Pain, pain, go OA

Frances Tao, MD, MPH
PGY2, Department of Family Medicine, UCLA
Disclosures

None! 😊
Outline

- Epidemiology
- Pathophysiology
- Clinical presentation
- Work up
- Treatment options
- Guidelines from medical societies
- New research
Objectives

▪ To identify the key clinical features of OA
▪ To evaluate x-ray results to further support the diagnosis of OA
▪ To explain the different modalities of OA treatment, and understand the pros and cons of each
Osteoarthritis

Common degenerative disorder of the articular cartilage associated w/ hypertrophic bone changes
Epidemiology
Epidemiology

- Prevalence: > 300 million people worldwide
- Lifetime risk of suffering symptomatic knee OA is ~44.7%
- ~1 in 11 US adults ≥ 60 y.o. diagnosed w/ symptomatic knee OA
- Risk factors:
  - Older age (esp. age > 50)
  - Female sex
  - Overweight or obesity
  - Prior joint injury
  - Job/sport that requires repetitive impact/motion (e.g. bending or squatting)
  - Family history
Pathophysicsiology

- Wear & tear
- Proinflammatory factor release
- Proteolytic enzymes production
- Extracellular matrix degradation
- Joint tissue destruction
Pathophysiology

Pathogenesis of osteoarthritis

Meniscal damage  Ligament tears  Synovitis

Cytokines, chemokines, growth factors, MMPs

Normal articular cartilage

Damaged articular cartilage

Normal subchondral bone

Subchondral bone thickening
What does a typical patient w/ OA look like?
Clinical Features: Signs & Sxs

- Pain
  - Joint pain
  - Stiffness
  - Locomotor restriction
Clinical Features: Signs & Sxs

- Pain
- Tenderness
- Limited ROM
- Stiffness
Clinical Features: Signs & Sxs

- Pain
- Tenderness
- Limited ROM
- Stiffness
- Bony swelling
- Joint deformity
- Instability
Clinical Features: Joint Distribution

Most commonly in the hands, knees, and hips—though any joint can be involved
Time for investigative work!
Work Up: History & Exam

Table 1. Signs and Symptoms of Osteoarthritis

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
</table>
| **Hand**  | Pain on range of motion  
Hypertrophic changes at distal and proximal interphalangeal joints (Heberden nodes and Bouchard nodes; Figure 1)  
Tenderness over carpometacarpal joint of thumb |
| **Shoulder** | Pain on range of motion  
Limitation of range of motion, especially external rotation  
Crepitus on range of motion |
| **Knee** | Pain on range of motion  
Joint effusion  
Crepitus on range of motion  
Presence of popliteal cyst (Baker cyst)  
Lateral instability  
Valgus or varus deformity |
| **Hip** | Pain on range of motion  
Pain in buttock  
Limitation of range of motion, especially internal rotation |
| **Foot** | Pain on ambulation, especially at first metatarsophalangeal joint  
Limited range of motion of first metatarsophalangeal joint, hallux rigidus  
Hallux valgus deformity |
| **Spine** | Pain on range of motion  
Limitation of range of motion  
Lower extremity sensory loss, reflex loss, motor weakness caused by nerve root impingement  
Pseudoclaudication caused by spinal stenosis |

Figure 1.
Hand affected by osteoarthritis. (1) Heberden nodes. (2) Bouchard nodes.
Work Up: Labs

- Not necessary

- Synovial fluid
  - Noninflammatory or mildly inflammatory w/ < 2,000 WBC
  - Inflammatory effusions can have calcium pyrophosphate (CPP) crystals
Work Up: Imaging

X-ray

- Joint space narrowing
- Subchondral sclerosis
- Osteophytes
- Subchondral cysts
Figure 2.
Radiograph of a hand affected by osteoarthritis showing (1) joint space narrowing, (2) osteophytes, and (3) joint destruction. Also note changes at carpometacarpal joint (4), which are very common in osteoarthritis.
Work Up: Imaging

Figure 3.
Radiograph of the hips showing (1) joint space narrowing and (2) osteophyte formation.
Figure 4.
Radiograph of the knee in (A) anteroposterior and (B) lateral views showing (1) joint space narrowing and (2) osteophyte formation.
Work Up: Imaging

MRI
- Can identify earlier stages of disease before XR changes become apparent
- Will pick up cartilage defects, bone marrow lesions
- Also can assess effusions, synovium, and ligaments

Ultrasound
- Can detect synovial inflammation, effusion, and osteophytosis
So, how do we make the pain go away?
Treatment

Nonpharmacological

Pharmacological

Complementary & Alternative

Surgical
Tx: Non-pharmacological

- Exercise + PT
- Braces + Orthoses
- Assistive Devices
- Cognitive Behavioral Therapy
Tx: Pharmacological-Orals and Topicals

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage Details</th>
<th>Cost (Price)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diclofenac/misoprostol (Arthrotec)</td>
<td>50 mg/200 mcg two to three times per day</td>
<td>NA ($195)</td>
</tr>
<tr>
<td>Ibuprofen, over-the-counter</td>
<td>400 to 600 mg three times per day</td>
<td>$28+ ($30)</td>
</tr>
<tr>
<td>Meloxicam (Mobic)</td>
<td>7.5 to 15 mg per day</td>
<td>$16+ ($155)</td>
</tr>
<tr>
<td>Nabumetone</td>
<td>500 mg two times per day</td>
<td>$40 (NA)</td>
</tr>
<tr>
<td>Naproxen, over-the-counter (Aleve)</td>
<td>220 to 440 mg two times per day</td>
<td>$5 ($5)</td>
</tr>
<tr>
<td>Naproxen (Naprosyn)</td>
<td>250 to 500 mg two times per day</td>
<td>$20+ ($151)</td>
</tr>
<tr>
<td>Oxaprozin (Daypro)</td>
<td>1,200 mg per day</td>
<td>$26 ($206)</td>
</tr>
<tr>
<td>Sulindac (Clinoril)</td>
<td>150 to 200 mg two times per day</td>
<td>$19 ($92+)</td>
</tr>
</tbody>
</table>

NA = not available.

## Tx: Pharmacological Injections

<table>
<thead>
<tr>
<th>Corticosteroid Injection (CSI)</th>
<th>Hyaluronic Acid Injection (HAI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Faster onset (24-48 hours)</td>
<td>• Slower onset (1-6 weeks)</td>
</tr>
<tr>
<td>• Shorter relief (4-8 weeks)</td>
<td>• Longer relief (up to 6 months)</td>
</tr>
<tr>
<td>• Cost: $</td>
<td>• Cost: $$$</td>
</tr>
</tbody>
</table>
# Tx: Pharmacological Injections

**Table 3.**

<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
<th>SELF-PAY FEE</th>
<th>PRIVATE INSURANCE REIMBURSEMENT</th>
<th>MEDICARE ALLOWABLE FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3301</td>
<td>Injection, triamcinolone acetonide (Kenalog), not otherwise specified, 10 mg</td>
<td>$17.00</td>
<td>$4.50</td>
<td>$1.54</td>
</tr>
<tr>
<td>J7324</td>
<td>Hyaluronan or derivative, Orthovisc, for intra-articular injection, per dose</td>
<td>$880.00</td>
<td>$342.00</td>
<td>$181.10</td>
</tr>
<tr>
<td>20610</td>
<td>Arthrocentesis, aspiration, and/or injection: major joint or bursa (e.g., shoulder, hip, knee joint; subacromial bursa)</td>
<td>$182.00</td>
<td>$139.00</td>
<td>$59.81</td>
</tr>
</tbody>
</table>
Tx: Complementary & Alternative Medicine

Limited evidence to support these!

- Vitamin D
- Diacerein
- Avocado soybean unsaponifiables
- Glucosamine + Chondroitin
- Fish oil
- Turmeric + black pepper
- Acupuncture
Tx: Surgery

- Elective surgery
- Consider comorbidities
- Prolonged recovery: 3-4 months
- Can have post-operative long-term pain
- Prostheses can function well for 15-20 yrs
Guidelines from medical societies
Medical societies of interest

Family Medicine Society
- American Academy of Family Physicians (AAFP)

Sports Medicine Societies
- American College of Sports Medicine (ACSM)
- American Medical Society for Sports Medicine (AMSSM)
AAFP Practice Guidelines

Osteoarthritis Management: Updated Guidelines from the American College of Rheumatology and Arthritis Foundation

AAFP Practice Guidelines

Key points:

- Weight loss, exercise, tai chi, and patient-directed activity programs can improve pain and function in knee and hip OA
- In knee and hip OA, CSI and NSAIDs improve pain and function only over the short term
Key points (continued):

- Avoid the following:
  - Transcutaneous electrical nerve stimulation
  - Immunomodulators
  - Glucosamine +/- chondroitin
  - Biologic injection therapies
- CBT and balance training appear to improve pain
- Acupuncture and thermal interventions slightly improve pain & function
Effects of Physical Activity in Knee and Hip Osteoarthritis: A Systematic Umbrella Review

VIRGINIA B. KRAUS¹, KYLE SPROW², KENNETH E. POWELL³, DAVID BUCHNER⁴, BONNY BLOODGOOD⁵, KATRINA PIERCY⁶, STEPHANIE M. GEORGE⁷, and WILLIAM E. KRAUS¹, FOR THE 2018 PHYSICAL ACTIVITY GUIDELINES ADVISORY COMMITTEE*

¹Duke Molecular Physiology Institute, Department of Medicine, Duke University School of Medicine, Durham, NC; ²National Cancer Institute, National Institutes of Health, U.S. Department of Health and Human Services, Bethesda, MD; ³Georgia Department of Human Resources, Centers for Disease Control and Prevention (Retired), Atlanta, GA; ⁴Department of Kinesiology and Community Health University of Illinois at Urbana-Champaign, Champaign, IL; ⁵ICF, Fairfax, VA; ⁶Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services, Rockville, MD; and ⁷Office of Disease Prevention, National Institutes of Health, U.S Department of Health and Human Services, Rockville, MD
Results:

- Physical activity decreased pain and improved physical function and improved health-related QOL among pts w/ hip or knee OA, relative to less active adults with OA.
- Physical activity of 150 min/wk of moderate intensity exercise in bouts > 10 min, and > 45 min/wk of moderate intensity activity were associated w/ improved or sustained high function.
- Benefits of physical activity persisted for up to 6 months following cessation of a defined program.
ACSM

Recommendations:

- Encourage patients w/ lower extremity OA to engage in achievable amounts of physical activity, of even modest intensities.
- They can accrue minutes of physical activity throughout the entire day, irrespective of bout duration.
AMSSM Scientific Statement Concerning Viscosupplementation Injections for Knee Osteoarthritis: Importance for Individual Patient Outcomes

Thomas H. Trojan, MD,* Andrew L. Concoff, MD,† Susan M. Joy, MD,‡ John R. Hatzenbuehler, MD,§ Whitney J. Saulsberry, PharmD,¶ and Craig I. Coleman, PharmD||
Results:

- Participants receiving hyaluronic acid injections were 15% and 11% more likely to respond to tx by OMERACT-OARSI criteria than those receiving ICS vs placebo respectively (p < 0.05 for both)
Recommendations:

- AMSSM recommends the use of hyaluronic acid for the appropriate pts w/ knee OA
Systematic Review

Efficacy of Intra-articular Platelet-Rich Plasma Injections in Knee Osteoarthritis: A Systematic Review

Carlos J. Meheux M.D., Patrick C. McCulloch M.D., David M. Lintner M.D., Kevin E. Varner M.D., Joshua D. Harris M.D.
Platelet Rich Plasma

**PRP THERAPY PROCESS**

**STEP 1**
Collecting Blood
A small amount of blood (30-60mL) is drawn from the patient’s arm.

**STEP 2**
Separating Platelets
The blood goes for a “spin” in a centrifuge separating the platelets from the rest of the blood.

**STEP 3**
Platelet-Rich Plasma
The patient’s own platelet-rich plasma is now extracted from the test tube.

**STEP 4**
Return PRP to the Patient
The plasma is injected into the injured area or inflamed tissue.

Copyright 360 Medical Center 2019
Results

- In symptomatic knee OA, PRP injection results in significant clinical improvements up to 12 months post-injection.
- Clinical outcomes and WOMAC scores are significantly better after PRP versus HA at 3 to 12 months post-injection.
Takeaways of OA:

- Clinical features:
  - Joint pain
  - Stiffness
  - Limited ROM

- Work up:
  - No labs needed
  - X-rays > MRI or US
  - X-ray findings:
    - Joint space narrowing
    - Osteophytes
    - Subchondral sclerosis
    - Subchondral cysts

- Treatment:
  - Nonpharmacological + pharmacological
    - Exercise + PT
    - Braces + orthoses
    - NSAIDs +/- Tylenol
    - CSI vs HAI vs PRP
  - Limited evidence for CAM
  - Minimize surgery unless pain remains uncontrolled and severe functional disability
Thank you for jointing! ;)

- Questions?
Citations


