Living with Arthritis

Benjamin Snyder, MD MPH MS

Education and Training:

- Board Certified Orthopedic Surgeon
- Fellowship in Joint Replacement/Adult Reconstruction: Stanford University School of Medicine, Stanford, CA
- Orthopedic Surgery Research Fellowship: UMass Medical School, Worcester, MA
- Orthopedic Surgery Residency: UMass Medical School, Worcester, MA
- Medical Degree: Dartmouth Medical School, Hanover, NH
- Graduate school
  - MPH, Dartmouth Medical School, Hanover, NH
  - MS Bioengineering, Penn State University, State College, PA
- Undergraduate school
  - BS Mechanical Engineering, Penn State University, State College, PA

Specializing in:

- Total hip and knee replacement surgery
- Revision hip and knee replacement surgery
- Partial knee replacement surgery

Practice philosophy: *"My goal is to understand each patient's unique story, and use my knowledge and experience to guide them through the treatment choices that will optimize their health and well-being."*

Definition of OA (osteoarthritis)

- Damage caused by combination of cartilage integrity, biochemical processes, genetics, and mechanical forces
  - Breakdown of articular cartilage
  - Synovial hypertrophy
  - Bone remodeling and sclerosis

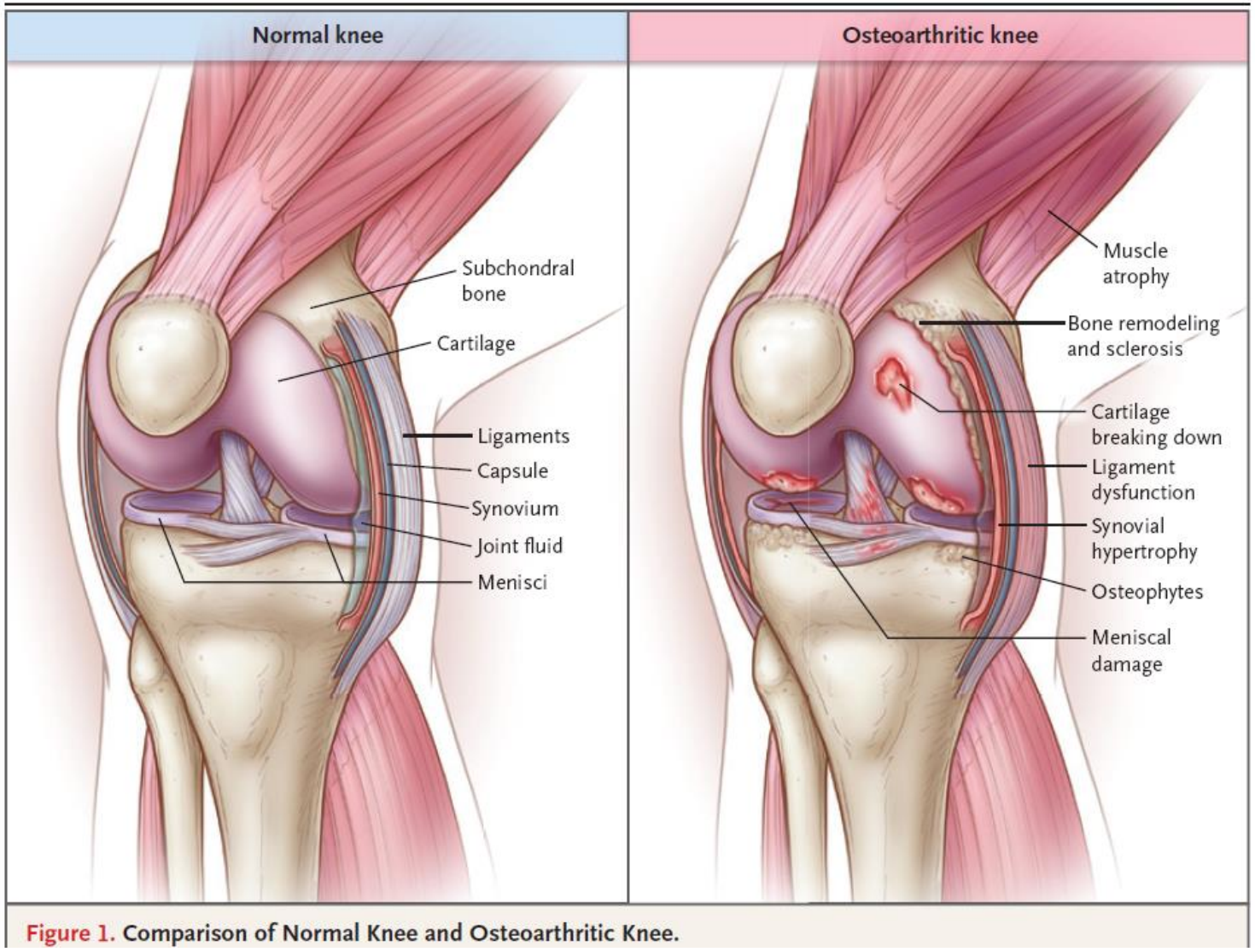
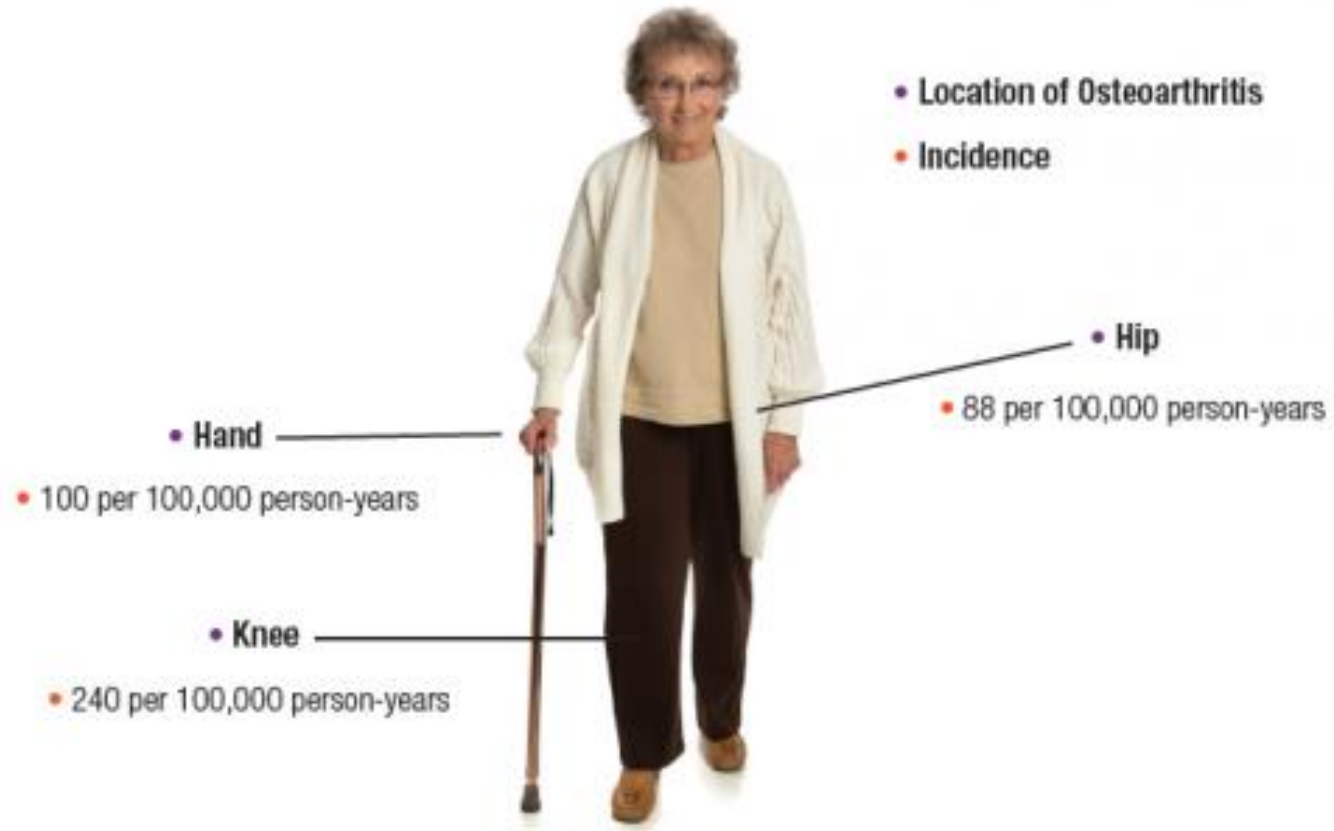


Figure 1. Comparison of Normal Knee and Osteoarthritic Knee.

Risk factors for OA

- Age
- Female
- Obesity (#1 modifiable risk factor)
- Previous injury
- Muscular weakness or inactivity
- Malalignment (valgus or varus) or dysplasia
- Activities (e.g. deep knee bending, squatting, heavy lifting)

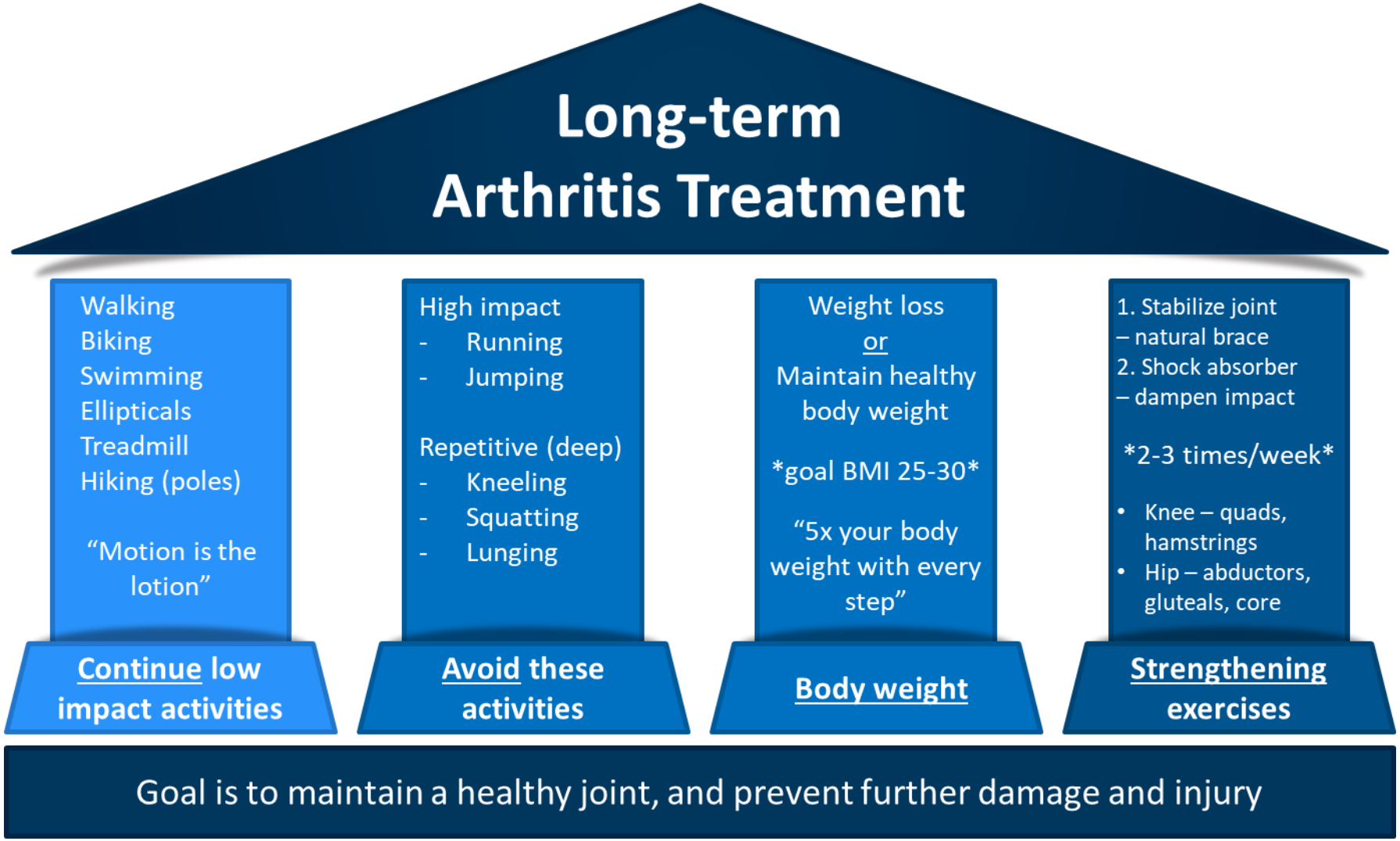
Incidence of OA



Source: Oliveria SA, Felson DT, Reed JI, et al. Incidence of symptomatic hand, hip, and knee osteoarthritis among patients in a health maintenance organization. *Arthritis Rheum*. 1995;38(8):1134-1141.

Very Common: 37% of people ≥60 years old have knee arthritis based on National Health and Nutrition Examination Survey

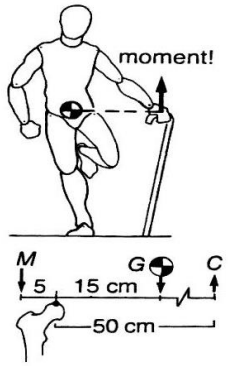
“Living With Arthritis”



Continue low impact activities

- Safe to do these activities
- You will not do more damage to your joints
- “Arthritis is hurtful, not harmful”
- “Motion is the lotion”
- “If you rest you rust”

Biomechanics of Cane



- Cane in Contralateral hand decreases JRF
- Long moment arm makes so effective
- 15% BW to cane reduces joint contact forces by 50%

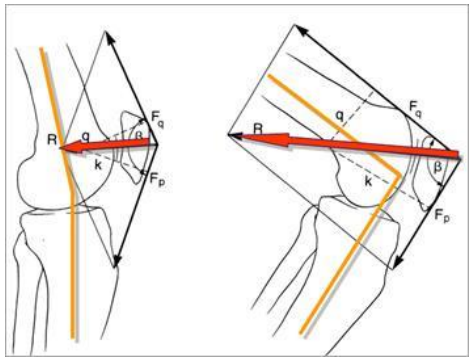
Walking
Biking
Swimming
Ellipticals
Treadmill
Hiking (poles)

“Motion is the lotion”

Continue low impact activities

Avoid these activities

- Places excessive stress on joints



Activity	Force	% Body Weight
Stair Ascend	1500 N	3.3 x BW
Stair Descend	4000 N	5 x BW
Jogging	5000 N	7 x BW
Squatting	5000 N	7 x BW
Deep Squatting	15,000 N	20 x BW

High impact
- Running
- Jumping

Repetitive (deep)
- Kneeling
- Squatting
- Lunging

Avoid these activities

Evidenced based

Patient Education

Patient education programs are recommended to improve pain in patients with knee osteoarthritis

Management of Osteoarthritis of the Knee (Non-Arthroplasty) (3rd Edition)
Endorsed by: AAHKS, APTA Cite this recommendation
★★★★ STRONG RECOMMENDATION

Supervised Exercise

Supervised exercise, unsupervised exercise, and/or aquatic exercise are recommended over no exercise to improve pain and function for treatment of knee osteoarthritis.

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★★★★ STRONG RECOMMENDATION

Self-Management

Self-management programs are recommended to improve pain and function for patients with knee osteoarthritis.

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Canes

Canes could be used to improve pain and function in patients with knee osteoarthritis.

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★★★☆ MODERATE RECOMMENDATION

Weight loss or maintain healthy body weight

- Every 1 pound you lose, is 5 pounds less through your hip and knee joint
  - Lose 20lbs → 100lbs less through joint
- "3500 calories = 1 pound loss = 500 calories/day x 1 week or 1 marathon"

$$BMI = \left[\frac{\text{weight in pounds}}{(\text{height in inches}) \times (\text{height in inches})} \right] \times 703$$

BMI	WEIGHT STATUS
Below 18.5	Underweight
18.5-24.9	Normal
25.0-29.9	Overweight
30 and Above	Obese

Evidence based

Weight Loss Intervention

Sustained weight loss is recommended to improve pain and function in overweight and obese patients with knee osteoarthritis.

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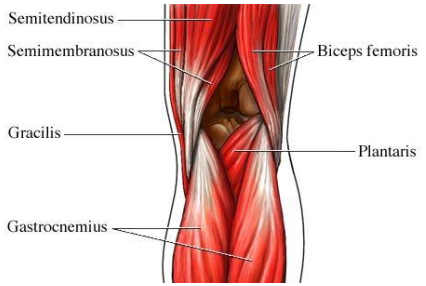
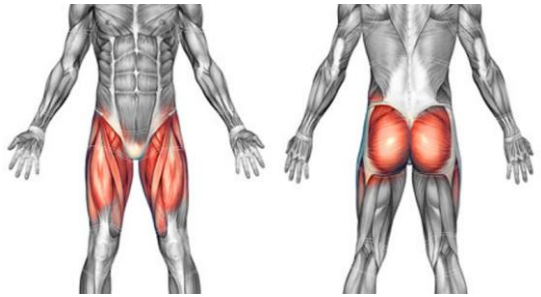
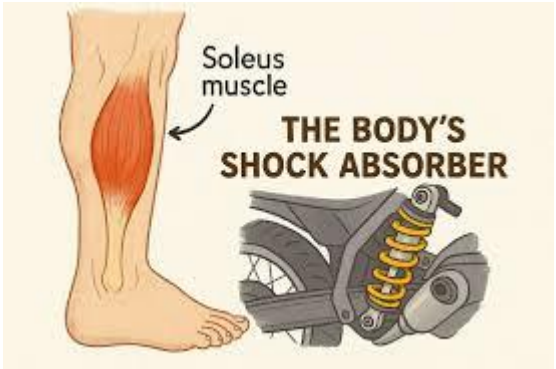
Strengthening exercises

- Strong muscles and tendons act as brace to stabilize the joint
- Strong muscles and tendons act like shock absorbers to the joint
- Home exercises or referral to physical therapy







1. Stabilize joint – natural brace
2. Shock absorber – dampen impact

2-3 times/week

- Knee – quads, hamstrings
- Hip – abductors, gluteals, core

Strengthening exercises

Knee strengthening exercises

- Do exercises 2-3 times per week

4. Half Squats

Repetitions	Days per week
3 sets of 10	4 to 5

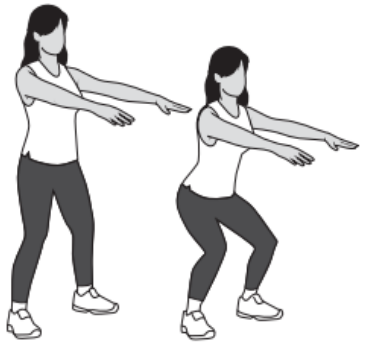
Main muscles worked: Quadriceps, gluteus, hamstrings
You should feel this exercise at the front and back of your thighs, and your buttocks

Equipment needed: As the exercise becomes easier to perform, gradually increase the resistance by holding hand weights. Begin with 5 lb. weights and gradually progress to a greater level of resistance, up to 10 lb. weights.

Step-by-step directions

- Stand with your feet shoulder distance apart. Your hands can rest on the front of your thighs or reach in front of you. If needed, hold on to the back of a chair or wall for balance.
- Keep your chest lifted and slowly lower your hips about 10 inches, as if you are sitting down into a chair.
- Plant your weight in your heels and hold the squat for 5 seconds.
- Push through your heels and bring your body back up to standing.

Tip Do not bend forward at your waist.



7. Leg Extensions

Repetitions	Days per week
3 sets of 10	4 to 5

Main muscles worked: Quadriceps
You should feel this exercise at the front of your thigh

Equipment needed: As the exercise becomes easier to perform, gradually increase the resistance by adding an ankle weight. Begin with a 5 lb. weight and gradually progress to a greater level of resistance, up to a 10 lb. weight. If you have access to a fitness center, this exercise can also be performed on a weight machine. A fitness assistant at your gym can instruct you on how to use the machines safely.

Step-by-step directions

- Sit up straight on a chair or bench.
- Tighten your thigh muscles and slowly straighten and raise your affected leg as high as possible.
- Squeeze your thigh muscles and hold this position for 5 seconds. Relax and bring your foot to the floor. Repeat.

Tip Do not swing your leg or use forceful momentum to lift it higher.

Hip strengthening exercises

- Do exercises 2-3 times per week

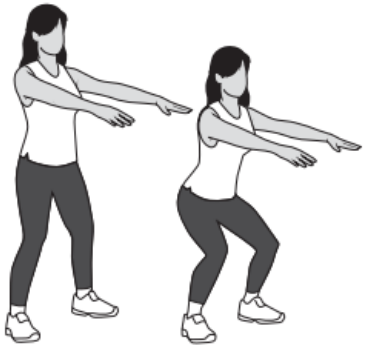
4. Half Squats

Repetitions
3 sets of 10

Days per week
4 to 5

Main muscles worked: Quadriceps, gluteus, hamstrings
You should feel this exercise at the front and back of your thighs, and your buttocks

Equipment needed: As the exercise becomes easier to perform, gradually increase the resistance by holding hand weights. Begin with 5 lb. weights and gradually progress to a greater level of resistance, up to 10 lb. weights.



Step-by-step directions

- Stand with your feet shoulder distance apart. Your hands can rest on the front of your thighs or reach in front of you. If needed, hold on to the back of a chair or wall for balance.
- Keep your chest lifted and slowly lower your hips about 10 inches, as if you are sitting down into a chair.
- Plant your weight in your heels and hold the squat for 5 seconds.
- Push through your heels and bring your body back up to standing.

Tip	Do not bend forward at your waist.

10. Hip Abduction

Repetitions
3 sets of 20

Days per week
4 to 5

Main muscles worked: Abductors, gluteus
You should feel this exercise at your outer thigh and buttock

Equipment needed: As the exercise becomes easier to perform, gradually increase the resistance by adding an ankle weight. Begin with a 5 lb. weight and gradually progress to a greater level of resistance, up to a 10 lb. weight.

Step-by-step directions

- Lie on your side with your injured leg on top and the bottom leg bent to provide support.
- Straighten your top leg and slowly raise it to 45°, keeping your knee straight, but not locked.
- Hold this position for 5 seconds.
- Slowly lower your leg and relax it for 2 seconds. Repeat.

Tip	Do not rotate your leg in an effort to raise it higher.

Evidence based

Neuromuscular Training

Neuromuscular training (i.e. balance, agility, coordination) programs in combination with traditional exercise could be used to improve performance-based function and walking speed for treatment of knee osteoarthritis.

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PHYSICAL THERAPY AS CONSERVATIVE TREATMENT

Physical therapy could be considered as a treatment for patients with mild to moderate symptomatic osteoarthritis of the hip to improve function and reduce pain.

Management of Osteoarthritis of the Hip (2023)
Endorsed by: AAHKS Cite this recommendation
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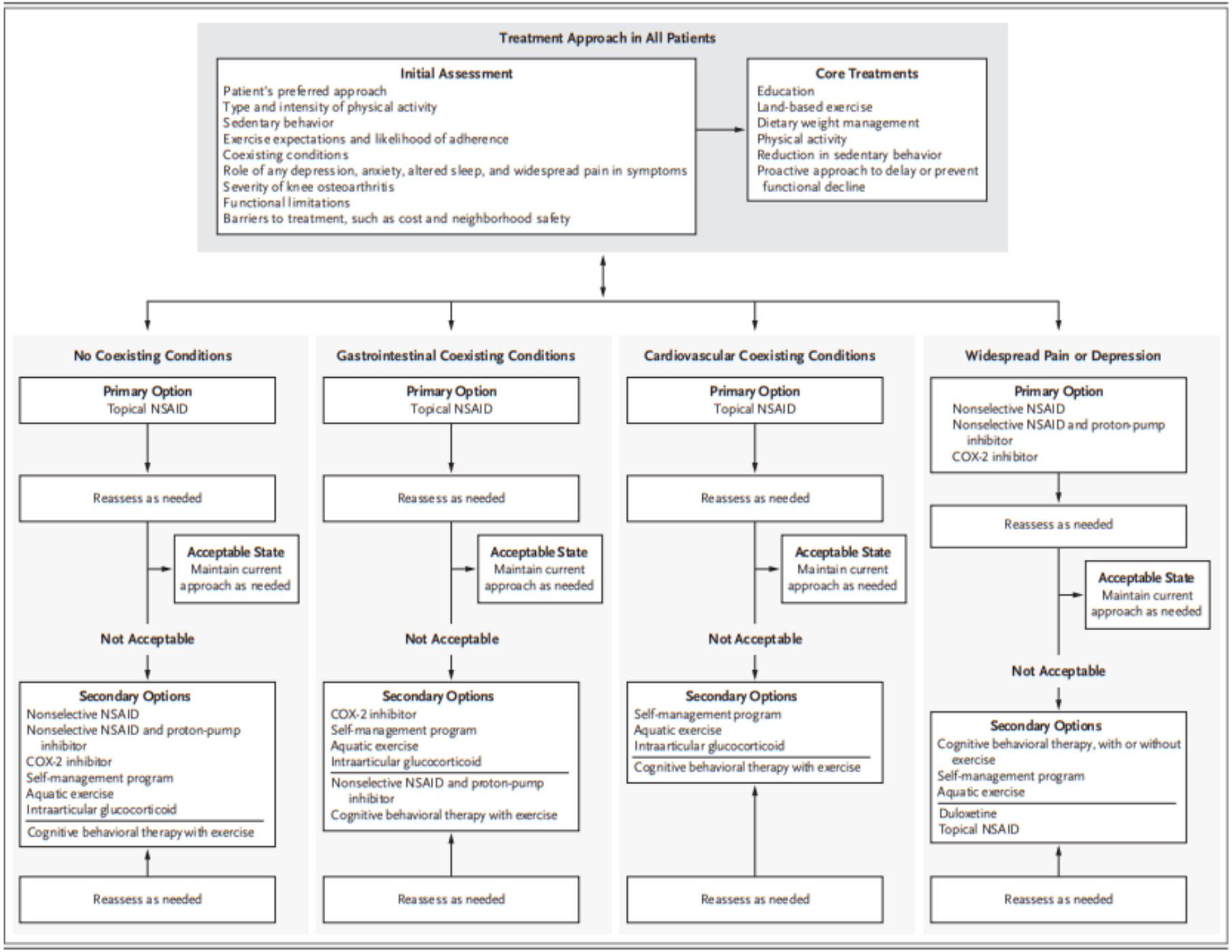
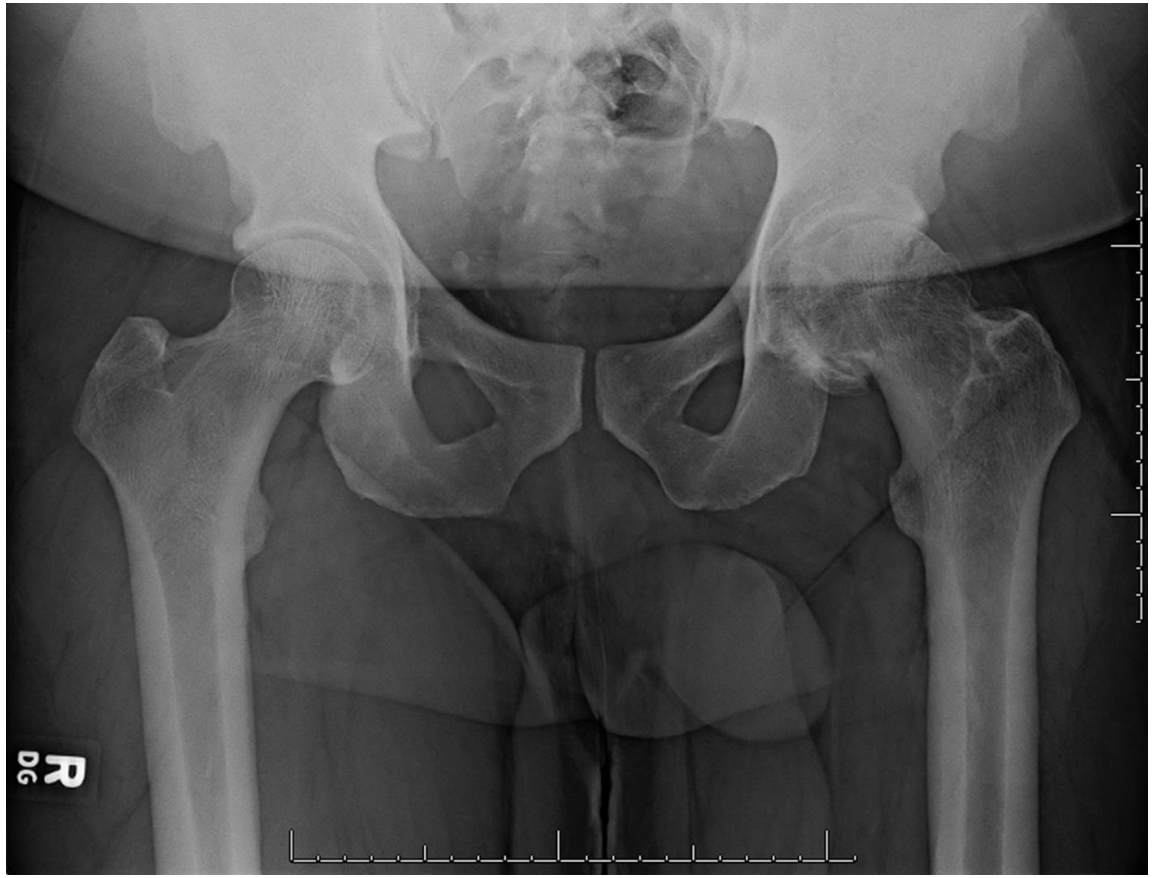
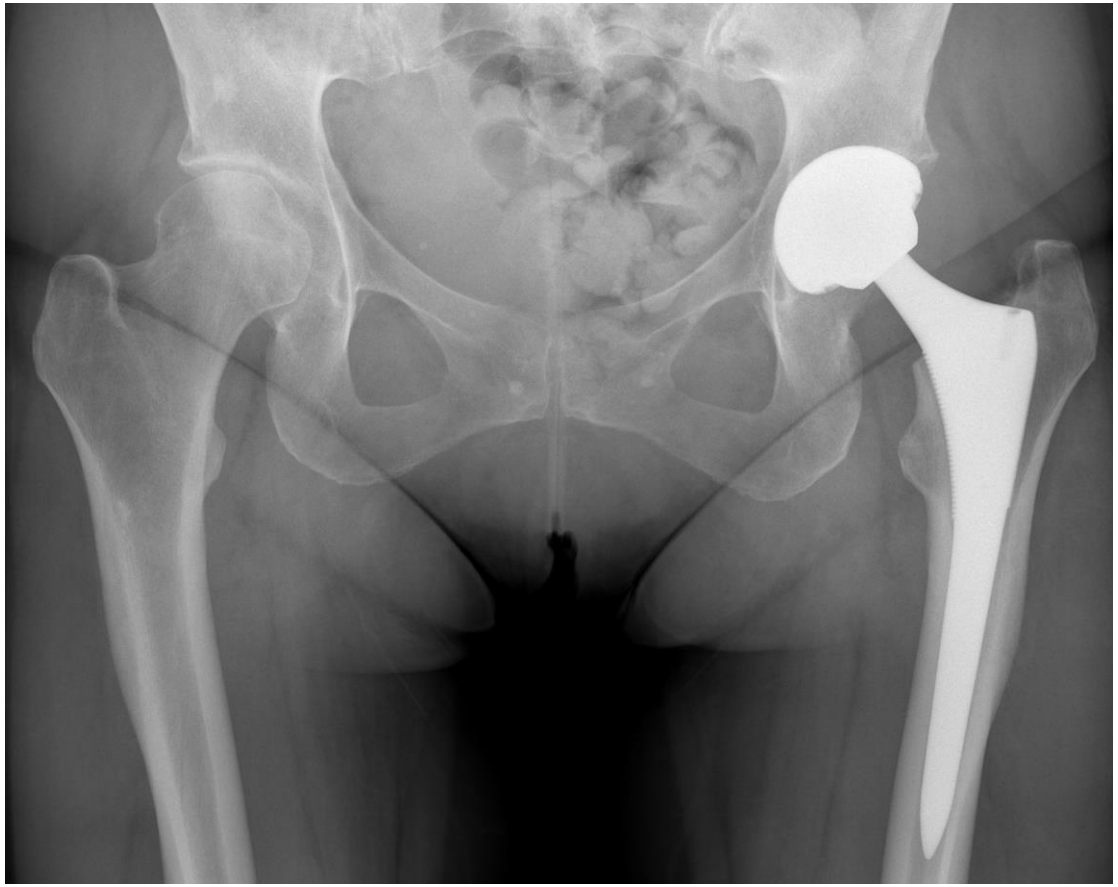


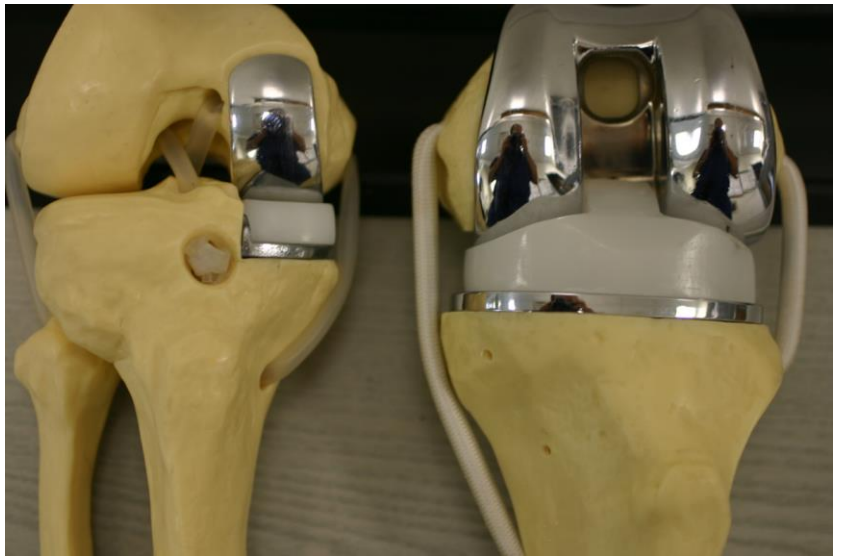
Sharma L, "Osteoarthritis of the Knee," NEJM 2021;384(1):51-59

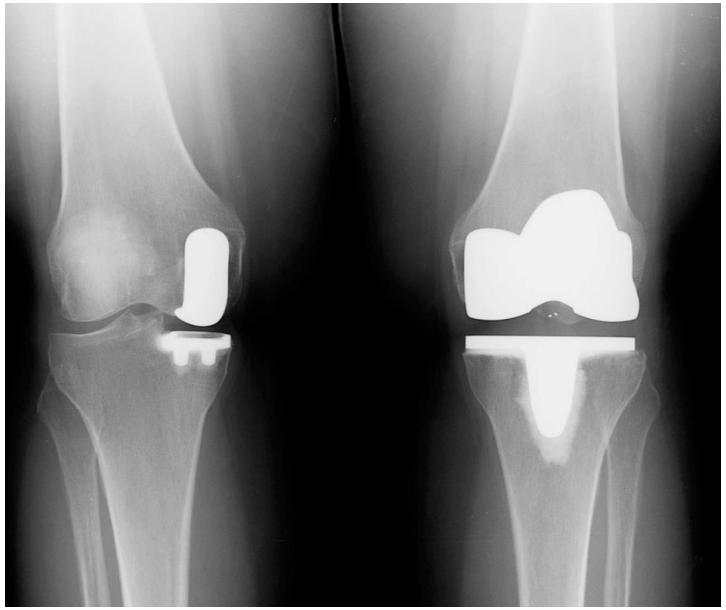
Joint Replacement Surgery – Hip





Joint Replacement Surgery – Knee





Surgical Candidacy

- Contraindications
  - BMI > 40
  - Diabetes with A1c > 8.0
  - Smoking
  - Active infection
  - Pending dental work
  - Malnutrition
  - Severe anemia
  - Uncontrolled psychiatric/substance issues
  - No injection within 3 months

- Better outcomes when medical and social comorbidities are optimized

Thank you! Any Questions?