Update on Osteoarthritis

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Objectives

1. Identify risk factors for developing osteoarthritis and factors that contribute to the progression of osteoarthritis.

2. Recognize the clinical manifestations of osteoarthritis and the diagnostic tools used in its assessment.

3. Recognize the impact of osteoarthritis on quality of life and functional disability, highlighting the importance of early intervention and appropriate treatment.

4. Describe the multimodal approach to managing osteoarthritis using pharmacologic and non-pharmacologic interventions.

5. Educate patients about the importance of self-management approaches for osteoarthritis.
Disclosures

• I have no financial disclosures to report.
Why Care About Osteoarthritis?

• Osteoarthritis (OA) is the most common form of arthritis.
  • Overall OA affects 22% of adults in the US
  • 50% of US adults will develop OA by age 60
  • Arthritic conditions are expected to affect ~67 million adults in the US by 2025
  • Annual medical cost to US economy > $80 billion

• Advanced OA produces severe morbidity reducing physical activity
  • One of the leading causes of disability in adults in the US
  • Knee OA is ranked within the top 10 noncommunicable diseases for global disability-adjusted life years
  • Number of years lived with disability due to knee and hip OA increased 64% between 1990 & 2010
Why Care About Osteoarthritis?

![Graph showing the increase in arthritis cases](https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm)
Why Care About Osteoarthritis?


https://www.cdc.gov/obesity/data/prevalence-maps.html
Osteoarthritis Types

• **Primary (idiopathic) → no preceding injury**
  • Localized OA
    • Hands, knee, hip or foot
  • Generalized OA
    • Hands and another joint

• **Secondary → preceding joint insult**
  • Congenital abnormality
  • Traumatic injury
  • Inflammatory arthropathy
  • Ongoing strenuous physical activity

Doherty, M. Clinical manifestations and diagnosis of osteoarthritis. In: UpToDate, Hunter, D (Ed), UpToDate, Waltham, MA, 2017.
Pathogenesis of Osteoarthritis

• Previously considered to be solely a degenerative “wear and tear” process

Excessive or Abnormal Loading

Genetics

Joint Injury

Proinflammatory Mediators

Idiopathic

Joint Tissue Destruction
Molecular Level Inflammatory Response

Classic cellular inflammation is not prominent (synovial fluid WBC <2000 cells/µL)
Osteoarthritis involves all of the joint tissues including the menisci in the knee, ligaments, synovium, articular cartilage, and bone. Damage to the menisci and ligament tears not only alter joint mechanics but, along with the inflamed synovium (synovitis), produce proinflammatory factors (cytokines and chemokines) and matrix-degrading enzymes (eg, matrix metalloproteinases [MMPs]). These factors are also produced by chondrocytes and serve to promote joint tissue destruction.

*Courtesy of Richard Loeser, MD.*

Articular Cartilage Injury Progression

• A – healthy articular cartilage
• B – focal articular cartilage fibrillation (mild OA)
• C – focal articular cartilage lesion (moderate OA)
• D – wide spread full thickness articular cartilage loss (severe OA)
Multi-Compartmental Articular Cartilage Injury

- Extensive cartilage damage weight bearing surface of the medial femoral condyle
- Widespread patellar undersurface cartilage damage
Pathogenesis of Osteoarthritis

- Destructive joint changes may include:
  - Articular cartilage thinning / loss
  - Synovitis
  - Joint capsule thickening
  - Ligament & meniscal tears
  - Joint margin osteophytes
  - Thickening of subchondral bone
  - Bone cysts & bone marrow lesions
  - Rarely bone erosions
  - Periarticular muscle weakness
  - Periarticular nerve dysfunction

Citation: Osteoarthritis, Williams BA, Chang A, Ahalt C, Chen H, Conant R, Landefeld C, Ritchie C, Yukawa M. Current Diagnosis & Treatment: Geriatrics, 2e; 2014. Available at: https://accessmedicine.mhmedical.com/ViewLarge.aspx?figid=53377128
OA Risk Factors

Intrinsic joint vulnerabilities (local environment)
- Previous damage (e.g., meniscectomy)
- Bridging muscle weakness
- Increasing bone density
- Malalignment
- Proprioceptive deficiencies

Systemic factors affecting joint vulnerability
- Increased age
- Female gender
- Racial/ethnic factors
- Genetic susceptibility
- Nutritional factors

Use (loading) factors acting on joints
- Obesity
- Injurious physical activities

Susceptibility to OA

Osteoarthritis or its progression

OA – Symptoms

• Pain
  • Affects one or a few joints
  • Insidious onset w/ slow progression
  • Variable intensity and variable character
  • Usage related joint pain that is relieved with rest
  • Night pain or pain at rest is associated with severe OA

• Stiffness “gelling”
  • ≤ 30 minutes upon first awakening or after inactivity

• Functional difficulties
  • “Giving way” / lack of confidence with weight bearing

• Swelling
  • Rare for patient to report

• Absence of associated constitutional symptoms
OA – Physical Findings

• Appearance
  • Joint enlargement
    • Bone overgrowth
    • Synovial hypertrophy
  • Alignment deformity (advance OA)
  • Muscle atrophy

• Palpation
  • Swelling (cool to touch)
  • Joint line tenderness
  • Periarticular tenderness

• Range of motion
  • Crepitus (knee, thumb base)
  • Reduced range of motion
    • Active and passive
  • Localized muscle weakness

• Antalgic gait
  • Advanced stages
  • “Hitch in my giddy-up”
OA – Radiographic Findings

• Most widely used imaging modality in OA
  • Osteophytes
  • Joint space narrowing
  • Subchondral sclerosis
  • Subchondral cysts

• Insensitive with early disease (MRI ideal)

• Findings often correlate poorly with symptoms

• Not necessary for diagnosis*
OA – Radiographic Findings

- Kellgren-Lawrence classification
  - A – minimal osteophytes at the joint margin (Grade 1)
  - B – ≥ 1 well defined marginal osteophyte (Grade 2)
  - C – definite joint space narrowing and marginal osteophytes (Grade 3)
  - D – bone-to-bone contact, complete obliteration of the joint space and marginal osteophytes (Grade 4)
Doherty, M, Abhishek, A. Clinical Manifestations and Diagnosis of Osteoarthritis. In: UpToDate, Hunter, D (Ed), UpToDate, Waltham, MA, 2018.
When to Suspect OA

- Persistent-usage related joint that is relieved with rest
- Age ≥ 45 years
- Morning stiffness ≤ 30 minutes
- Presence of other OA S&S add to the diagnostic certainty
When to Consider Additional Testing

• Younger individuals without history of traumatic injury to the involved joint(s)

• Presence of atypical symptoms
  • Atypical joint involvement
  • Atypical pain onset
  • Mechanical locking
  • S&S of joint inflammation
  • Presence of weight loss or constitutional symptoms

• Additional testing to consider
  • ESR or CRP, RF and anti-CCP antibodies
  • MRI
Management Considerations

• Joint pain and functional impairment are the hallmarks of OA
  • OA related pain has negative impacts on mood and sleep
  • Reduced participation in occupational and recreational activities

• Substantial reason for noncompliance with treatment, especially lifestyle changes, is often attributed to patients not understanding the purpose of the intervention and what to expect in terms of pain relief
  • Spend time with your patients
  • Develop a care team / plan that will facilitate patient understanding
Nonpharmacologic Therapies

• Weight loss of at least 10% body weight via diet and exercise for overweight/obese patients
  • Associated with 50% reduction in pain scores in patients with knee OA

• Combination of appropriate aerobic and strengthening exercises
  • Similar effects on pain reduction and functional improvement in comparison to NSAIDs
  • For optimal results plan should be individualized
Pharmacologic Therapies

• Use should be prn based upon symptoms
• None of the interventions have been shown to be disease-modifying
• Comorbid conditions may limit options
• Topical options
  • NSAIDs (diclofenac 1%)
  • Capsaicin
• Acetaminophen
• Oral NSAIDs
• Duloxetine
• Tramadol
Pharmacologic Therapies – Cont’d

• Intraarticular glucocorticoid injection
  • Short duration of affects (~4 weeks)
  • Potential to accelerate articular cartilage damage

• Intraarticular hyaluronic acid injection
  • FDA approved for knee OA
  • AMSSM & ACR support use, AAOS does not recommend use
Additional Therapy Considerations

• Glucosamine and chondroitin
• Platelet rich plasma (PRP) / growth factor injections
  • Under FDA investigation at this time
• Genicular nerve block / ablation
Case 1 – “I have a cyst on my finger”

- 48 y/o female presents with complaints of a “cyst” on her finger. She is bothered by the appearance and is requesting the you “pop the cyst”. She also complains of stiffness involving the fingers of both hands in the morning for about 15 minutes. Recently she has cut back how much she works in her garden because of finger pain. She upset that her blood pressure is high because it has been well controlled since starting Lisinopril 20mg.
- PMHx: Obesity and hypertension
- Medications: Lisinopril 20 mg qd, ibuprofen 200 mg x2 q 6-8
- Ht 5’0”, Wt 165 lbs, BMI 32.2, BP 148/94, HR 74, T 98.4 F
Case 1 – The “cyst I want you to pop”
Case 1 – Physical Exam Findings

• Physical exam
  • Bilateral enlargement of the DIP joints of the 2\textsuperscript{nd} and 3\textsuperscript{rd} finger
  • Moderate tenderness with palpation of the DIP joints and mild tenderness with palpation of the PIP joints

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Case 1 – Physical Exam Findings

• Physical exam
  • “Squaring” at the base of each thumb
  • Tenderness with palpation of the 1st CMC joints
  • Crepitus at the 1st CMC joint with action ROM

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Case 1 – Treatment

- Would not recommend popping the cyst
- Discontinue ibuprofen
- Start topical diclofenac gel 1% apply 2 grams to the painful area every 4 hours as needed for pain
- Occupational therapy referral
  - Hand strengthening exercises
  - Gardening ergonomic evaluation
  - Paraffin wax bath treatment / education
- What am I missing?
Case 2 – “My left knee hurts”

• A 52 y/o male presents with complaints of right knee pain and stiffness. Symptoms were present when he awoke this morning. “I tweaked my knee country line dancing last night”. No previous episodes of knee pain or knee stiffness. No previous history of traumatic injury to his left knee.

• Social Hx: Retired pharmacist

• PMHx: Type 1 diabetes, hypertension and hyperlipidemia

• Medications: Lantus & Humalog insulin, Lisinopril 20 mg qd, Atorvastatin 10mg qd

• Ht 5’11”, Wt 170 lbs, BMI 23.7, BP 124/82, HR 72, T 98.4 F

• Last A1c = 6.8 (4 weeks ago), fasting sugar this morning was 104
Case 2 – Physical Exam Findings

- Mildly antalgic gait
- Mild to moderate knee effusion
- Medial joint line tenderness and tenderness with palpation of the pes anserine insertion
- Palpable fullness in the right popliteal fossa
- Both McMurray’s and Thessaly’s meniscal tests are positive for medial joint line pain
- Negative ligamentous laxity tests
- Pain and tightness in popliteal fossa at end range of active and passive knee flexion
Case 2 – Radiographic Findings

Case courtesy of Dr Alborz Jahangiri, Radiopaedia.org, rID: 46483
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Case 2 – Radiographic Findings
Types of meniscus tear

- Horizontal cleavage
  - Cross section
- Flap
- Radial
- Degenerative
  - Bucket handle
- Longitudinal

Medial meniscus

FEMUR

TIBIA
Case 2 – Treatment

• Don’t forget that we need to take into consideration his underlying comorbidities

• Physical therapy referral
  • Symptomatic care
  • Therapeutic exercise progression

• Consider Intraarticular glucocorticoid injection
  • Close monitoring of glucose levels for 4-5 days following injection
Case 3 – Neck and shoulder pain

• A 55 y/o male presents with complaints of right sided neck and shoulder blade pain. Pain has been present intermittently for the past 3-4 years. Over the past 4 weeks the pain has been occurring on a daily basis while he is at work. He typically experiences sharp neck pain when he turns his head to the right. The shoulder blade pain is a persistent dull ache that increases throughout the work day. He experiences neck stiffness for about 20 minutes in the morning. He shares that everything started to get worse when he started a new job.
Case 3 – Neck and shoulder pain

• Social Hx: Data analyst at an equity firm
• PMHx: Hyperlipidemia with strong family history for CAD
• Medications: Rosuvastatin 20mg qd, ASA 81 mg qd, Naproxen 250 mg x 2 bid
• Ht 5’9”, Wt 190 lbs, BMI 28.1, BP 144/96, HR 78, T 98.4 F
Case 3 – Physical Exam Findings

• No midline cervical spinous process tenderness
• Pain with palpation in the region of the right C4-C5 cervical facet joint
• Mild increase in pain at end range of active cervical extension and active cervical right rotation
• Moderate increase in pain at end range of combined active right cervical rotation and cervical extension
• Cervical pain is reproduced with Spurling’s test
Case 3 – Work Station
Postural Alteration of the Future

- **cervical** (neck) spine
- **thoracic** (middle and upper back) spine
- **lumbar** (lower back) spine
- **pelvic bone** (pelvis)
Case 3 – Physical Exam Findings

- Spinal cord (cauda equina)
- Vertebra
- Facet joint
- Spinal nerves
- Healthy facet joint
- Cartilage
- Facet joint with osteoarthritis
- Osteophyte formation and cartilage degeneration

- C2-C3
- C3-C4
- C4-C5
- C5-C6
- C6-C7
Case 3 – Treatment

• Weight loss program – goal 10% of body weight

• Physical therapy
  • Postural education
  • Therapeutic exercise program
  • Assess symptom response to cervical traction

• Occupational therapy
  • Workplace ergonomic evaluation

• What options do we have for oral medications?
Thank You!

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