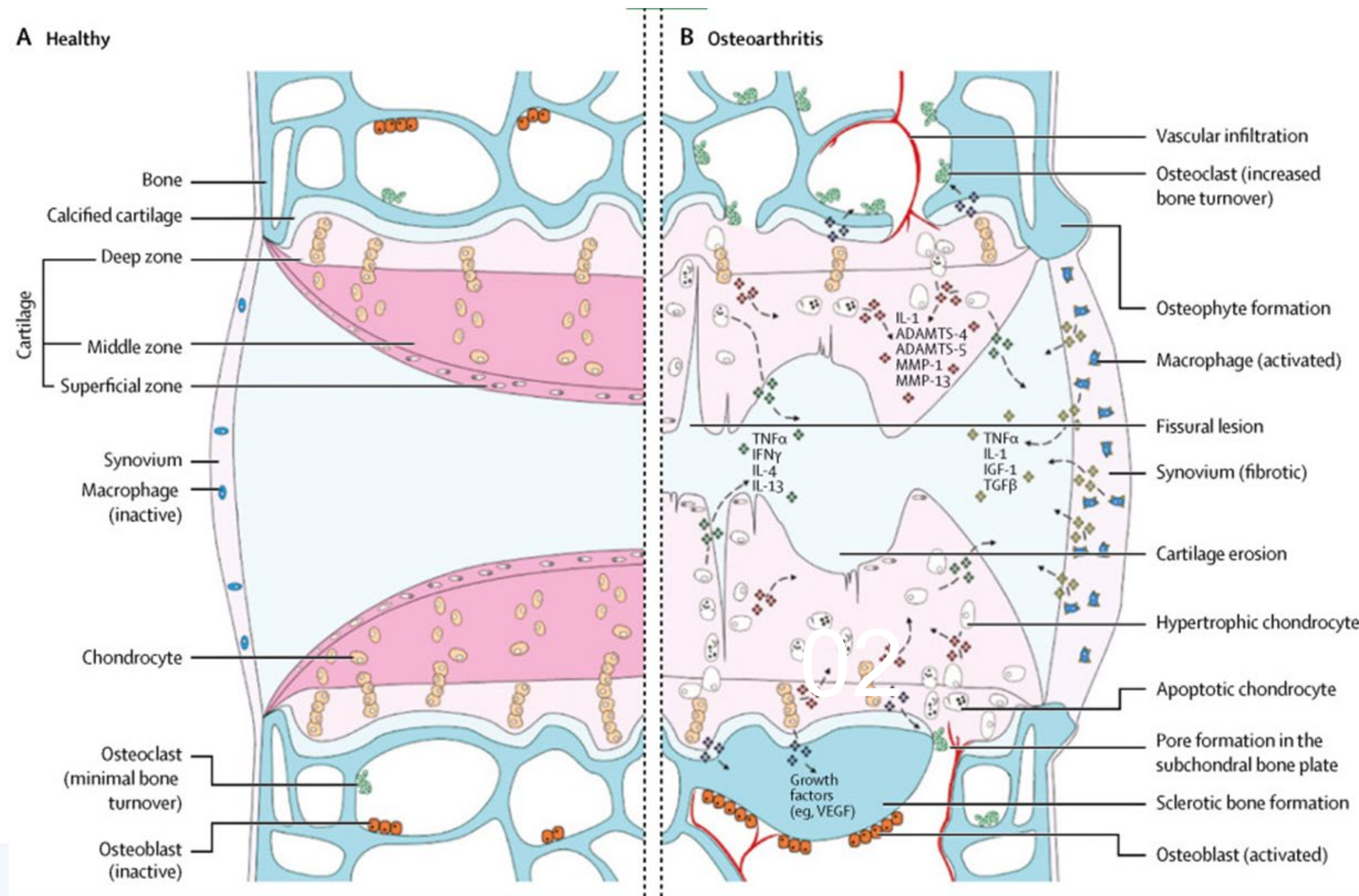
- tried ice, rest, ibuprofen 400 mg 1-2 x / day
- minimal rest pain, no locking / giving way
- 15 min of stiffness of am stiffness
- taking the elevator at work and missing her son's games
- X-ray: mild to moderate medial compartment OA

The Gravity of Osteoarthritis



- 1 in 10 adults limit their activities related to arthritis
- \$300 billion dollar annual medical cost in lost wages, medical spending
- Risk factor for CVD (3 x as likely to have HF or CAD) and is associated with dementia
- Osteoarthritis OA is a leading cause of disability

Is it just wear and tear?



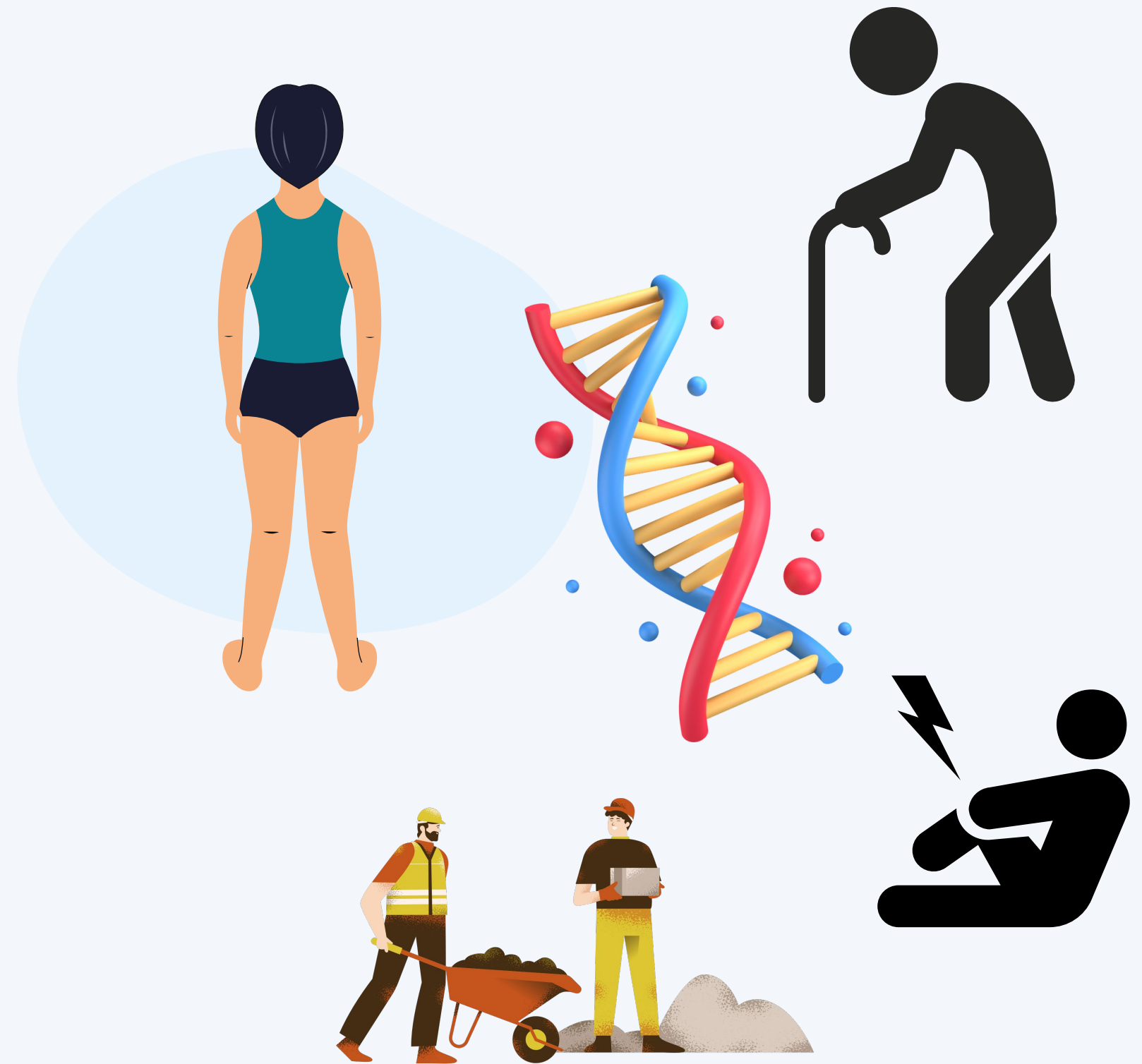
Pathophysiology: OA is a disorder of the entire joint

- Articular cartilage– fissures, volume loss
- Bone– osteophytes, subchondral changes
- Ligaments
- Periarticular muscle
- Synovitis



Risk Factors

- Increasing age
- Female gender
- Prior accident or injury
- Genetics (hip more so than the knee)
- Obesity
- Knee malalignment or hip deformity
- Heavy work activities



Diagnostic criteria:

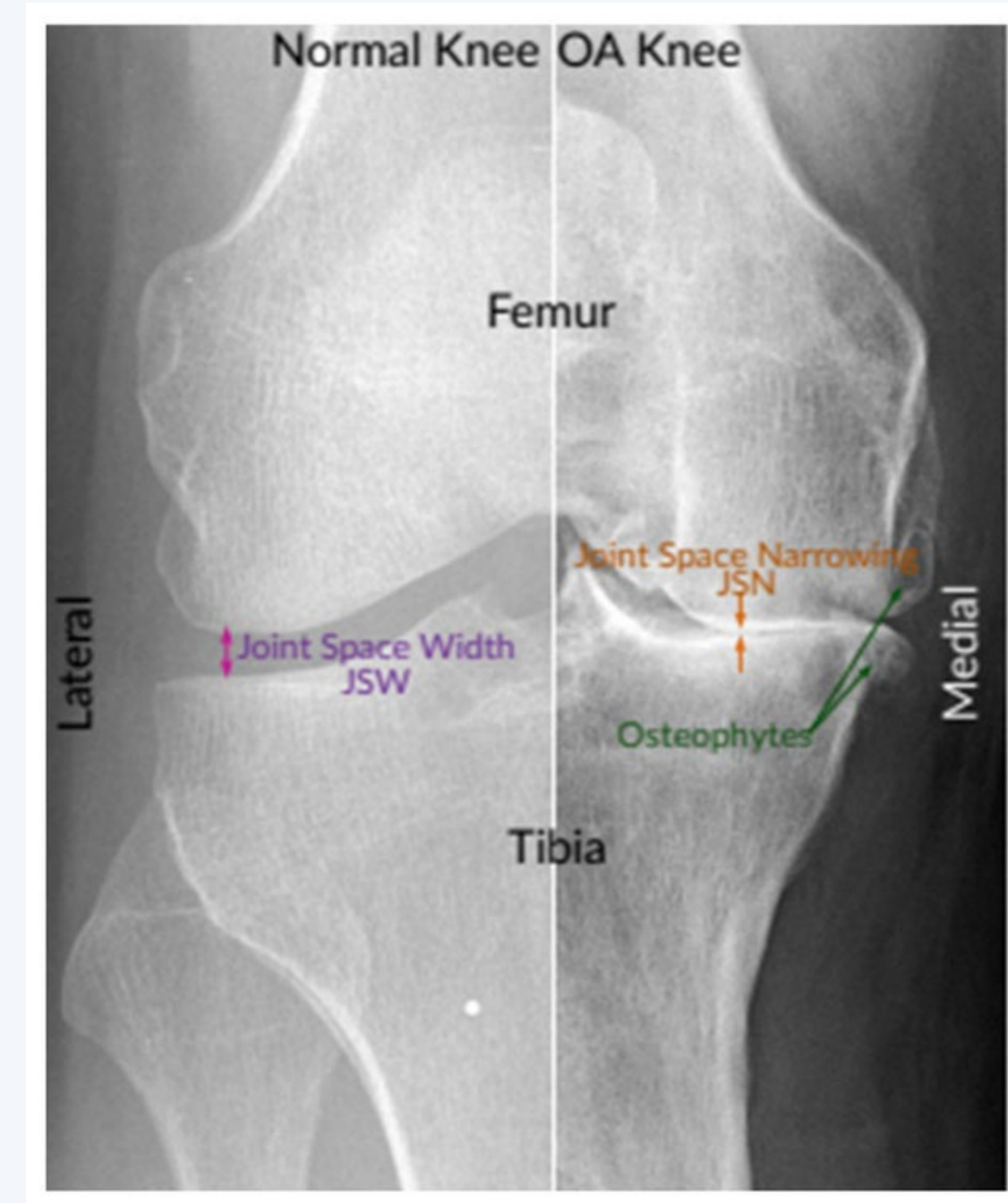
1. Persistent joint pain that is worse with use
2. Age >45
3. Less than 1 hour of morning stiffness

Physical exam findings:

- Knee: crepitus, joint line tenderness, effusion (small, cool), reduced ROM, antalgic gait
- Hip: reduced internal rotation (earliest and most affected), pain with passive and active ROM, reduced muscle bulk of the thigh, antalgic gait

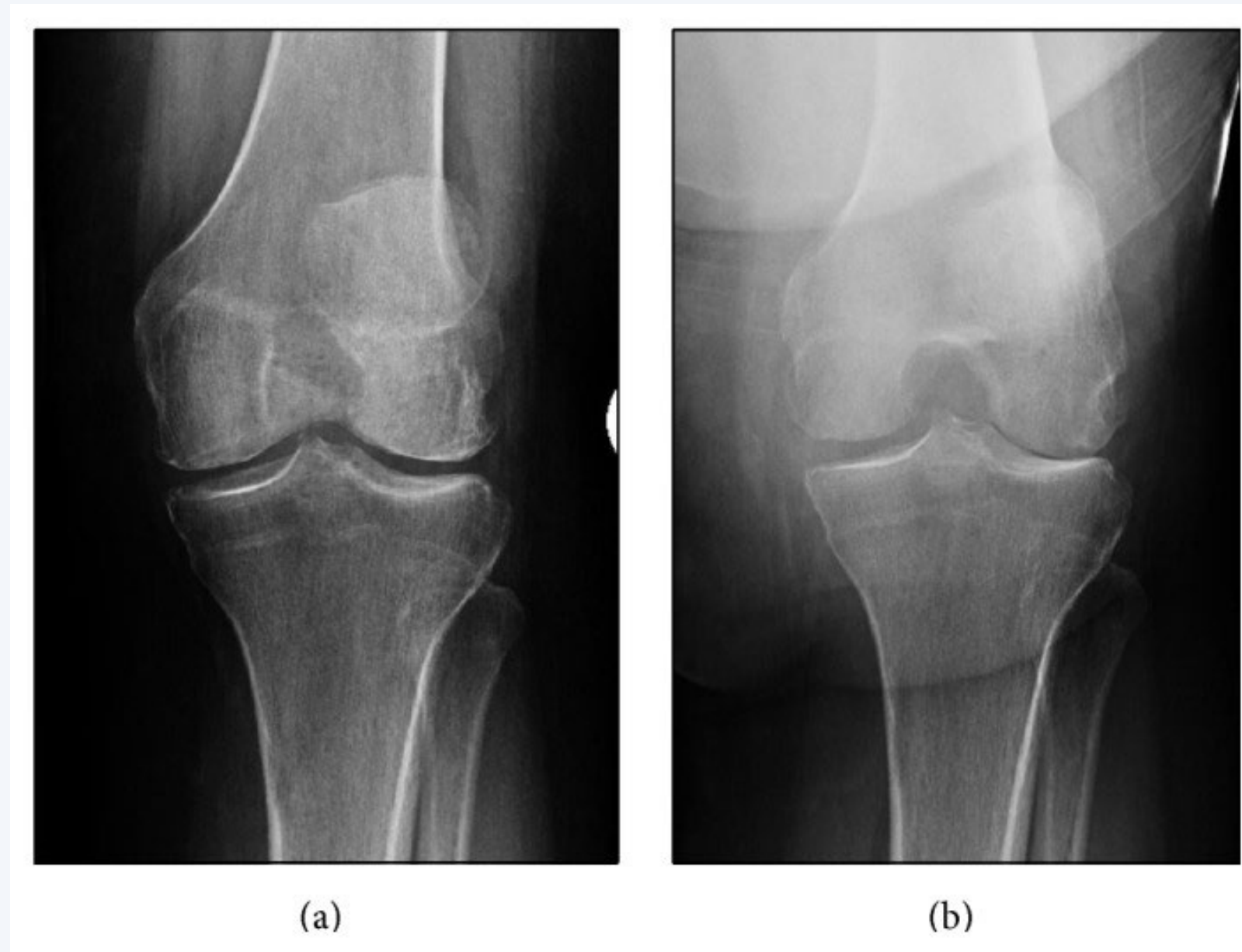
Radiographic findings

1. Osteophytes
2. Subchondral sclerosis
3. Joint space narrowing
4. Subchondral cysts



Ahmed SM, Mstafa RJ. Identifying Severity Grading of Knee Osteoarthritis from X ray Images Using an Efficient Mixture of Deep Learning and Machine Learning Models. *Diagnostics (Basel)*. 2022 Nov 24;12(12):2939. doi: 10.3390/diagnostics12122939. PMID: 36552945; PMCID: PMC9777157.

Rosenberg view



Mortensen JF, Kappel A, Rasmussen LE, Østgaard SE, Odgaard A. The Rosenberg view and coronal stress radiographs give similar measurements of articular cartilage height in knees with osteoarthritis. *Arch Orthop Trauma Surg.* 2022 Sep;142(9):2349-2360. doi: 10.1007/s00402-021-04136-z. Epub 2021 Sep 3. PMID: 34477925.

Core strategies of OA management

1. Education
2. Physical activity/physical therapy
3. Weight loss/maintenance
4. Stress and sleep management
5. Injury avoidance
6. Self efficacy

Essential education

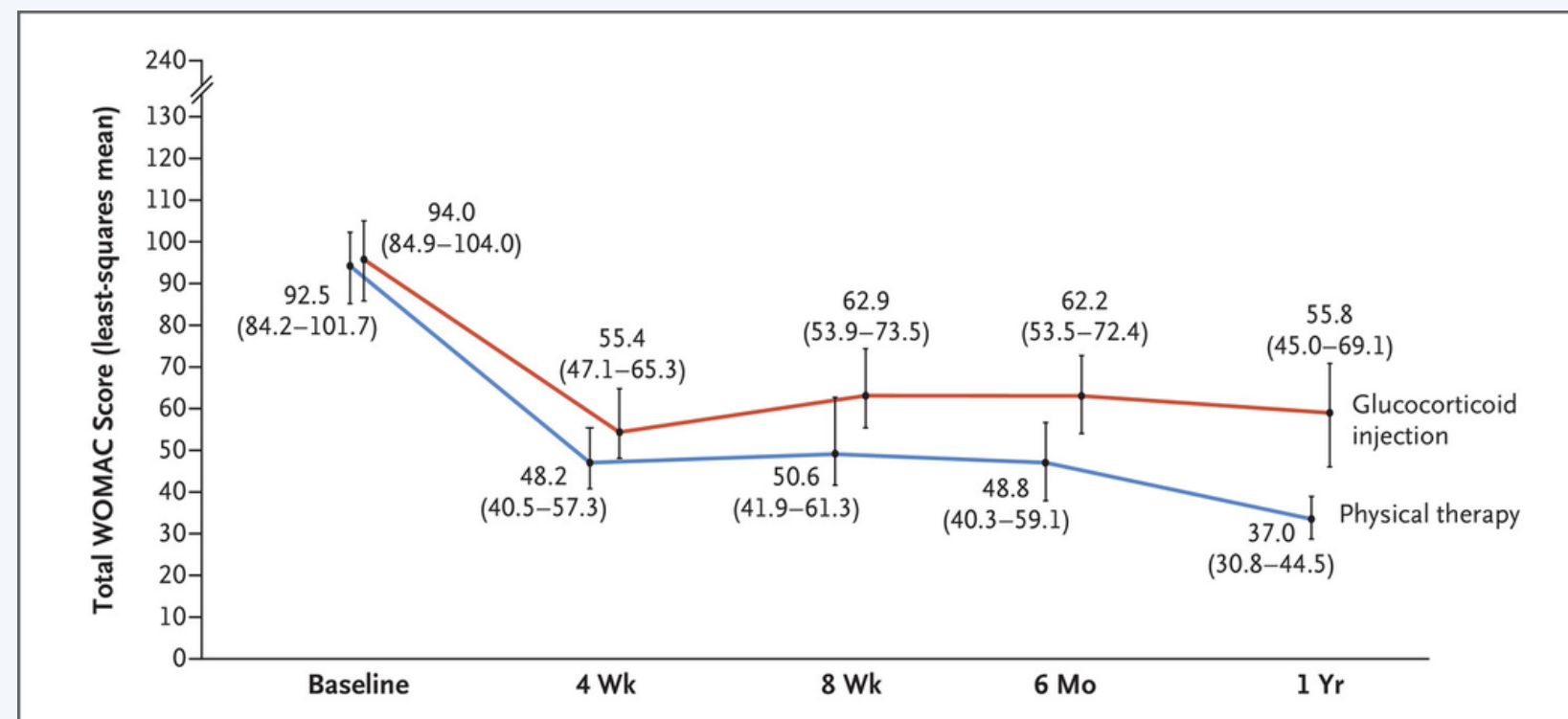
1. Osteoarthritis is a condition involving the entire joint.
2. X-ray findings poorly predict patient experience.
3. Non-medication therapies have similar benefits to pharmacologic therapy.
4. An arthritis plan should be individualized for each patient.

Education continued

5. Regular exercise/activity can improve pain, function, and prevent progression.
6. Strength and CV training should be included in the plan.
7. Losing weight can be beneficial in improving pain and preventing OA progression. Maintaining body weight is a good goal for some.
8. Not all pain in OA means there is damage occurring in the joint.

The Data:

1. Most CPGs recommend weight loss (Usually 5–10%). 2018 Arthritis Care and Function article showed an extra 25% improvement in pain and function with increasing wt loss from 10 to 20% of body weight.
2. NEJM study from 2020 showing improved improved pain, function, stiffness scores in PT v steroid injections at 1 yr.



Western Ontario and McMaster Universities
Osteoarthritis Index (WOMAC) Total Scores over
the 12 -Month Follow - up Period.

The Data:

2019 review article in *Medicine & Science in Sports & Exercise* showing:

- similar reduction in joint pain with physical activity as analgesics (although not compared head to head)
- no worsening of OA with up to 10,000 steps daily
- land based activity benefits are similar to water based

Considerations for Mary:

1. Education
2. Movement plan -biking/ walking
3. Weight management plan
4. Medication plan- diclofenac gel
5. PT referral

Case 2

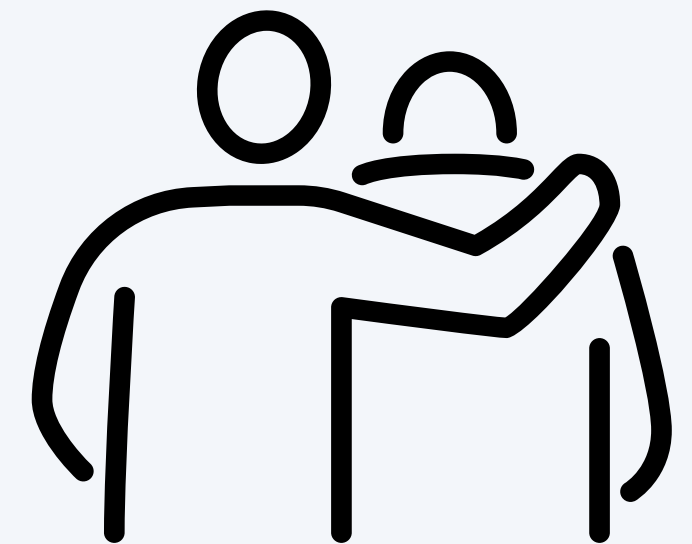
Susan is a 66 year old F

PMH: atrial fibrillation on apixaban, DM2, depression, BMI 43

- left knee pain x 15 years
- using a cane to ambulate, son helps with groceries and laundry
- notes reduced motivation, is tearful
- interested in having a knee replacement but was told weight is too high

Initial evaluation

1. Pain levels and mechanical symptoms
2. Quality of life
3. Mood
4. Sleep
5. Occupation
6. Activities/hobbies
7. Social support
8. Relevant comorbid conditions



Pain

Osteoarthritis pain is both a sensory and emotional experience, determined not only by the pathology within the joint but also moderated by the central nervous system, and interpreted within a psychosocial context. To hurt is to 'suffer pain', emphasizing pain's emotional context. Pain related suffering combines depression, anxiety, frustration, fear, and anger and is affected by both personality traits and demographic factors as well as by pain's sensory and emotional dimension.

- Oxford Textbook of Osteoarthritis and Crystal Arthropathy

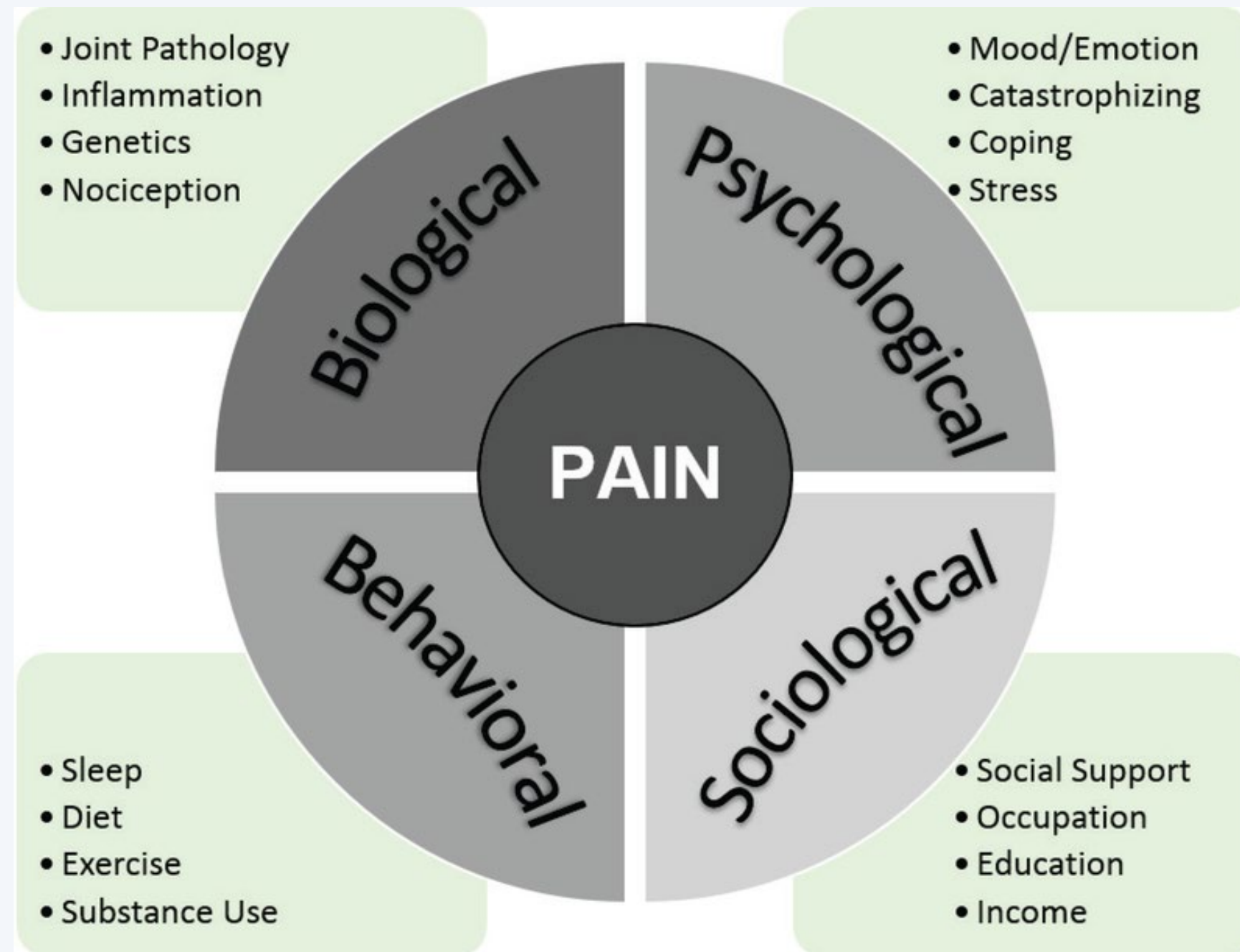
Nocioceptive pain

Peripheral
sensitization

Central pain



Biopsychosocial model of pain



Bartley EJ, Palit S, Staud R. Predictors of Osteoarthritis Pain: the Importance of Resilience.

Curr Rheumatol Rep. 2017 Sep;19(9):57. doi: 10.1007/s11926

-017 -0683 -3. PMID: 28752491;

PMCID: PMC6335024.

Pharmacologic pain management

Topical medications (knee):

1. Diclofenac gel
2. Lidocaine

Oral medications:

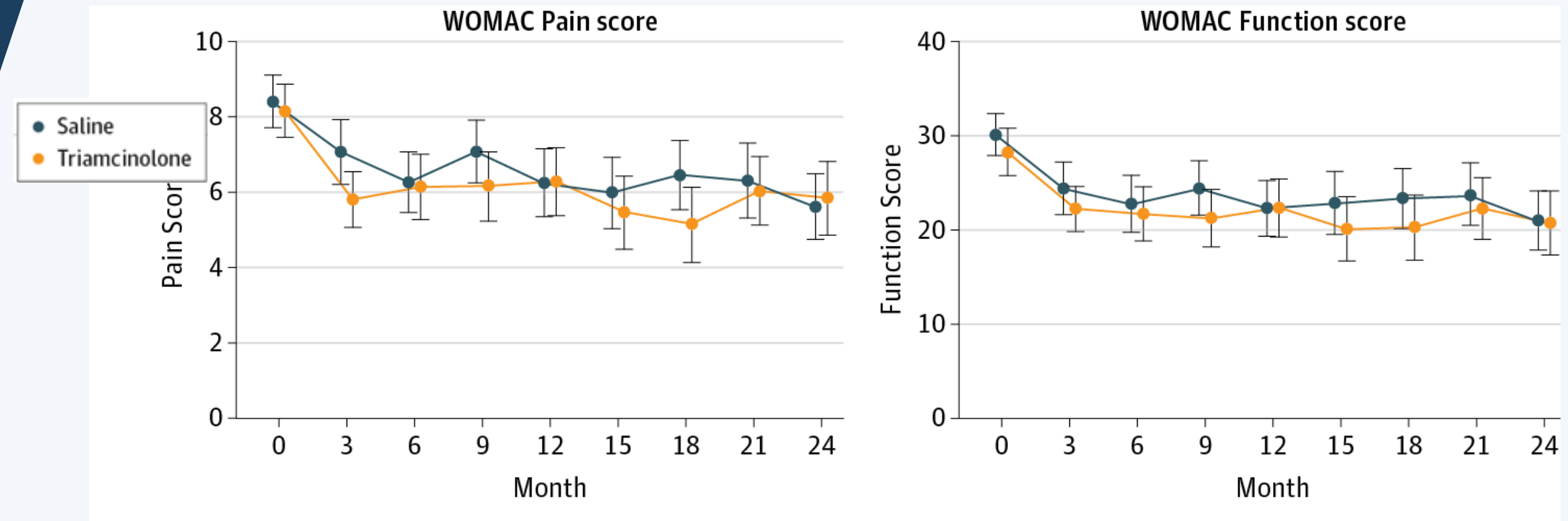
1. Nonselective NSAIDS (consider PPI for prophylaxis)
2. Selective COX2 inhibitors
3. Acetaminophen
4. Duloxetine



Injections

Corticosteroids

- widely used
- Risks: reduced cartilage thickness, infection, elevated sugars
- no difference in pain/function at 2 yrs– JAMA 2016 RCT
- consider for flare management



McAlindon TE, LaValley MP, Harvey WF, et al. Effect of Intra-articular Triamcinolone vs Saline on Knee Cartilage Volume and Pain in Patients With Knee Osteoarthritis: A Randomized Clinical Trial. JAMA. 2017;317(19):1967-1975. doi:10.1001/jama.2017.5283

Table 2. Treatment Effect on Structural Outcomes of Knees With Osteoarthritis^a

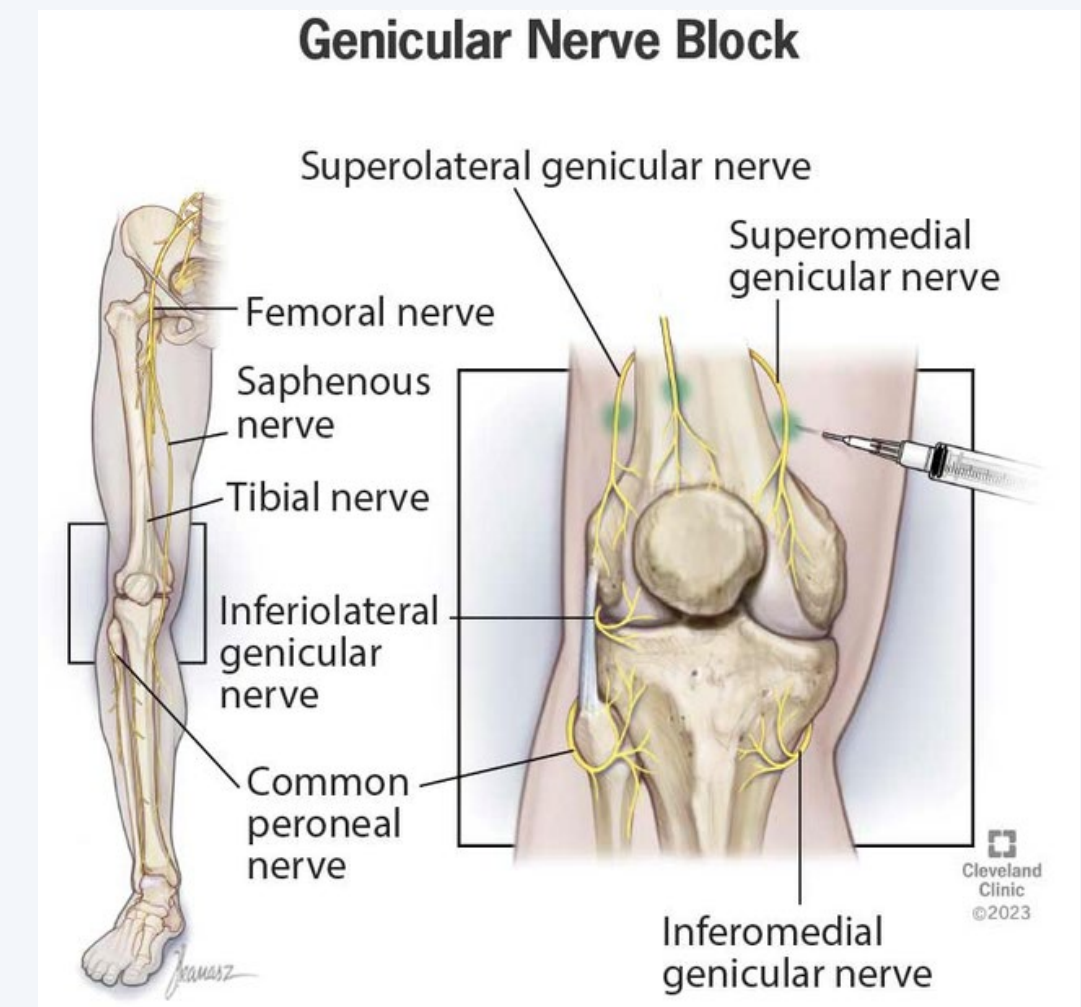
Measurement	Triamcinolone (n = 70)		Saline (n = 70)		Between-Group Difference in Change	P Value
	Mean (95% CI) Baseline	Mean (95% CI) 2-Year Change	Mean (95% CI) Baseline	Mean (95% CI) 2-Year Change		
Cartilage thickness, mm						
Index compartment	2.43 (2.27 to 2.58)	-0.21 (-0.29 to -0.14)	2.34 (2.19 to 2.50)	-0.10 (-0.16 to -0.04)	-0.11 (-0.20 to -0.03)	.01
Total mean cartilage thickness	5.58 (5.35 to 5.81)	-0.29 (-0.43 to -0.15)	5.61 (5.38 to 5.84)	-0.13 (-0.23 to -0.03)	-0.16 (-0.31 to -0.01)	.04

Visco-supplements

- Used to be derived from rooster comb, now is synthetic
- Numerous brands. Vary in cross linking and molecular weight
- BMJ review in 2022 small pain benefit, not statistically significant
- May be more effective for patients with moderate rather than severe joint space loss and with femorotibial OA rather than patellofemoral
- Avoid with extensive subchondral edema, fractures, acute inflammatory flare of OA
- Risks: local reaction, swelling, infection

Genicular nerve block/ablation

- 3–4 genicular nerves targeted
- Initial procedure is the block, if successful, followed by RFA
- RCT 2018–published in Regional Anesthesia and Pain Medicine – showing 71% of pts with >50% improvement at 6 mo
- Risks: tendon injury, hematoma, septic arthritis
- May be less effective in patients taking opiates

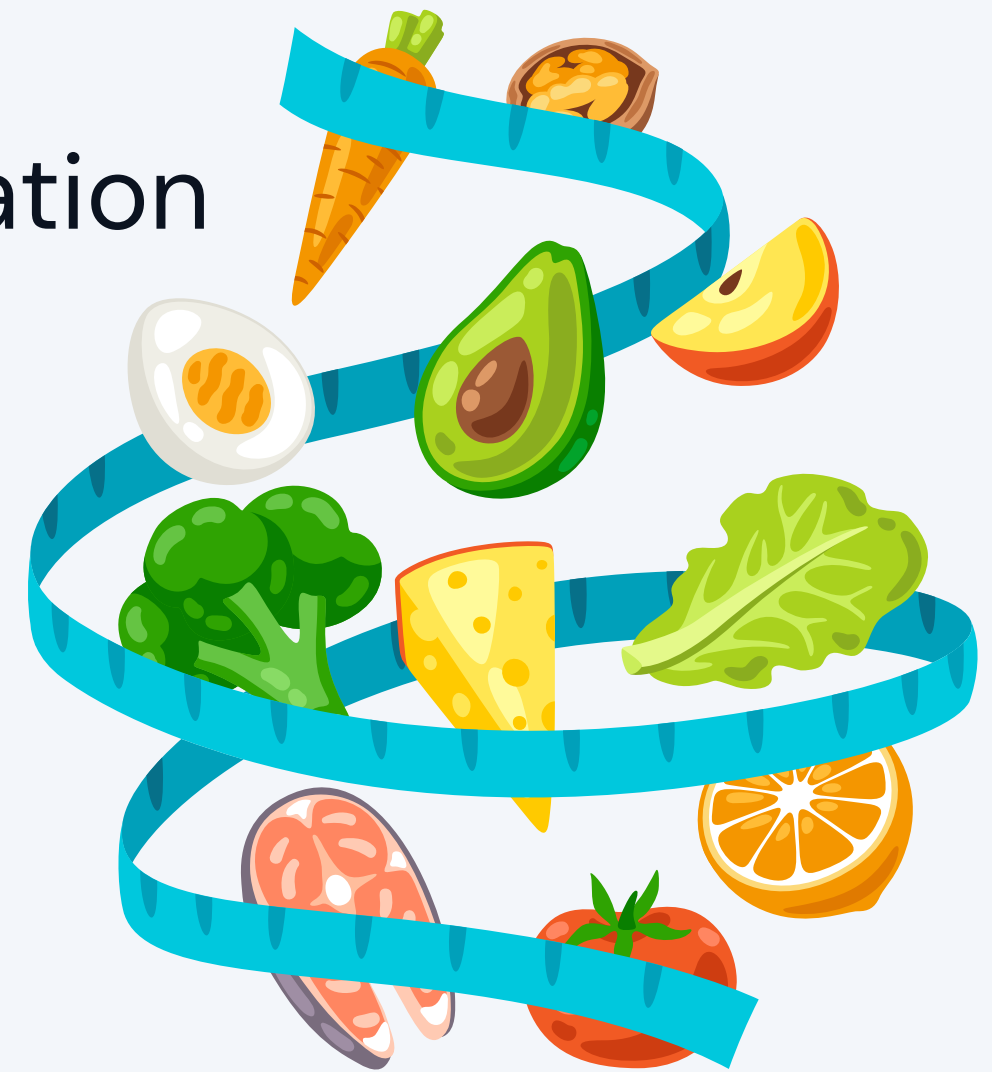


Cleveland Clinic

<https://my.clevelandclinic.org/health/treatments/24823-genicular-nerve-block>

Weight and nutrition management

1. Patient centered changes and lifestyle modification
2. Anti inflammatory diet
3. GLP-1
4. Bariatric surgery



Motivational Interviewing

A collaborative, patient centered form of guiding to elicit and strengthen motivation for change

Skills of motivational interviewing

O- open ended questions: Evoke ideas on change. What are activities you enjoy?

A- affirmations: Recognize patient's skills. How did you know that would work?

R- reflective listening: Demonstrate interest in their perspective. You are realizing that...

S- summarize: What are your next steps?

Susan's Plan

1. Education
2. Pain management: Duloxetine, consideration of referral to a therapist. Acetaminophen, diclofenac gel
3. Individual exercise plan- floor pedaling machine, PT
4. Injections could be an option- with multiple changes, could revisit next appt
5. Weight management- RD support, GLP1
6. Follow up 4-6 weeks



Case 3

John is a 68 year old male

PMH: hypertension, migraines, BMI 28

- Used to walk 18 holes of golf and bike
- Now walking under 1 mi with moderate pain + limp
- Tried PT, still does exercises but are now less effective
- Celecoxib helps some
- Pain wakes him, he is distracted by pain

John is interested in surgery but wonders about acupuncture?

**Low yield
therapies:**

Acupuncture

Stem cell

Massage

Laser therapy

Foam rollers

PRP

Tens

Gabapentin

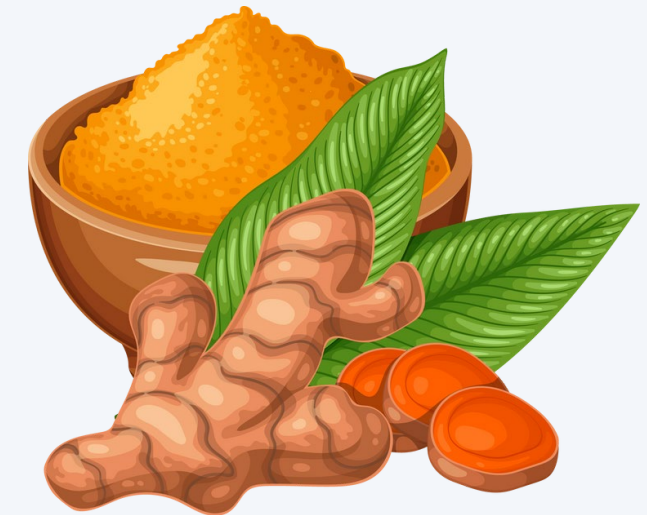
Shoe wedges

Narcotics

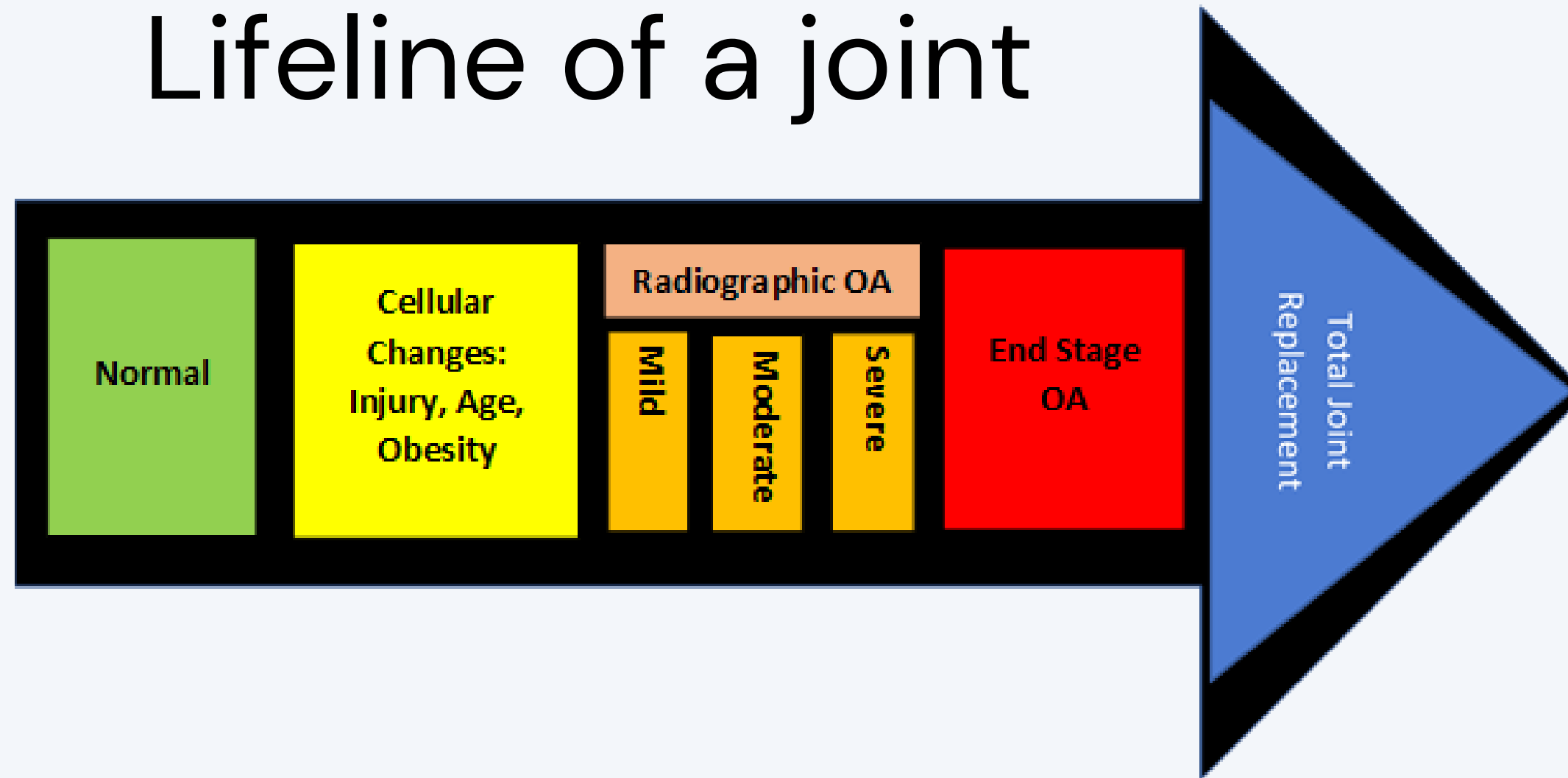
Glucosamine

Tylenol

Turmeric?



Lifeline of a joint



Courtesy of Jessica Johnson, PT

Joint arthroplasty decision

- Timing?
 - Pain levels
 - Trial of conservative measures, quality OA care
 - Would arthroplasty clearly improve abilities and quality of life?
- No upper age limit
- BMI <40, A1c <7.5, no tobacco use x 1 mo, managed osteoporosis

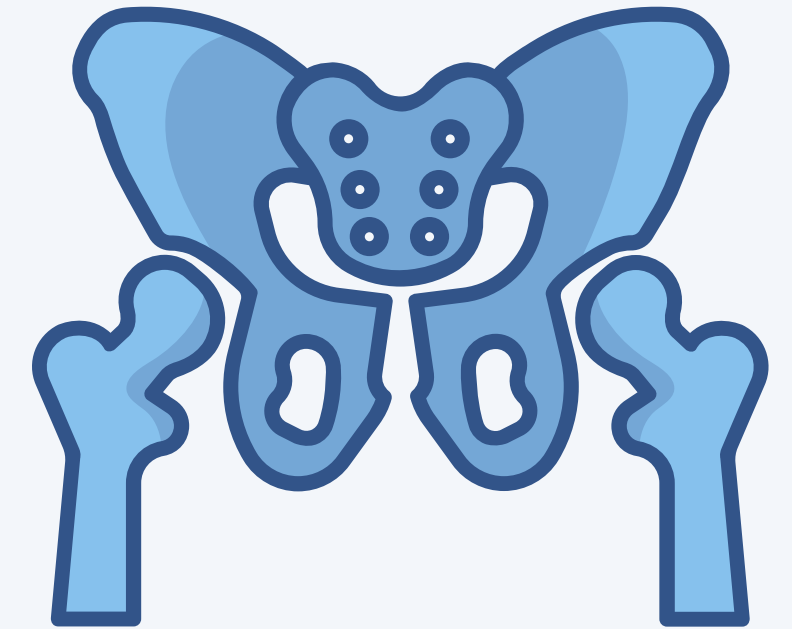
John's Plan

1. Education
2. Joint arthroplasty





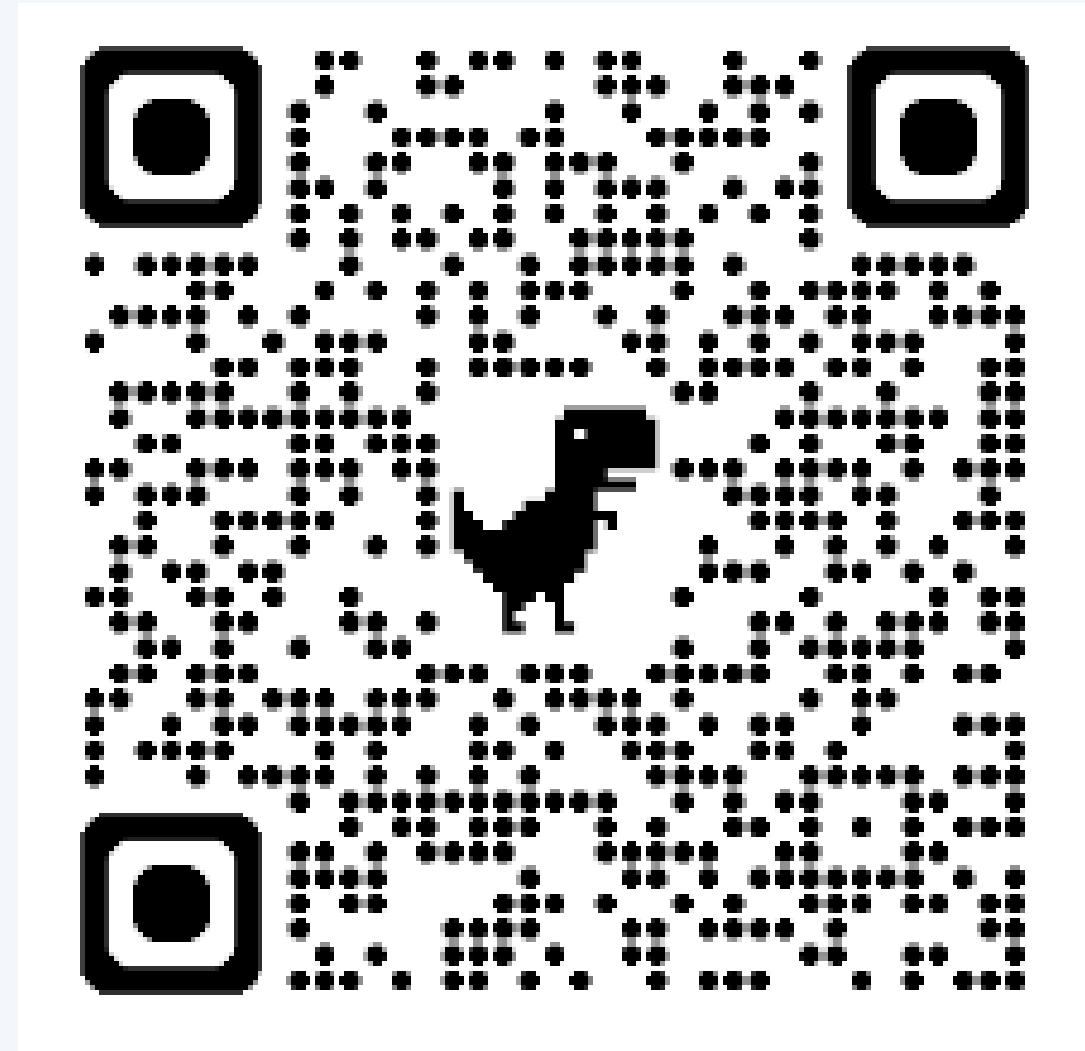
Knee	Hip
<ul style="list-style-type: none">• better data for exercise and PT efficacy• more injection options• More painful surgery recovery• Post surgical return to work: 8-12 wks light work, 12-16 wks for heavy duties	<ul style="list-style-type: none">• less efficacy with lifestyle change• less injection options• Easier surgery recovery• Post surgical return to work: 4-8 wk light work, 8-12 wks heavy duties.



Treatment Options for Knee and Hip Osteoarthritis

<p>Pre-Osteoarthritis Weight loss and maintenance Avoid injury</p>	<p>Core Treatment Education Weight loss/maintenance Physical activity/exercise Physical Therapy Stress Management Sleep regulation</p>	<p>Non-pharmacologic options Walking devices Braces</p>
<p>Topical medications Diclofenac gel Topical lidocaine</p>	<p>Oral medications NSAIDS Acetaminophen Duloxetine</p>	<p>Injections (knee) Corticosteroid injections Hyaluronic acid injections Genicular nerve blocks</p>
	<p>Surgical options Joint replacement</p>	

QR code for patient handouts



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