I GOT YOUR BACK

Osteoarthritis

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Sports Medicine Elective

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The One-Liner

65yo F w/ DM2 presents with persistent aches and pains in the knees and lower back.

Onset: Has been ongoing for the last few years. No acute insult.

Characterization: Dull aching pain.

Aggravators: Walking or standing for prolonged periods of time. Sometimes when she does stand for a while, she will end up with swelling in her knees as well.

Relievers: Resting, Ibuprofen

History

- Where exactly does it hurt? (Ask them to point)
- What activities bring on the symptoms?
- Does it occur at rest?
- Assess for Inflammatory symptoms → multiple joint swelling, morning stiffness
- Differentiate between articular pain or non-articular pain
- Any weight gain?
- Changes in activity level?
- History or knee blocking or buckling/instability?
- Hx of any knee injuries (i.e.. meniscal injury/ACL tear)?
- How has this affected your ADLs?
- Any associated fevers and chills?

"Any family history of cancer, heart disease, diabetes, extinction…"

Physical Exam

- Crepitus?
- Range of movement → What elicits restricted or painful movement?
- Joint line tenderness
- bony enlargement/effusion
- Check alignment at knee when standing and supine
  - Do they have any varus or valgus thrust while walking?
- Look at joint above and below
- Foot alignment --> flat feet, pronated
- Meniscal injury → Thessaly test
- ACL/PCL injury → Posterior drawer/anterior drawer


Normal   Varus   Valgus
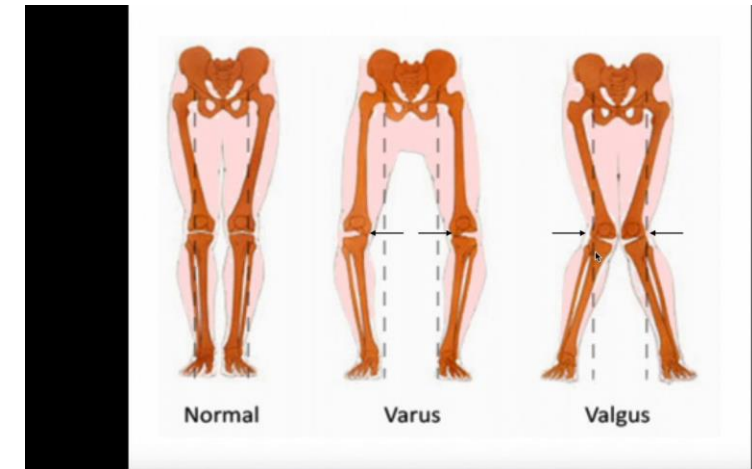
Labs? Imaging?

- We don't really NEED imaging
- Diagnosis of osteoarthritis is technically CLINICAL
- Only reason we would need to get labs or imaging is if dx cannot be determined from the H&P alone
- Labs → to r/o inflammatory response
- Structure/symptom discordance on XR: Plain radiographs are insensitive and often discordant with the degree of symptoms across a population (a patient with a horrible x-ray might have no symptoms while another patient with normal imaging might have severe pain)

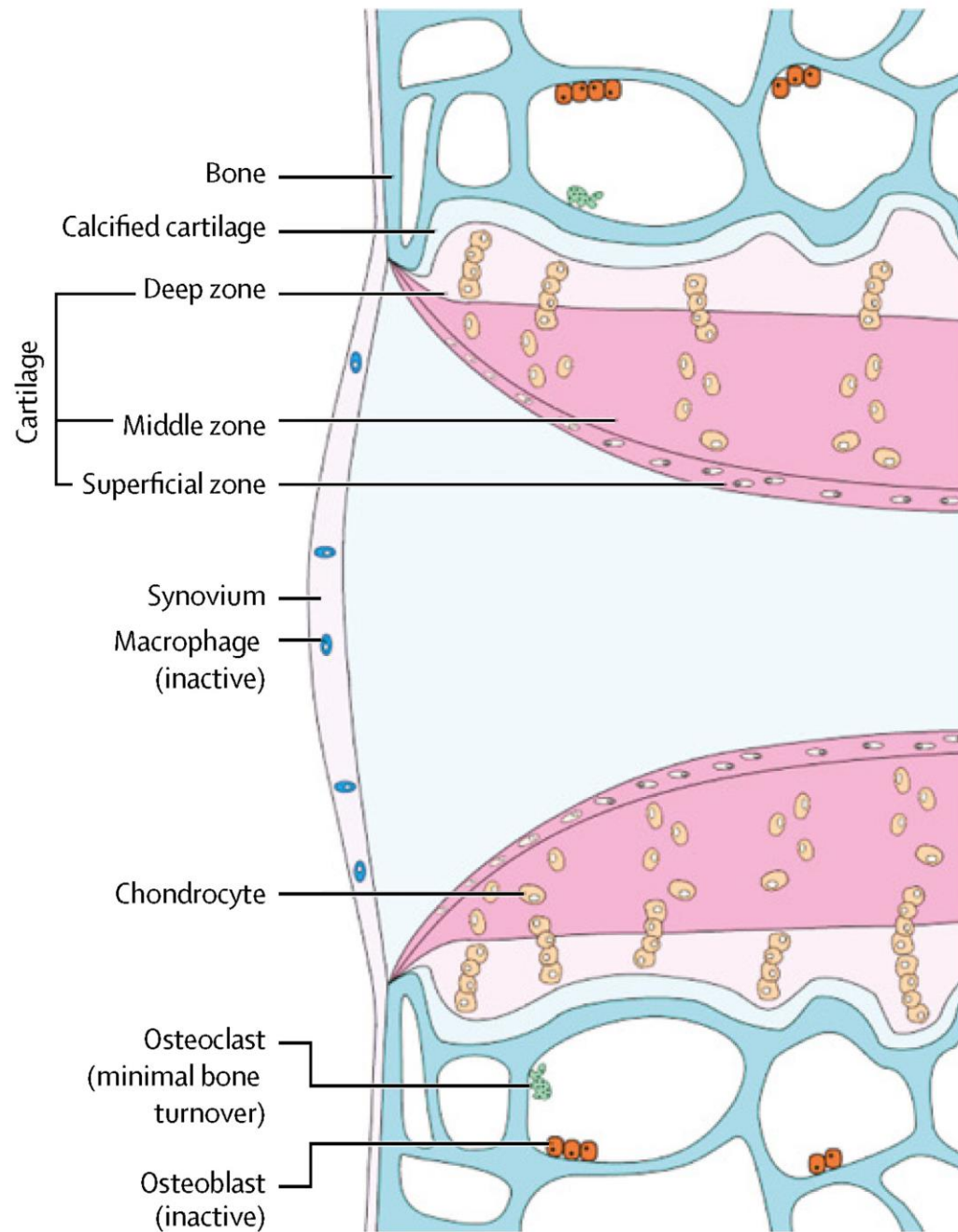|	Name
⌂	XR knee ap+lat+tunnel+merchant standing bilat (4 views ea) (aka X-RAY SPORTS KNEE SERIES)
⌂	XR knee ap+lat+tunnel+merchant standing left (4 views) (aka X-RAY SPORTS KNEE SERIES)
⌂	XR knee ap+lat+tunnel+merchant standing right (4 views) (aka X-RAY SPORTS KNEE SERIES)
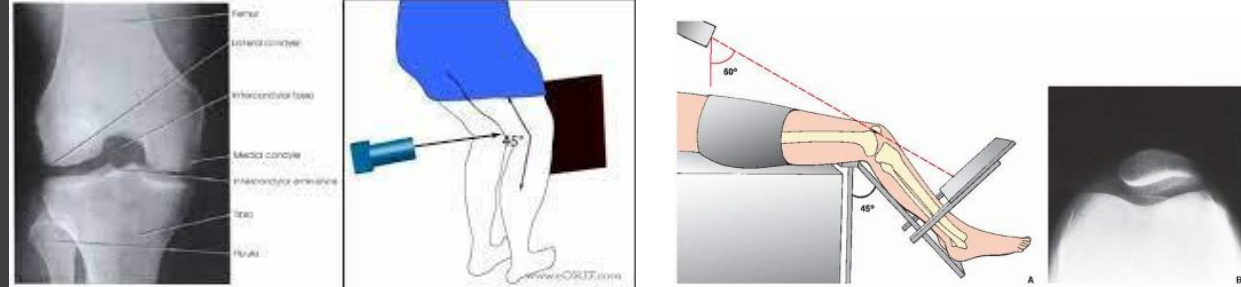
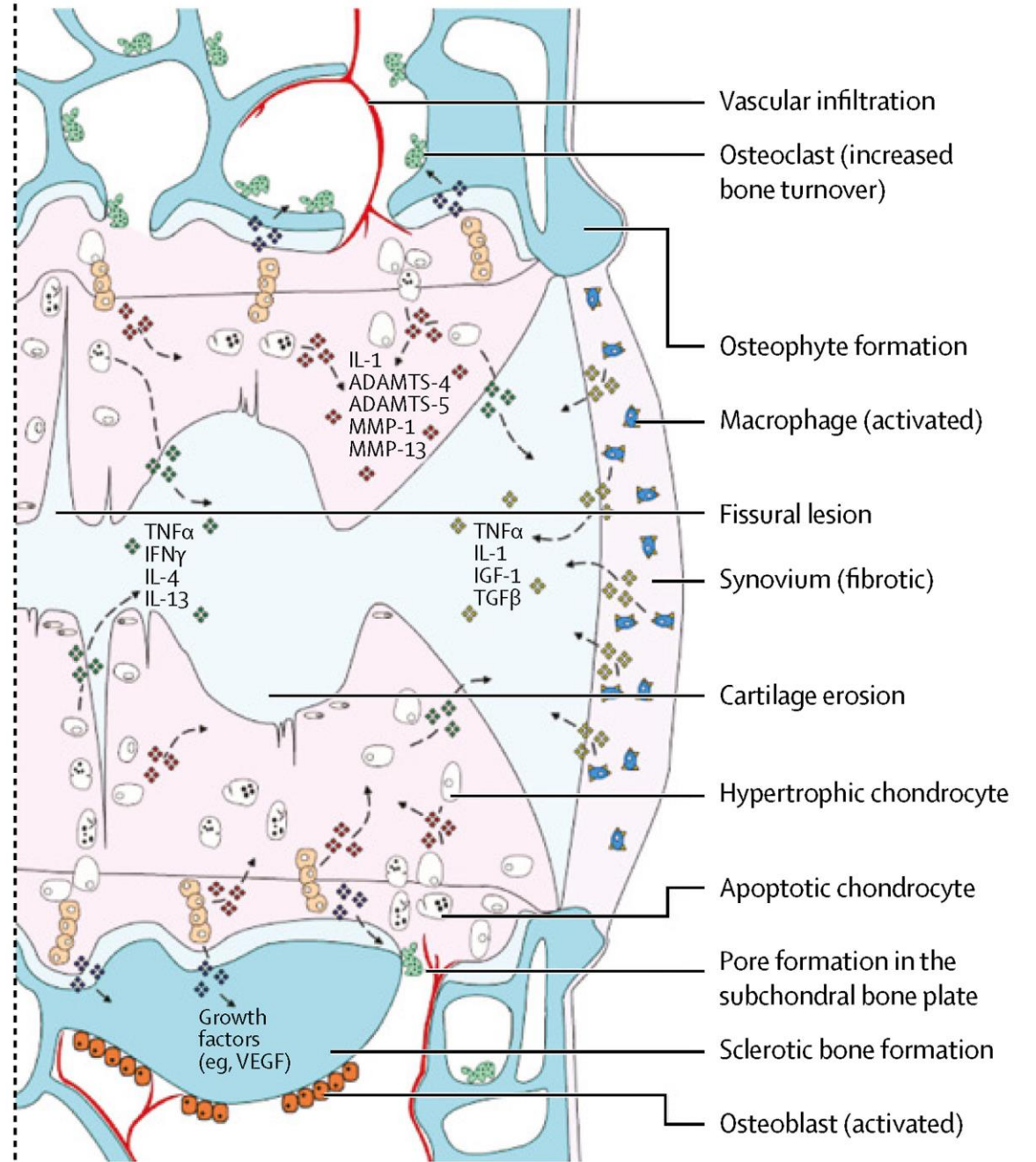| XR Knee 1 or 2 Views Left	XR Knee 4 Views w/ Tunnel + Sunrise Left T;N
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XR Knee 1 or 2 Views Left T;N, Stat	
XR Knee 1 or 2 Views Left T;N, Urgent	XR Knee 4 Views w/ Tunnel + Sunrise Left T;N, Urgent
XR Knee 1 or 2 Views Right	XR Knee 4 Views w/ Tunnel + Sunrise Right
XR Knee 1 or 2 Views Right T;N	XR Knee 4 Views w/ Tunnel + Sunrise Right T;N
XR Knee 1 or 2 Views Right T;N, Stat	
XR Knee 1 or 2 Views Right T;N, Urgent	XR Knee 4 Views w/ Tunnel + Sunrise Right T;N, Stat
XR Knee 3 Views Left	XR Knee 4 Views w/ Tunnel + Sunrise Right T;N, Urgent
XR Knee 3 Views Left T;N	
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XR Knee 3 Views Left T;N, Urgent	XR Knee Complete Left
XR Knee 3 Views Right	XR Knee Complete Left T;N
XR Knee 3 Views Right T;N	XR Knee Complete Left T;N, Stat
XR Knee 3 Views Right T;N, Stat	XR Knee Complete Left T;N, Urgent
XR Knee 3 Views Right T;N, Urgent	XR Knee Complete Right
XR Knee 4 Views w/ Patella Left	XR Knee Complete Right T;N
XR Knee 4 Views w/ Patella Left T;N	XR Knee Complete Right T;N, Stat
XR Knee 4 Views w/ Patella Left T;N, Stat	XR Knee Complete Right T;N, Urgent
XR Knee 4 Views w/ Patella Left T;N, Urgent	
XR Knee 4 Views w/ Patella Right	

Epidemiology

- Specifically knee OA affects one-fifth (20%) of the US population and is one of the most common causes of pain and disability
- Risk Factors:
  - Increasing age (>50yo)
  - Female sex
  - Obesity
  - Hx of knee injury
  - Genetic associations
  - Biomechanical risk factors → pre-existing joint damage (RA), leg length discrepancies

A Healthy

Bone

Calcified cartilage

Deep zone

Cartilage

Middle zone

Superficial zone

Synovium

Macrophage (inactive)

Chondrocyte

Osteoclast (minimal bone turnover)

Osteoblast (inactive)

B Osteoarthritis

IL-1
ADAMTS-4
ADAMTS-5
MMP-1
MMP-13

TNFα
IFNγ
IL-4
IL-13

TNFα
IL-1
IGF-1
TGFβ

Growth factors (eg, VEGF)

Vascular infiltration

Osteoclast (increased bone turnover)

Osteophyte formation

Macrophage (activated)

Fissural lesion

Synovium (fibrotic)

Cartilage erosion

Hypertrophic chondrocyte

Apoptotic chondrocyte

Pore formation in the subchondral bone plate

Sclerotic bone formation

Osteoblast (activated)

Treatment

- Primarily symptoms driven
- Preventative Measures:
  - Focus on joint protection → weight loss
  - Prevent joint injuries
- In general, patient education, self management, exercise (e.g. walking program, basic strength training), weight loss, nutrition management, and physical therapy/occupational therapy are the mainstays of treatment

REST is RUST.

MOTION is Lotion.

Symptomatic Management

- Knee
  - Topical NSAIDs strongly recommended
  - Physical therapy

- Hand
  - Topical capsaicin, but needs multiple applications, feels burnie
  - Occupational therapy → paraffin therapy, hand exercises, help with choosing orthotics (for CMC joints), kinesiotaping

- Hip
  - Physical therapy

- Use of Acetaminophen has minimal efficacy in multiple meta-analyses 2015 Cochrane Review found **topical NSAIDs to be effective for both acute and chronic musculoskeletal pain**

- The 2019 OARSI guidelines for OA give oral NSAIDS a conditional (weaker) recommendation for use with the caveats that a) patients with gastrointestinal disease should use a non-selective NSAID along with a proton pump inhibitor or a COX-2 inhibitor; and b) Oral NSAIDS are not recommended for patients with cardiovascular comorbidities or frailty

- If it is 1 or 2 joints, topical therapy is preferred. Hip joints are not as amenable to topical therapy.
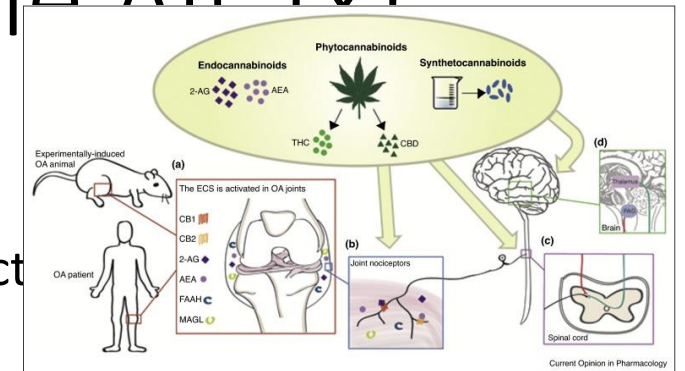
Injections?

- Controversial! A 2015 Cochrane review notes low quality data for short term benefit of CSI, but uncertain benefit beyond 6 months.
- 2017 trial of intraarticular corticosteroids versus saline found both no lasting effect on pain after two years of therapy ([McAlindon, 2017](#)), and cartilage damage with use of steroids.
  - May be benefit for 3 months (in the short term). Helpful in very severe/painful disease (presence of effusion/synovitis on ultrasound)
  - Long acting intra-articular steroid injection available (triamcinolone ER), which has less of a blood glucose effect
- The evidence for hyaluronic acid is weak and shows modest benefit, predominantly in younger patients with less severe osteoarthritis. It is not recommended by the AAOS.
- Evidence for PRP, stem cells, prolotherapy is very weak and not endorsed by any major medical organizations.

A Point about Pain

- Causes of pain may be beyond peripheral nociceptive pain
- Eventually, peripheral neuropathic pain and central pain sensitization also occur
- Most of our treatment strategies focus on nociceptive pain relief
- However, don't sleep on sleep or mood and how they can affect one's pain!
  - Duloxetine is FDA approved for the management of chronic musculoskeletal low back pain and knee osteoarthritis.

Don't be marrow minded – possible Alt Tx?

- CBD → Slim to none human clinical trials
- Turmeric: binds to nociceptors, believed to have anti-inflammatory effect
- Fish oil --> has been promising
- Chondroitin (OTC): May improve pain slightly in the short term (6mo) (2015 Cochrane review)
- Doxycycline → NO. Side effects do not outweigh the perceived benefit of protecting joints
- Acupuncture: 2018 Cochrane review of 6 trials (413 ppl) found no significant difference – but side effects are low
- Electromagnetic Fields: 2013 Cochrane review of 9 trials (636 ppl), may offer moderate benefit for pain
- Tai Chi
- Mindfulness: Mindfulness based stress reduction (MBSR) Headspace, Insight Timer (Free).
- Balneotherapy: Spending time in an indoor pool filled with mineral water at temperature of between 31 to 34 degrees Celsius (88 to 93 degrees Fahrenheit).

The Fi-kneel slide ~

- Diagnosis is Clinical!
- If you're going to get XRs, get 4 views →
  - AP, Lateral, Sunrise/Merchant, Tunnel
- Motion is Lotion
- GoodRx is Good4You
- To Inject or Not to Inject, is still the question
- Practice a Poly-Pronged aPProach to pain!
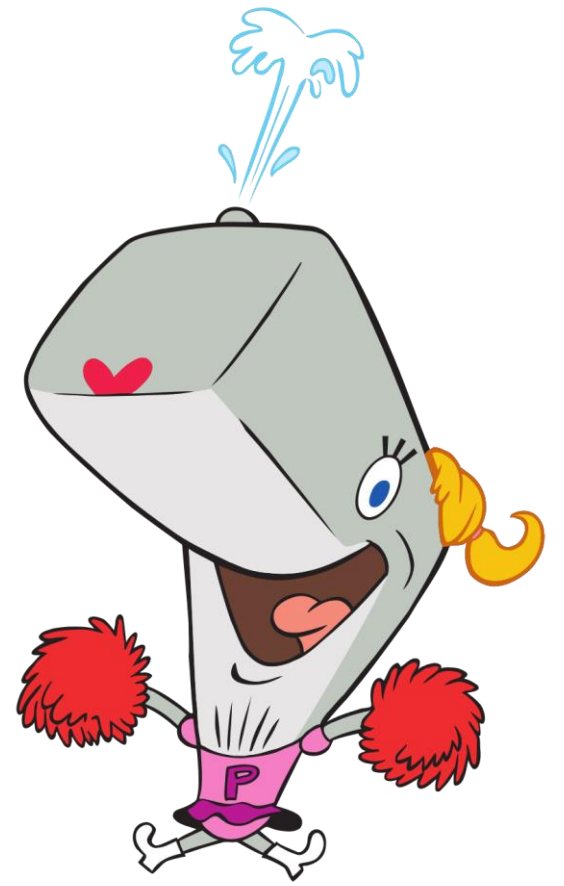
Resources

- Cochrane Review Website
- PrimaryCareRap
- Curbsiders
- Dr. Vigil
- Dr. Goldman
- Google