Pharmacotherapy 2

Osteoarthritis

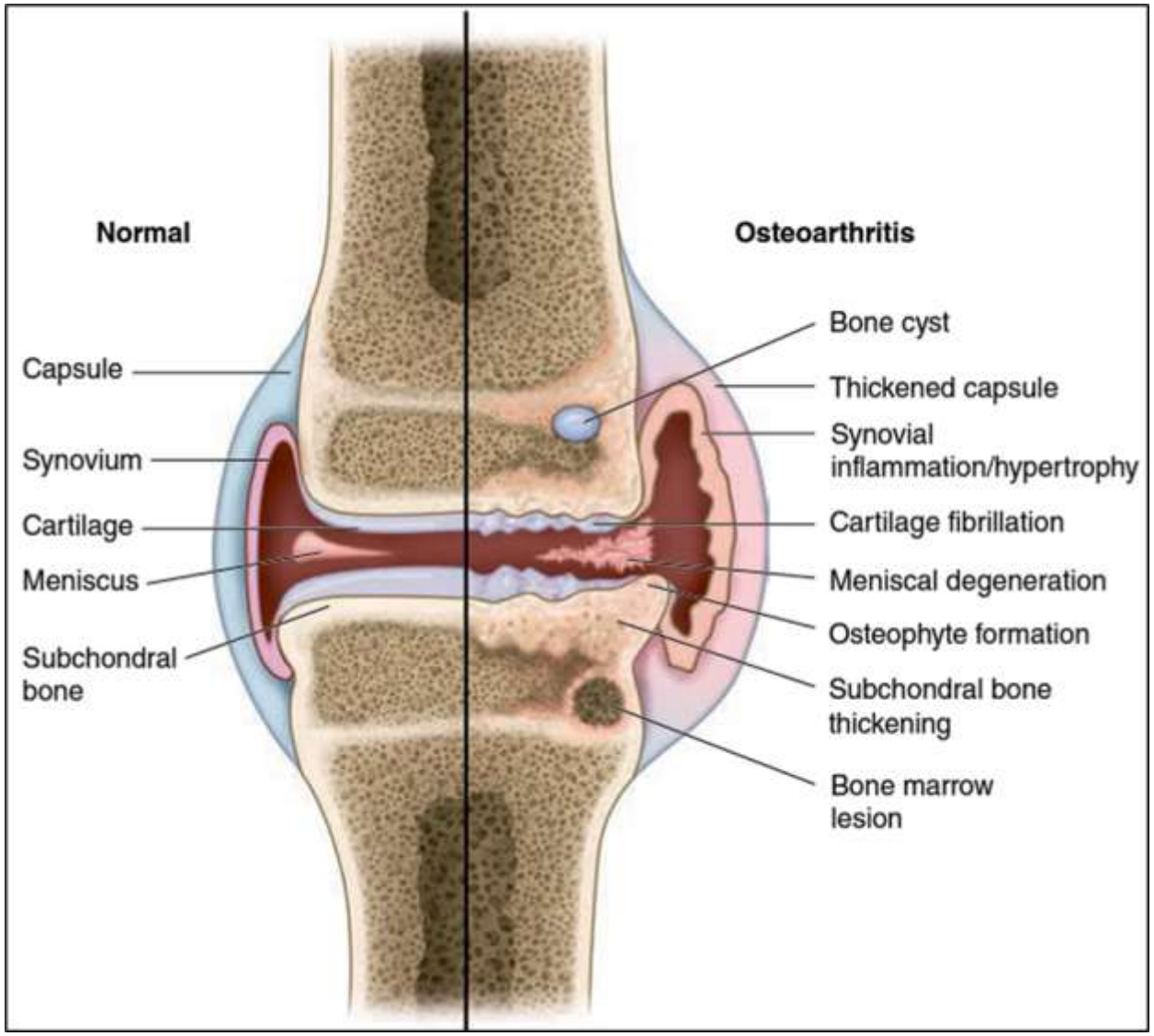
Dr Enaam M. Al Momany
Faculty of Pharmaceutical Sciences
Department of Clinical Pharmacy and Pharmacy Practice

Osteoarthritis (OA)

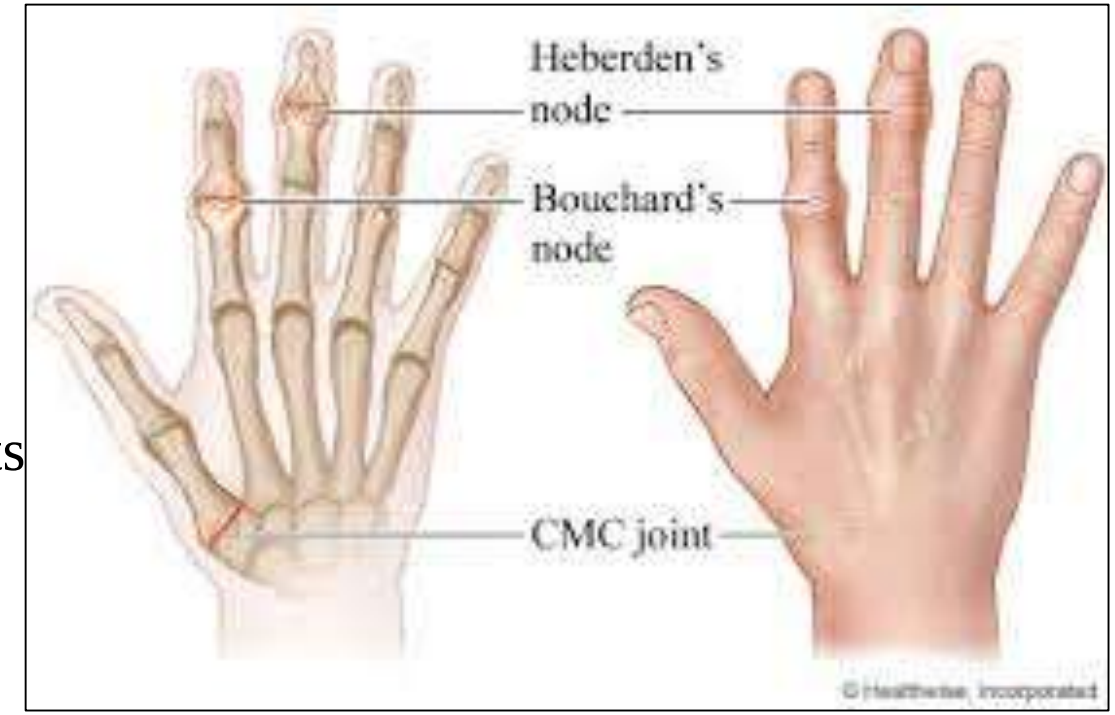
General Principles

- ✓ OA, or degenerative joint disease, is characterized by deterioration of articular cartilage with subsequent formation of reactive new bone at the articular surface.

- ✓ Risk factors include increasing age, obesity, gender, certain occupations and sports activities, history of joint injury or surgery, and genetic predisposition.



- ✓ The predominant symptom is deep, aching pain in affected joints. Pain accompanies joint activity and decreases with rest.
- ✓ Limitation of motion, stiffness, crepitus, and deformities may occur. Patients with lower extremity involvement may report weakness or instability.
- ✓ Upon arising, joint stiffness typically lasts less than 30 minutes and resolves with motion.
- ✓ Presence of warm, red, and tender joints suggests inflammatory synovitis.
- ✓ Physical examination of affected joints reveals tenderness, crepitus, and possibly enlargement.
- ✓ Heberden and Bouchard nodes are bony enlargements (osteophytes) of the DIP and PIP joints, respectively.



CLINICAL PRESENTATION Osteoarthritis

Age

- Usually occurs in older adults (≥65 years of age)

Gender

- Age <45 years more common in men
- Age >45 years more common in women

Symptoms

- Pain
- Deep, aching character
- Pain on motion
- Stiffness in affected joints
- Resolves with motion, recurs with rest ("gelling phenomenon")
- Usually duration <30 minutes
- Often related to weather
- Limited joint motion
- May result in limitations of activities of daily living
- Instability of weight bearing joints

Signs, history, and physical examination

- Monoarticular or oligoarticular, asymmetrical involvement
  - Transient joint effusion
  - Genu varum ("bow-legged")
- Hips
  - Groin pain during weight bearing exercises
  - Stiffness, especially after activity
  - Limited joint movement
- Spine
  - Lumbar involvement is most common at L3 and L4
  - Paresthesia
  - Loss of reflexes
- Feet
  - Typically involves the first metatarsophalangeal joint
- Shoulder, elbow, acromioclavicular, sternoclavicular, temporomandibular joints may also be affected.
- Observation on joint examination
  - Bony proliferation or occasional synovitis
  - Local tenderness
  - Crepitus
  - Limited motion with passive/active movement
  - Deformity
- Radiologic Evaluation

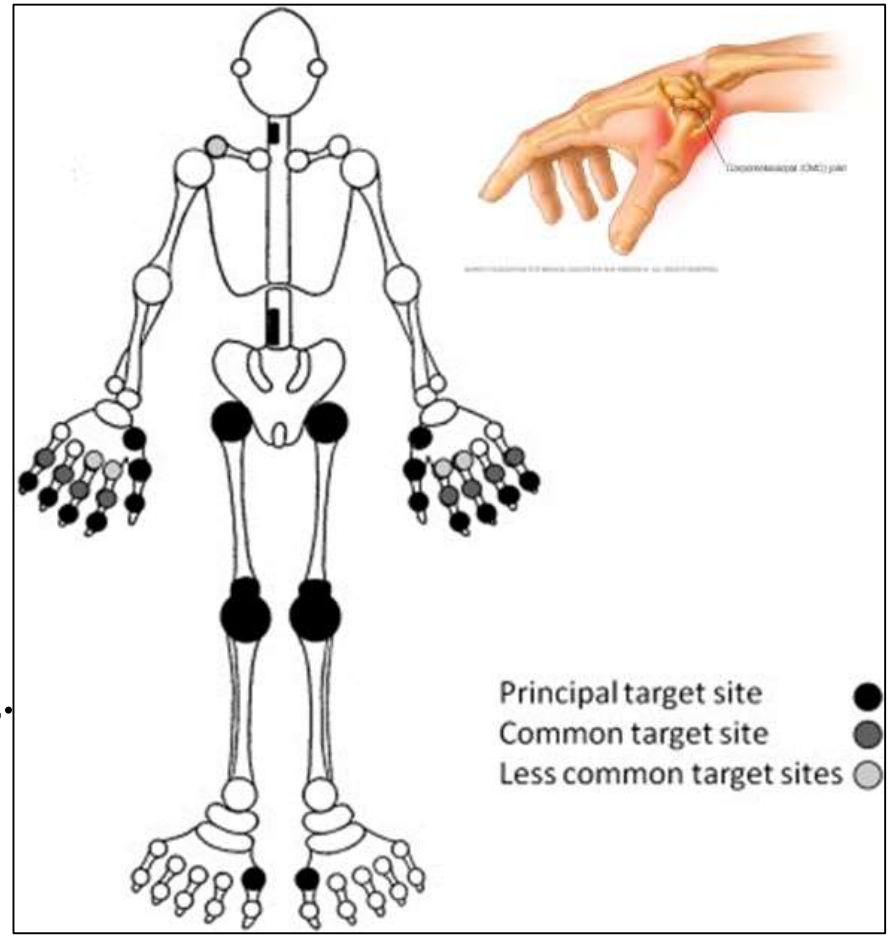
✓ The joints most commonly affected are the distal and proximal interphalangeal joints of the hands, the first carpometacarpal joint and joints of the hips, knees, and cervical and lumbar spine.

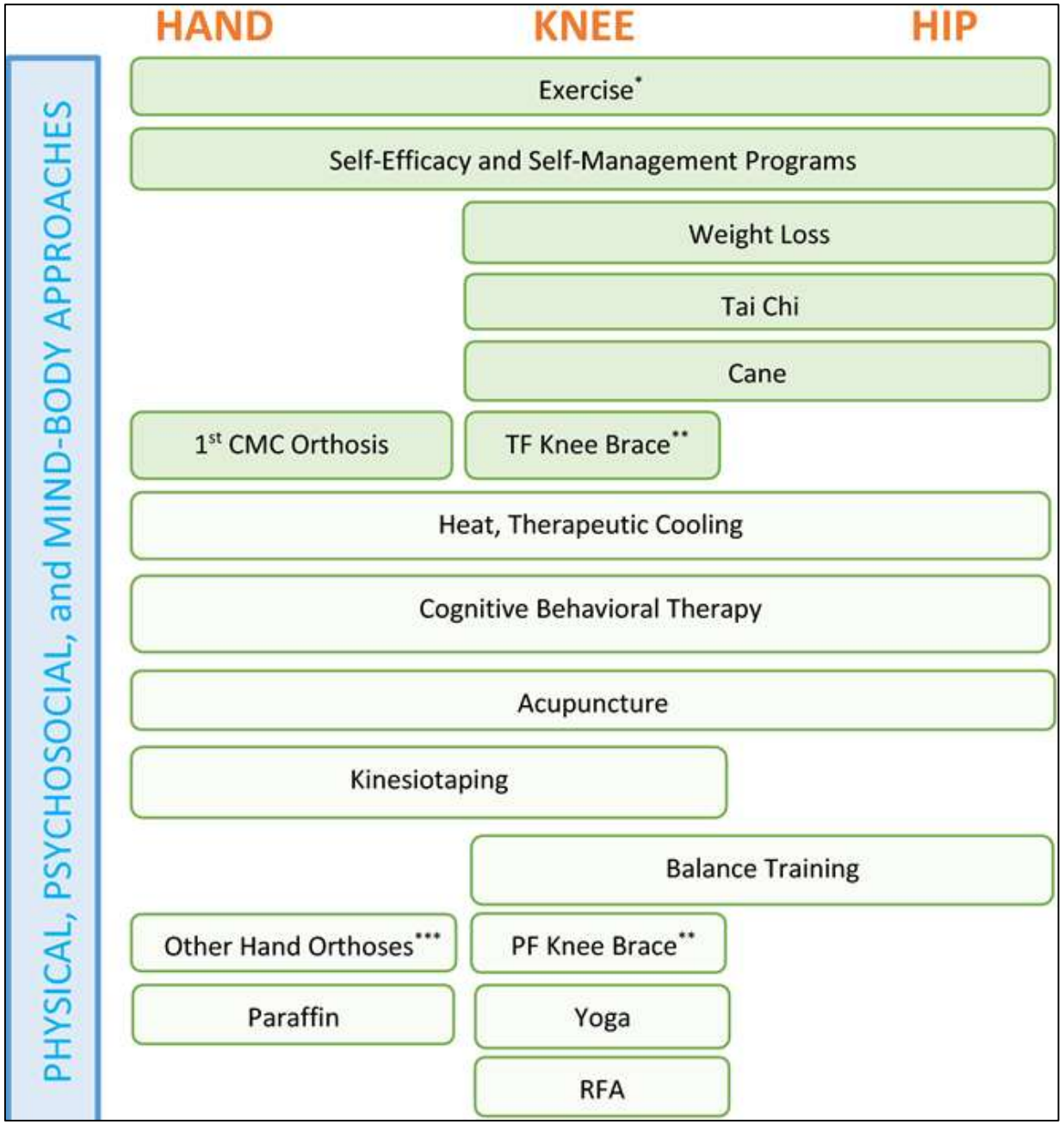
Diagnosis

✓ It is made through patient history, physician examination, radiologic findings, and laboratory testing.

✓ American College of Rheumatology criteria for classification of OA of the hips, knees, and hands include:

- presence of pain
- bony changes on examination
- Normal ESR
- radiographs showing osteophytes or joint space narrowing.





Treatment

Figure 1. Recommended therapies for the management of osteoarthritis (OA). Strongly and conditionally recommended approaches to management of hand, knee, and/or hip OA are shown. **No hierarchy within categories** is implied in the figure, with the recognition that the **various options may be used (and reused)** at various times during the course of a particular patient's disease. * = Exercise for knee and hip OA could include walking, strengthening, neuromuscular training, and aquatic exercise, with no hierarchy of one over another. Exercise is associated with better outcomes when supervised. ** = Knee brace recommendations: tibiofemoral (TF) brace for TF OA (strongly recommended), patellofemoral (PF) brace for PF OA (conditionally recommended). *** = Hand orthosis recommendations: first carpometacarpal (CMC) joint neoprene or rigid orthoses for first CMC joint OA (strongly recommended), orthoses for joints of the hand other than the first CMC joint (conditionally recommended). RFA = radiofrequency ablation; IA = intraarticular.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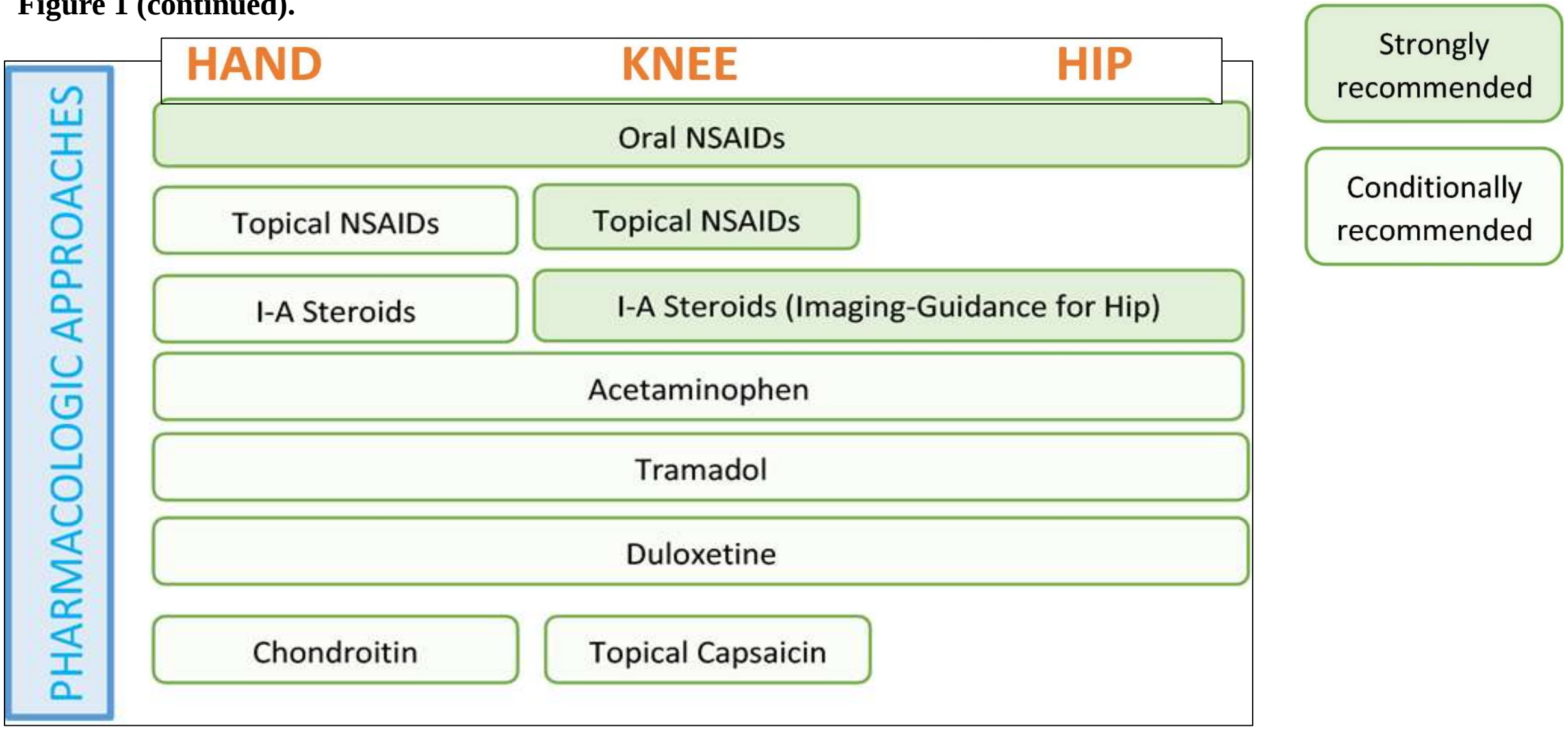
ROGER

Figure 1 (continued).



2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee.

Arthritis & Rheumatology, Volume: 72, Issue: 2, Pages: 220-233, First published: 06 January 2020, DOI: (10.1002/art.41142)

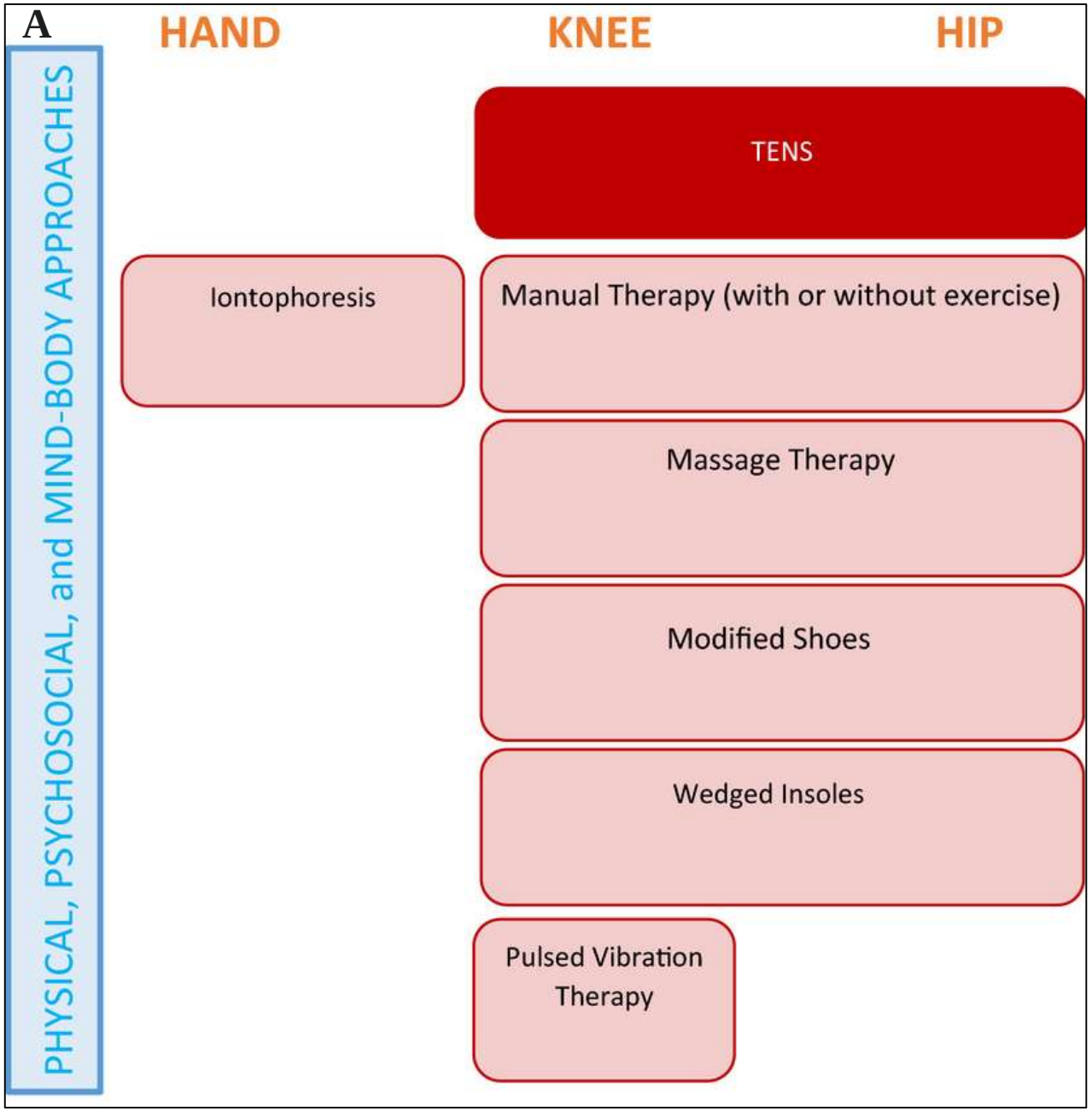


Figure 2. Therapies recommended *against* (physical, psychosocial, and mind-body approaches [**A**] and pharmacologic approaches [**B**]) in the management of hand, knee, and/or hip osteoarthritis. No hierarchy within categories is implied in the figure. TENS = transcutaneous electrical nerve stimulation; TNF = tumor necrosis factor; IL-1 = interleukin-1; PRP = platelet-rich plasma; IA = intraarticular.

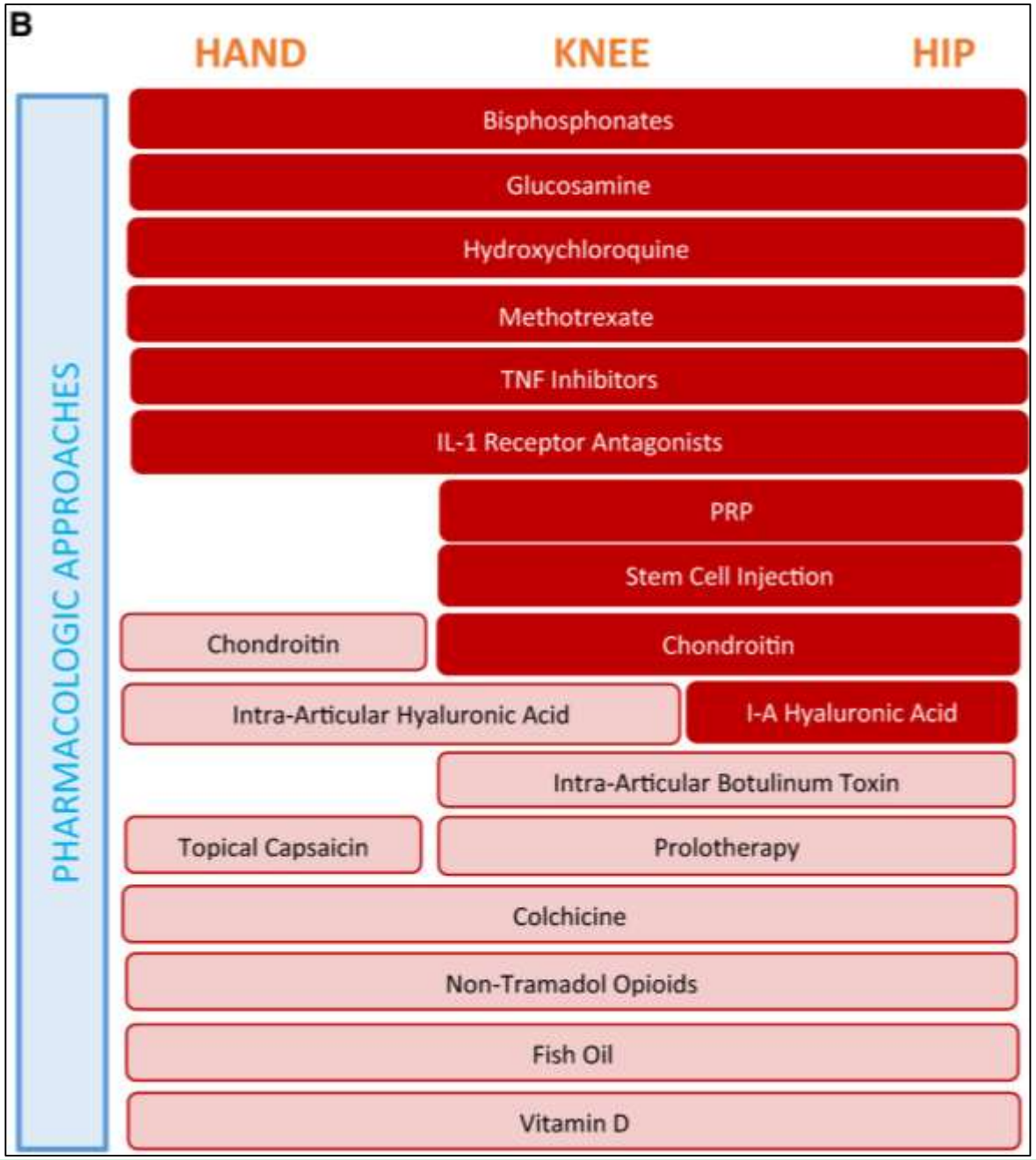


Figure 2 (continued).

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- ✓ RCTs of pharmacologic agents may be subject to a variety of limitations, including generalizability of their findings across patients.
- ✓ Publication bias may reduce the likelihood that negative trials will become part of the published literature.
- ✓ Statistically significant findings may represent benefits so small that they are not clinically important to patients.
- ✓ Both clinicians and patients may be dissatisfied with the options and unsure of how to choose among them.
- ✓ There are controversies in interpretation of the evidence, particularly with regard to the use of glucosamine and chondroitin, acupuncture, and intraarticular hyaluronic acid injections. Nonetheless, the process of updating treatment guidelines permits identification of critical gaps in our knowledge about best practices

TABLE 106-3 Monitoring of Medications Used in Osteoarthritis Treatment

Drug	Adverse Drug Reactions	Monitoring Parameters	Comments
Oral Analgesics			
Acetaminophen	Hepatotoxicity	Total daily dose limits	Use caution with multiple acetaminophen-containing products—total 4 g limit (or less in patients with hepatic dysfunction)
Tramadol	Nausea, vomiting, somnolence	No routine labs recommended	Drug–drug interaction with other serotonergic medications
Opioids	Sedation, constipation, nausea, dry mouth, hormonal changes	No routine labs recommended	Risks of addiction, dependence, and drug diversion
NSAIDs	Dyspepsia, CV events, GI bleeding, renal impairment	BUN/Creatinine, Hgb/Hct, blood pressure	Risks higher in those older than 75 years of age
Topical Analgesics			
Capsaicin	Skin irritation and burning	Inspection of areas of application	Wash hands thoroughly after application
NSAIDs	Skin itching, rash, irritated Dyspepsia, CV events, GI bleeding, renal impairment	Inspection of areas of application. As needed: BUN/Creatinine, Hgb/Hct, blood pressure	Wash hands thoroughly after application. Avoid oral NSAID or aspirin other than cardioprotective dose. Ensure patient applying gel, solution, or patch correctly
Injectable drugs			
Intra-articular corticosteroids	Hypertension, hyperglycemia	Glucose, blood pressure	HPA axis suppression if used too frequently
Intra-articular hyaluronates	Local joint swelling, stiffness, pain	No routine labs recommended	Less effective than intra-articular

TABLE 106-2 Dosing of Medications for Osteoarthritis

Drug	Brand Name	Starting Dose	Usual Range	Special Population Dose	Other
Oral analgesics					
Acetaminophen	Tylenol	325-500 mg three times a day	325-650 mg every 4-6 hours or 1 g 3-4 times/day	Chronic alcohol intake, hepatic disease	Contained in many combination analgesics
Tramadol Tramadol ER	Ultram Ultram ER	25 mg in the morning 100 mg daily	Titrate dose in 25 mg increments to reach a maintenance dose of 50-100 mg three times a day. Titrate to 200-300 mg daily	Creatinine clearance <30 mL/min (0.5 mL/s)—maximum dose is 200 mg daily Do not use if creatinine clearance <30 mL/min (0.5 mL/s)	May need to taper dose upon discontinuation to prevent withdrawal symptoms
Hydrocodone/acetaminophen	Lortab, Vicodin, Norco	5 mg/325 mg three times daily	2.5-10 mg/325-650 mg 3-5 times daily	Titrate dose slowly in older adults (age >65 years)	Maximum dose limited by total daily dose of acetaminophen
Oxycodone/acetaminophen	Percocet	5 mg/325mg three times daily	2.5-10 mg/325-650 mg 3-5 times daily	Titrate dose slowly in older adults (age >65 years)	Maximum dose limited by total daily dose of acetaminophen
Topical analgesics					
Capsaicin 0.025% or 0.15%	Capzasin-HP		Apply to affected joint 3-4 times per day		—
Diclofenac 1% gel	Voltaren		Apply 2 or 4 g per site as prescribed, 4 times daily		

Diclofenac 1.3% patch	Flector		Apply one patch twice daily to the site to be treated, as directed.		
Diclofenac 1.5% solution	Pennsaid		Apply 40 drops to the affected knee, applying and rubbing in 10 drops at a time. Repeat for a total of four times daily		
Diclofenac 2% solution	Pennsaid		Apply 40 mg (two pump actuations) twice daily		
Intra-articular Corticosteroids					
Triamcinolone	Kenalog	5-15 mg/joint	10-40 mg/large-joint (knee, hip, shoulder)	If multiple joints injected, maximum total dose is usually 80 mg	Often administered concomitantly with a local anesthetic
Methylprednisolone acetate	Depo-Medrol	10-20 mg/joint	20-80 mg/large-joint (knee, hip, shoulder)	10-40 mg for medium joints (elbows, wrists)	

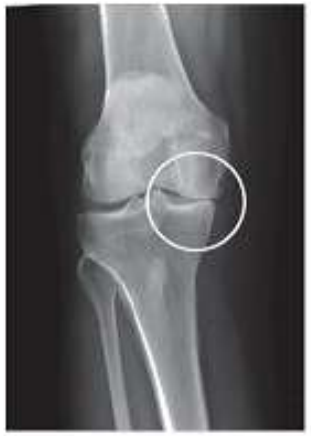
Nonsteroidal anti-inflammatory drugs (NSAIDs)				
Aspirin, plain, buffered, or enteric-coated	Bayer, Ecotrin, Bufferin	325 mg three times a day	325-650 mg four times a day	Doses of 3,600 mg/day are needed for anti-inflammatory activity
Celecoxib	Celebrex	100 mg daily	100 mg twice daily or 200mg daily	
Diclofenac XR	Voltaren-XR	100 mg daily	100-200 mg daily	
Diclofenac IR	Cataflam	50 mg twice a day	50-75 mg twice a day	
Diflunisal	Dolobid	250 mg twice a day	500-750 mg twice a day	
Etodolac	Lodine	300 mg twice a day	400-500 mg twice a day	
Fenoprofen	Nalfon	400 mg three times a day	400-600 mg 3-4 times a day	
Flurbiprofen	Ansaid	100 mg twice a day	200-300 mg/day 2-4 divided doses	
Ibuprofen	Motrin, Advil	200 mg three times a day	1,200-3,200 mg/day in 3-4 divided doses	Available OTC and Rx
Indomethacin	Indocin	25 mg twice a day	Titrate dose by 25-50 mg/day until pain controlled or maximum dose of 50 mg three times a day	
Indomethacin SR	Indocin SR	75 mg SR once daily	Can titrate to 75 mg SR twice daily if needed	

TABLE 106-2 Dosing of Medications for Osteoarthritis (*Continued*)

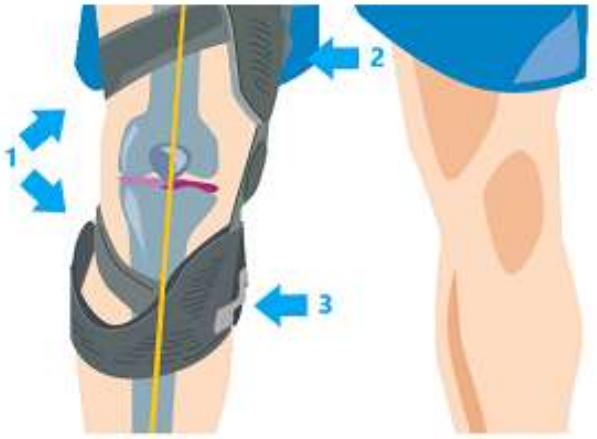
Drug	Brand Name	Starting Dose	Usual Range	Special Population Dose	Other
Ketoprofen	Orudis	50 mg three times a day	50-75 mg 3-4 times a day		
Meclofenamate	Meclomen	50 mg three times a day	50-100 mg three to four times a day		
Mefenamic acid	Ponstel	250 mg three times a day	250 mg four times a day		FDA approval for 1 week of therapy
Meloxicam	Mobic	7.5 mg daily	15 mg daily		
Nabumetone	Relafen	500 mg daily	500-1000 mg 1-2 times a day		
Naproxen	Naprosyn	250 mg twice a day	500 mg twice a day		
Naproxen sodium Naproxen sodium DR	Anaprox, Aleve Naprelan	220 mg twice a day	220–550 mg twice a day 375-750 mg twice a day		Available OTC and Rx
Oxaprozin	Daypro	600 mg daily	600-1200 mg daily		
Piroxicam	Feldene	10 mg daily	20 mg daily		
Salsalate	Disalcid	500 mg twice a day	500-1000 mg 2-3 times a day		

Nonpharmacologic Therapies

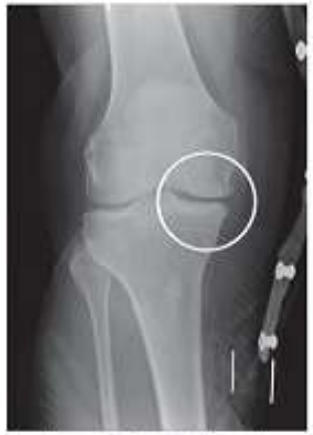
- ✓ Activities that involve excessive use of the joint should be identified and avoided.
- ✓ When weight-bearing joints are affected, support in the form of a cane, crutches, or a walker can be helpful.
- ✓ Weight reduction may be of benefit, even for non-weight-bearing joints.
- ✓ Consultation with occupational and physical therapists may be helpful.



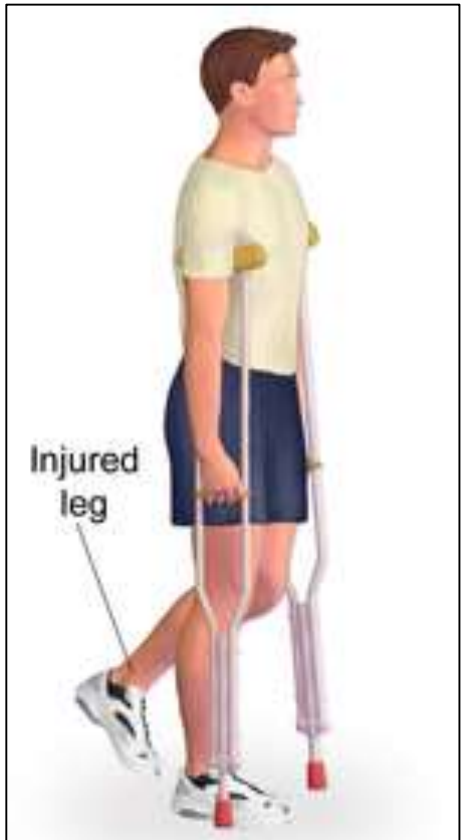
Knee OA without bracing
(bone-on-bone contact)



The 3-Point Leverage System



Knee OA with bracing
(space created between bones)



Walking with Crutches

- ✓ Physical supports (cervical collar, lumbar corset), local heat, and exercises to strengthen cervical, paravertebral, and abdominal muscles may provide relief in some patients.

- ✓ Surgical Management can be considered when patients suffer from disabling pain or deformity:

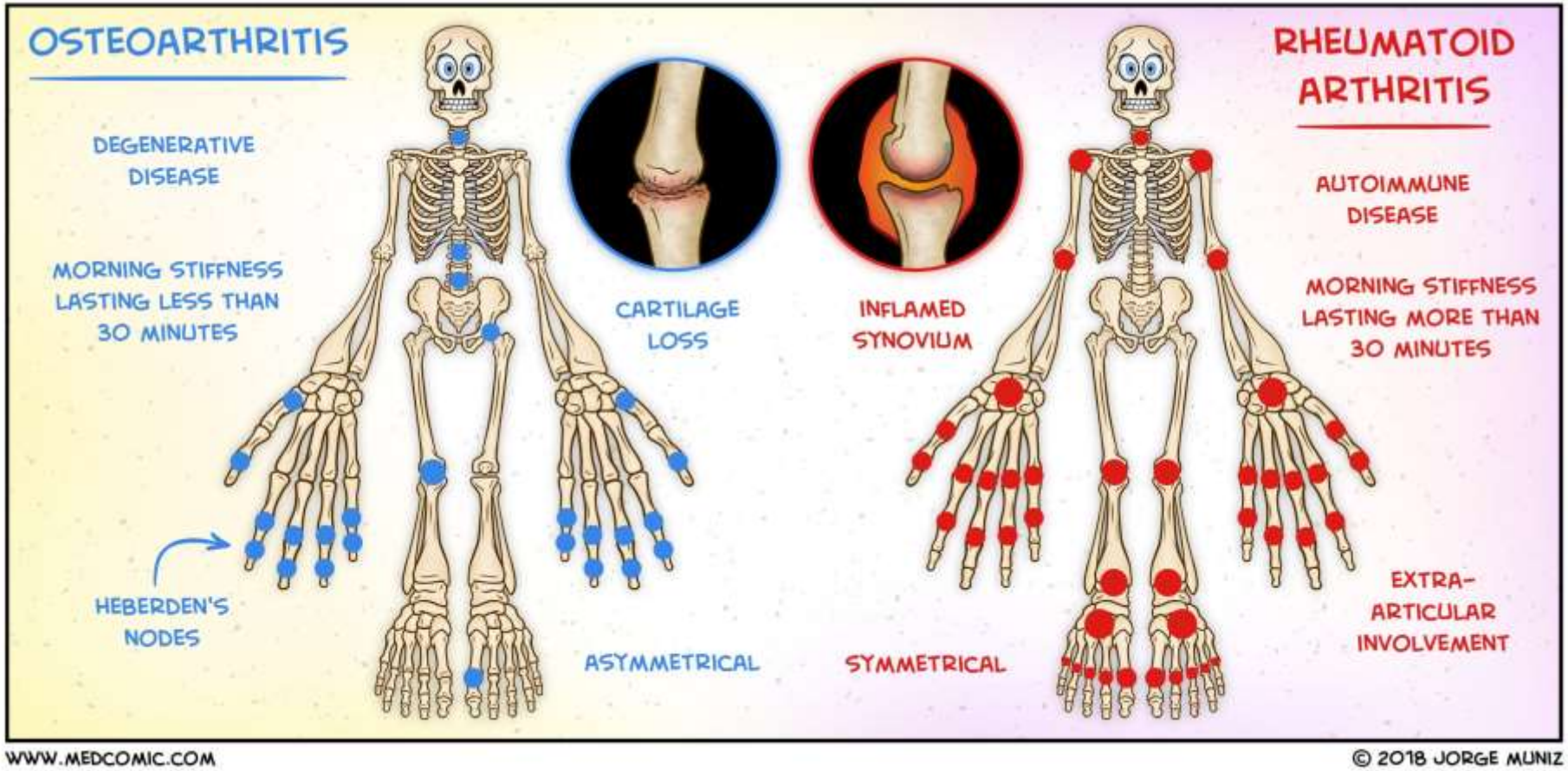
  - Joint replacement surgery usually relieves pain and increases function in selected patients.
  - Laminectomy and spinal fusion should be reserved for patients who have severe disease with intractable pain or neurologic complications.

TABLE 106-1 Nonpharmacologic Interventions in the Treatment of OA[28,29]

Intervention	Strength of Recommendation
Exercise	Strong
Weight loss (if overweight)	Strong
Patient education	Strong
Use of assistive device (ie, cane)	Moderate
Use of shoe insoles	Moderate
Application of heat	Moderate
Use of fitted knee braces	Minimal
Lateral patellar taping	Minimal
Passive exercise alone	Minimal

Robustness of recommendation: Strong–fully supported by evidence-based guidelines, Moderate–supported by evidence-based guidelines, Minimal–little support by evidence-based guidelines.

OA versus RA


OSTEOARTHRITIS
DEGENERATIVE DISEASE
MORNING STIFFNESS LASTING LESS THAN 30 MINUTES
HEBERDEN'S NODES
CARTILAGE LOSS
ASYMMETRICAL
INFLAMED SYNOVIUM
SYMMETRICAL
RHEUMATOID ARTHRITIS
AUTOIMMUNE DISEASE
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Stages of Knee Osteoarthritis - YouTube
https://www.youtube.com/watch?v=BBqjltHNOrc
4:08

Knee Joint Injection - YouTube
https://www.youtube.com/watch?v=n7BtIHmhOcg
1:13

Steroid Therapy for Knee Joint Arthritis - Medical Animation by Watermark - YouTube
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Knee joint steroid injection - YouTube
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