Osteoarthritis and Exercise

American Council on Exercise

Association of Rheumatology Health Professionals

Arthritis Foundation

Course Overview

Thank you for choosing “Osteoarthritis and Exercise”.
The American Council on Exercise developed this course in partnership with the Association of Rheumatology Health Professionals, a division of the American College of Rheumatology, and in cooperation with the Arthritis Foundation.

This continuing education course is designed to increase your knowledge about osteoarthritis (OA) and help you design safe and effective exercise interventions for your clients who suffer from OA.

You will be uniquely positioned to meet the needs of millions of people with osteoarthritis who aim to lead a rewarding and low-pain physically active lifestyle.

Course Overview

The course includes the following information:

- Osteoarthritis (OA) – Disease Process, Symptoms and Treatment Strategies
- Other Types of Arthritis
- Working with the Healthcare Team
- Benefits and Potential Risks of Exercise
- Exercise Guidelines for OA clients
- Exercise Tips and Joint Protection Strategies
- Recommended Resources/References

Learning Objectives

At the end of the course, you will be able to:

1. Describe the symptoms, underlying disease process and common treatment approaches for clients with osteoarthritis
2. Identify strategies for reducing unnecessary joint stress during and after exercise and the need to modify a client's program
3. List exercise variations for the knee, hip and spine when a client has osteoarthritis in those joints
4. Describe the benefits, challenges and guidelines related to flexibility exercise, strength training and aerobic exercise for individuals with osteoarthritis

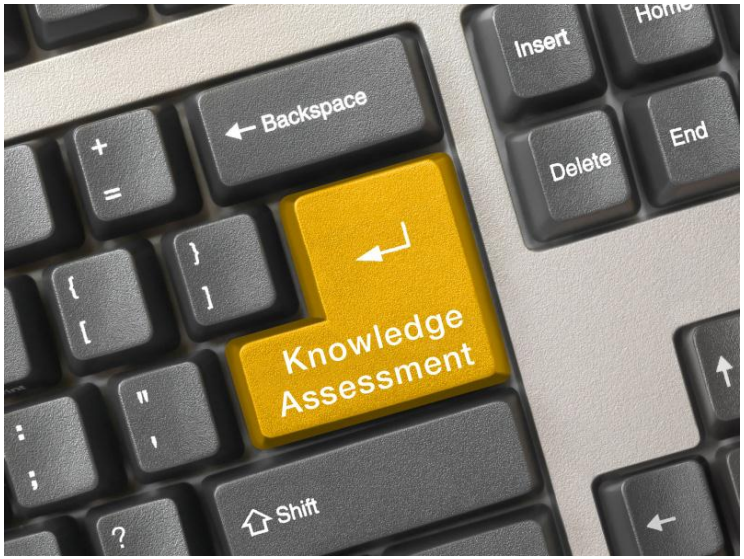
Knowledge Assessment

Throughout the course you will be asked questions to reinforce key learning points and verify your understanding of the material.

Think carefully before answering each question.

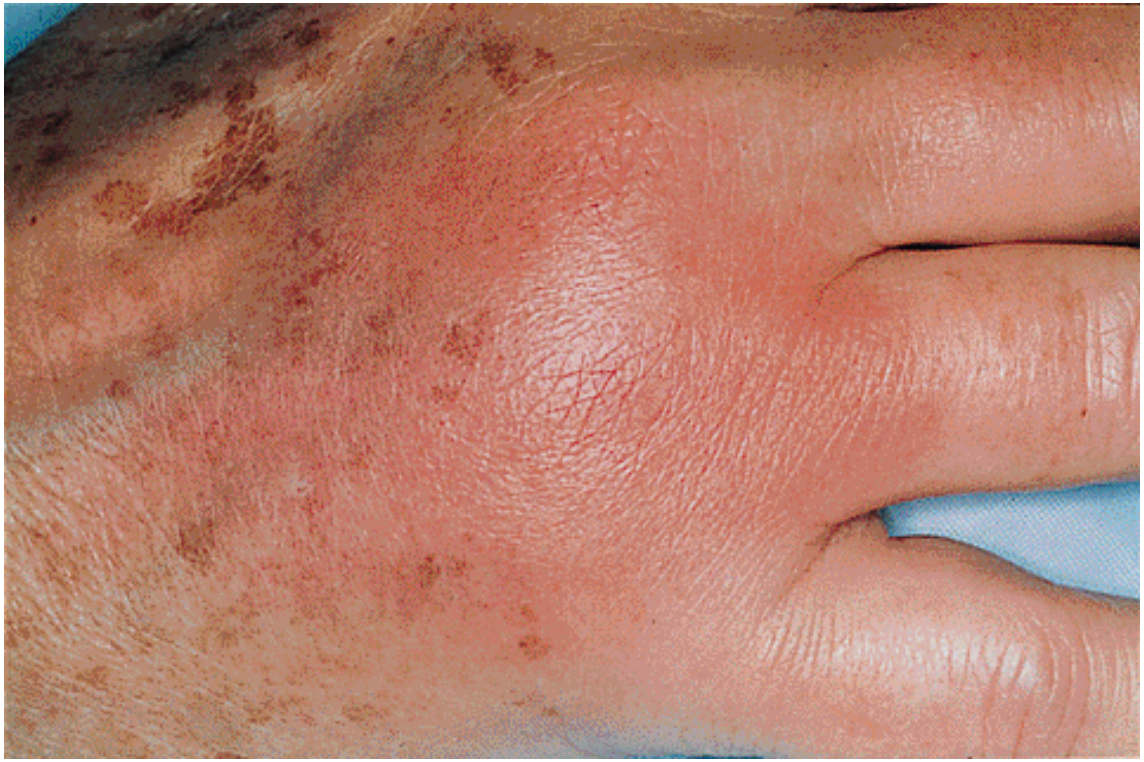
You must answer 70% of these questions correctly to complete the Osteoarthritis and Exercise course.

Let’s get started.



What is Arthritis?

The term arthritis translates to “inflammation of a joint”



Arthritis = Over 100 Different Pathologies

Arthritis is characterized by inflammation, injury, and pain of the joints, muscles, connective tissue and/or soft tissues surrounding the bones and joints. Rheumatologic disorders (forms of arthritis) tend to be chronic and incurable; however, most can be effectively managed with proper treatment programs.

Psoriatic Arthritis

Rheumatoid Arthritis

Scleroderma

Fibromyalgia

Gout

Systemic Lupus Erythematosus

Juvenile Arthritis

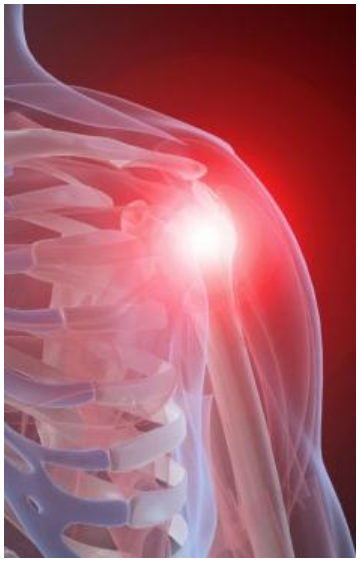
Ankylosing Spondylitis

Osteoarthritis

Osteoporosis

Arthritis Statistics

- As of 2006, 46 million Americans (1 in 5) have arthritis.
- By 2030, an estimated 67 million Americans are projected to have doctor-diagnosed arthritis.
- Arthritis is the second most prevalent chronic condition in the US and leading cause of disability over age 15.
- It results in 39 million doctor visits and 500,000 hospitalizations per year.
- It cost the US economy $128 billion in 2003.
- It affects people in all age groups, including 300,000 kids.
- It tends to affect more women (28.3%) than men (18.2%).
- Prevalence: 34 million Caucasians; 4.6 million African-Americans; and 3.1 million Hispanics



Arthritis Foundation and CDC

More Arthritis Statistics

- Nearly 80% of adults have or know someone with arthritis.
- 40% of people with arthritis need to have work limitations.
- It is a more frequent cause of activity limitation than heart disease, cancer or diabetes.
- Everyday activities (walking, dressing, bathing) are limited for more than 7 million Americans.
- Half of Americans with arthritis think there is nothing you can do about arthritis.
- Baby boomers are primarily at risk.
- Over ½ of those affected are under age 65.

Arthritis Foundation and CDC

Osteoarthritis (OA) Statistics

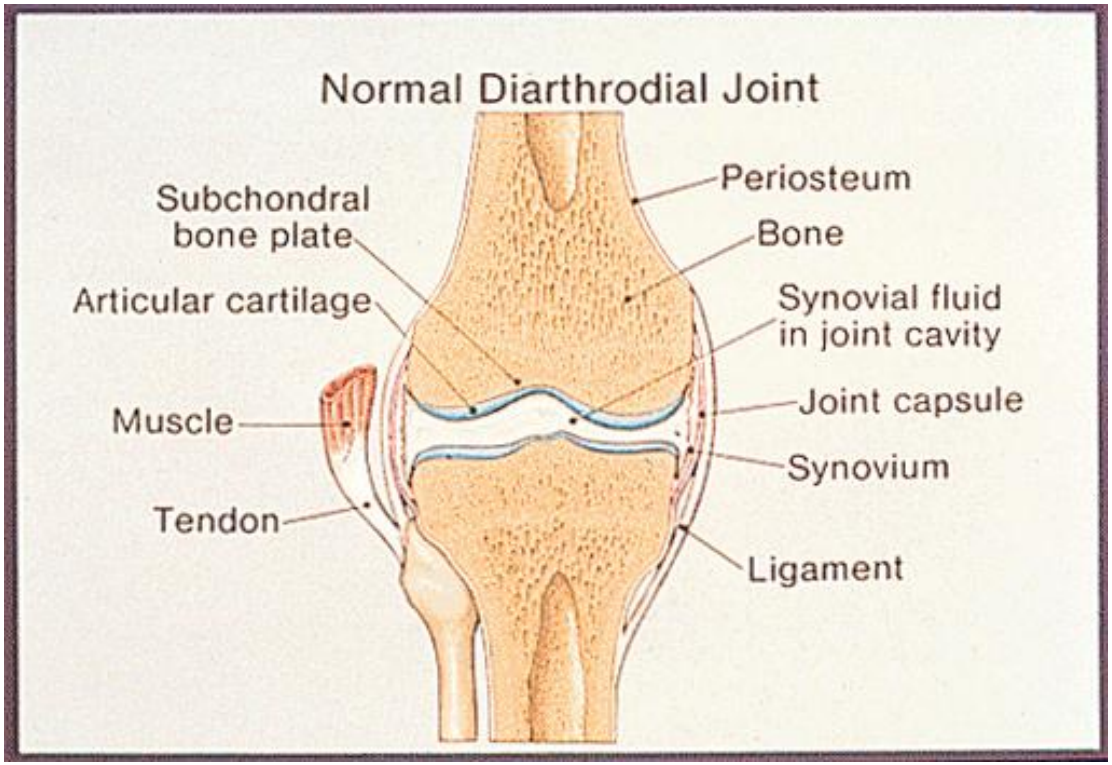
Now let's focus our attention on the form of arthritis called osteoarthritis (OA).

- OA is the most common joint disorder in the United States, affecting 27 million Americans over 25 (Lawrence et al. 2008)
- Symptoms typically start *after* age 40 with slow progression.
- Total annual cost per person living with OA is $5700.
- Under age 55, more men are affected with OA. Over age 55, more women are affected with OA. Overall, women are more often affected by OA than men.
- A loss of joint function is the leading cause of work disability and reduced quality of life.
- OA is common in people of all races and backgrounds.

Arthritis Foundation and CDC

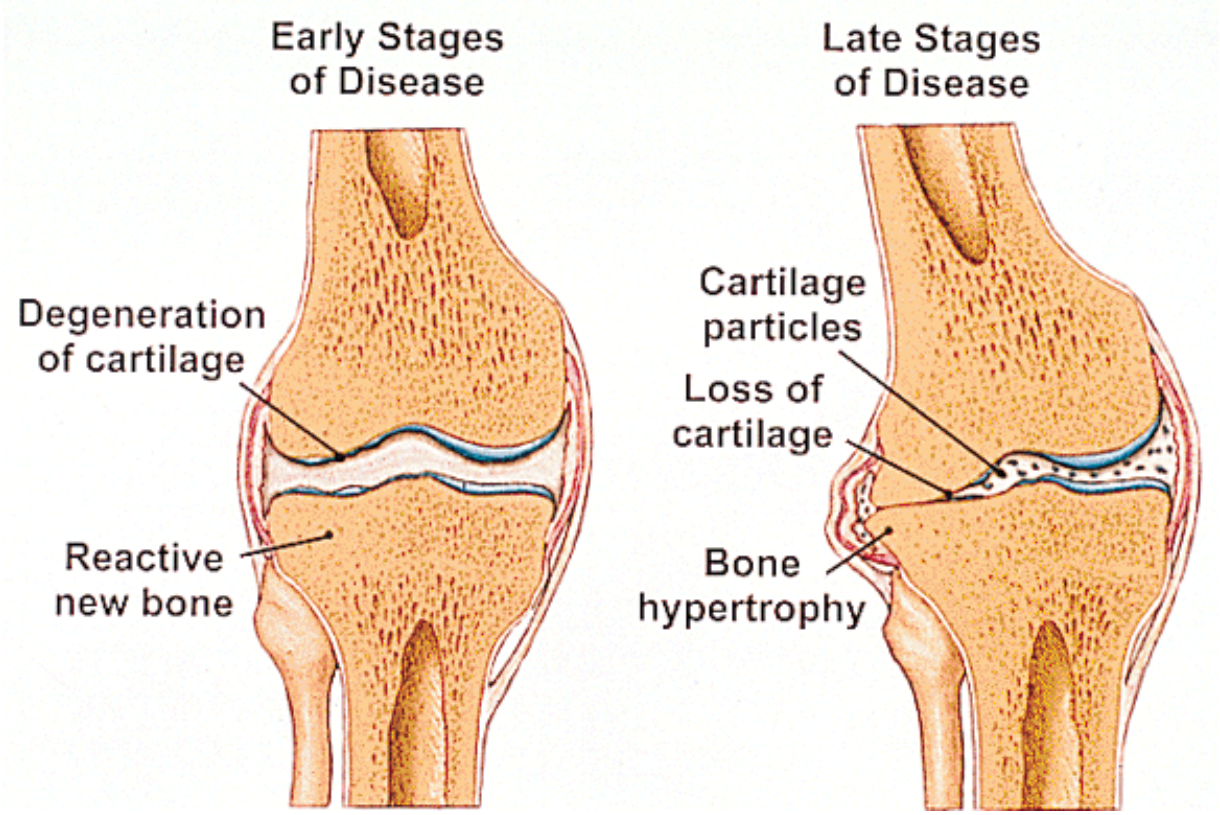
What is Osteoarthritis (OA)?

Osteoarthritis (OA) is called Degenerative Joint Disease (DJD) or “wear and tear” arthritis. OA results from degenerative changes in the cartilage of weight-bearing joints (knee, hip and spine) and hands.



Progression of OA – Changes around Joint

As OA progresses, the joint space narrows, causing bone-on-bone contact and spurring. Ligament laxity(looseness) and decreased strength around the joint can occur.



Osteoarthritis – The disease process

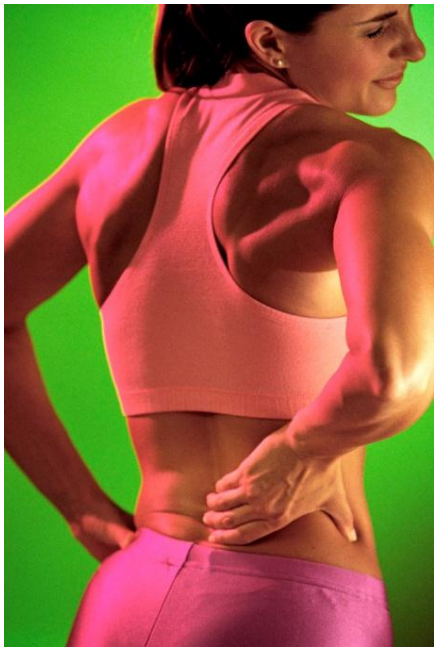
OA likely begins with the breakdown of articular cartilage, a tough material that cushions and protects the bone ends. Cartilage allows bones to smoothly glide over one another and effectively absorb the shock of physical movement.

With OA, cartilage becomes damaged and ineffective, leaving the bones to rub against one another during movement.

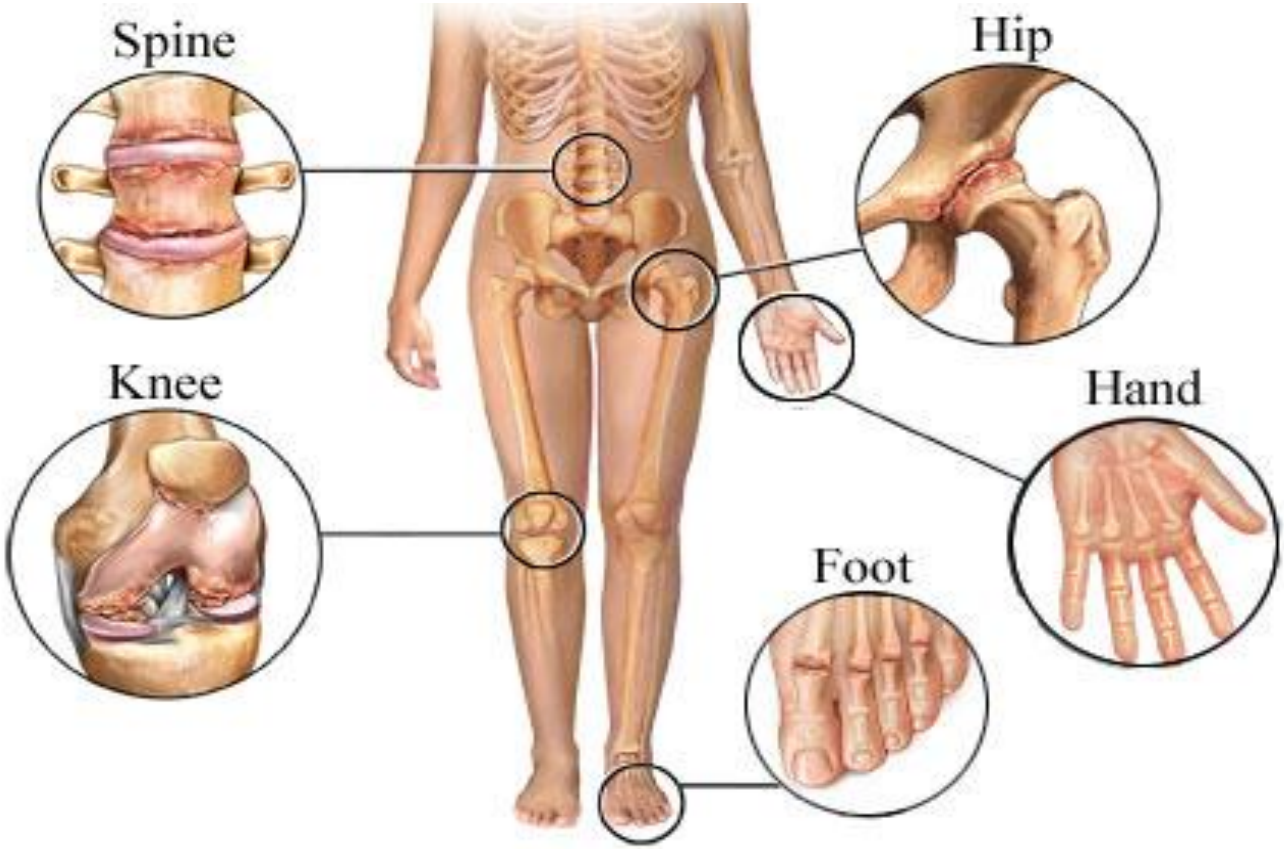
This process may be stimulated by high circulating levels of pro-inflammatory cytokines and other inflammatory cells.

Osteoarthritis – The disease process

Friction in the joint causes pain, swelling, and decreased range of motion. Sometimes small deposits of bone, known as osteophytes, start to grow at the edge of the joint. If these osteophytes break off and float into the joint space, they can cause more pain and damage.



Most Common Joints Affected in OA



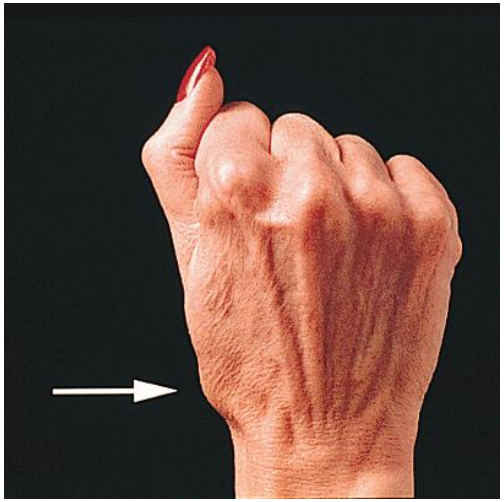
Common OA Symptoms

The following symptoms characterize osteoarthritis:

- Joint pain, swelling and stiffness after periods of inactivity or excessive use. Morning stiffness lasts *less than* 30 minutes.
- Decreased function of the affected joint
- Grating or ‘catching’ sensation during joint movement
- Joint instability and buckling (knee)
- Bony growths at the margins of affected joints
- Loss of mechanical integrity of the joint

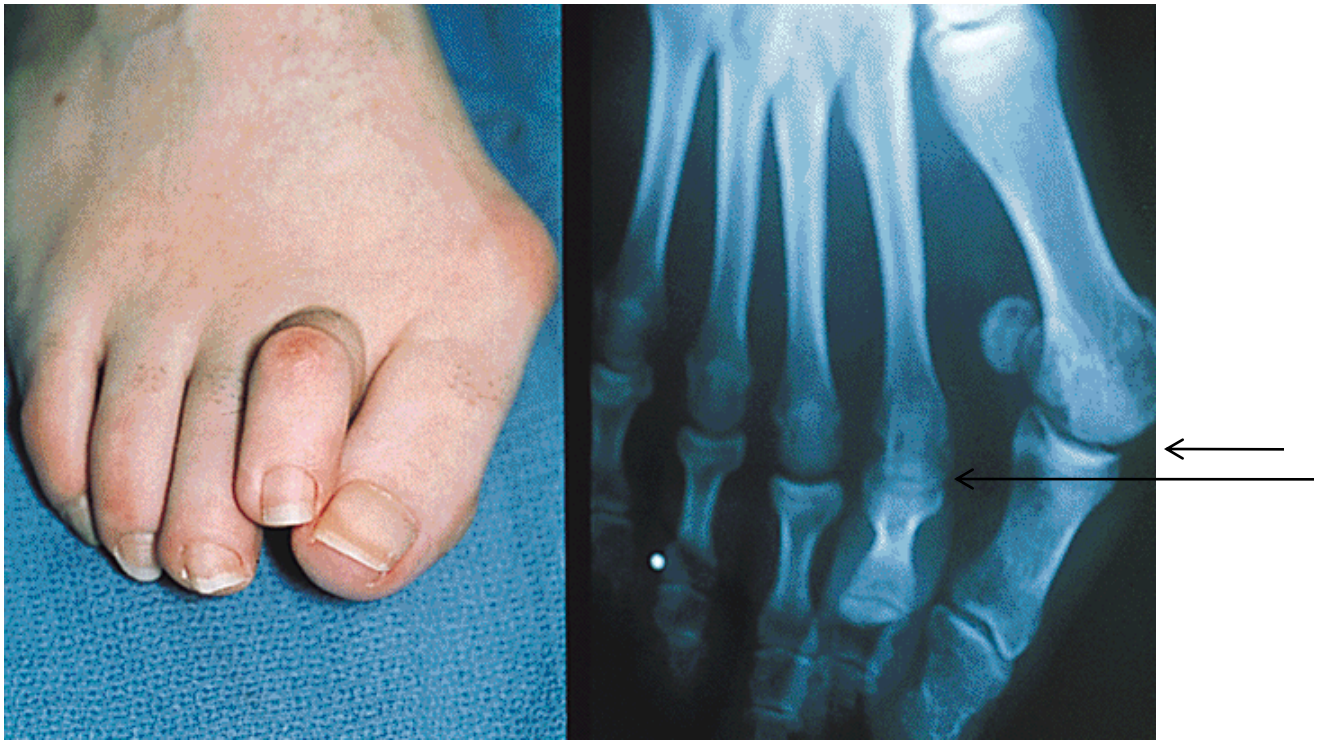
Fitness professionals should never attempt to diagnose OA. If a client reports one or more of these symptoms, refer your client to a physician for a formal diagnosis and access to a variety of treatment options.

OA of Hands & CMC Joint of Thumb



No visible joint changes can be seen with OA of the spine, knee or hip. However, spurring and enlargement of finger joints (proximal and distal interphalangeal joints or PIP and DIP) can become visible with OA. Squaring (see arrow) can be found at the base of the thumb (TMC joint).

OA Foot – MTP Joint



In OA of the foot, the metatarsal phalangeal (MTP) joints drop down and the fat pad slips, causing hammer toes. This may affect shoe selection and the ability to perform weight-bearing exercise.

Risk Factors in OA

What factors may increase someone's risk for developing OA?

- Biochemical factors
- Metabolic factors
- Biomechanical stress
- Excessive repetitive stress (either occupational or recreational)
    - Traumatic single-impact loads
    - Non-traumatic repetitive or static physiological loading
        - ❑ Prolonged tension of muscle
        - ❑ Awkward postures
        - ❑ Repetitive movements
        - ❑ Heavy lifting
        - ❑ Vibration

More Factors Contributing to OA

- Increasing age
- Genetic predisposition/heredity
- Overweight/Obesity–increases the mechanical load on weight-bearing joints.
- Injury or overuse–Old joint injuries/surgeries can increase risk. Aging athletes are often challenged with OA.
- Muscle weakness
- Impaired proprioception–can lead to the loss of protective muscular reflexes. Reflex inhibition is a response to pain and joint effusion (swelling).
- High bone mass
- Disuse– Moderate physical activity actually *decreases* OA risk.

Lane, 2007, Manninen, 2001

OA and Obesity

Overweight/obesity increases the load on weight-bearing joints, particularly the hip and knee, and can increase pain and disability as well as increase the risk of developing OA.

- For every one pound of weight lost, there is a four pound reduction in the load exerted on the knee for each step taken during daily activities. (Messier)
- Losing as few as 11 pounds can cut the risk of developing knee osteoarthritis by 50 percent for some women. (Felson)
- Weight loss of only 15 pounds can cut knee pain in half for overweight individuals with arthritis. (Barlett)

OA and Obesity

Small, progressive weight loss is beneficial and effective for individuals with osteoarthritis.

Overweight/obese individuals with OA may have difficulty performing certain weight-bearing exercises for the purpose of creating an energy deficit. Water exercise, recumbent cycling or short bouts of walking may be better tolerated. Exercise should be initiated in small increments and progressed gradually to avoid joint overload.

To help individuals with OA lose weight/fat, attention to energy intake and nutrient density is essential. Clients should be encouraged to work with a dietitian who can design an individualized nutrition program.

Ways to Slow the Progression of OA

How can we slow the progression of OA?

- Moderate physical activity decreases risk.
- Weight loss decreases joint stress.
- Staying involved in other lifestyle activities can improve quality of life and minimize psychological and physiological stressors.

Rheumatoid Arthritis

Another common form of arthritis you may encounter is rheumatoid arthritis (RA). Let's look at how this type of arthritis differs from OA.

Rheumatoid arthritis is an inflammatory disease that causes pain, swelling, stiffness, and loss of function in the joints.The body's immune system essentially turns against itself. Rheumatoid arthritis typically occurs in a symmetrical pattern. For example, when one knee or hand is involved, the other one is also involved. The disease often affects the wrist and finger joints closest to the hand. Other body parts and systems can also be affected. Individuals with rheumatoid arthritis may experience fatigue, anemia, occasional fevers and a general sense of malaise.

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NISM)

Comparison between OA and RA

Osteoarthritis

- Onset older age
- Slow, gradual onset symptoms/pain
- Worse pain later in the day or after repetitive activities
- Primarily affects cartilage

- Typically starts in one joint (weight bearing joint-knee or hip) and hands
- DJD or wear and tear
- AM stiffness *less than 30 minutes*
- X-ray evidence of bone spurs (osteophytes)

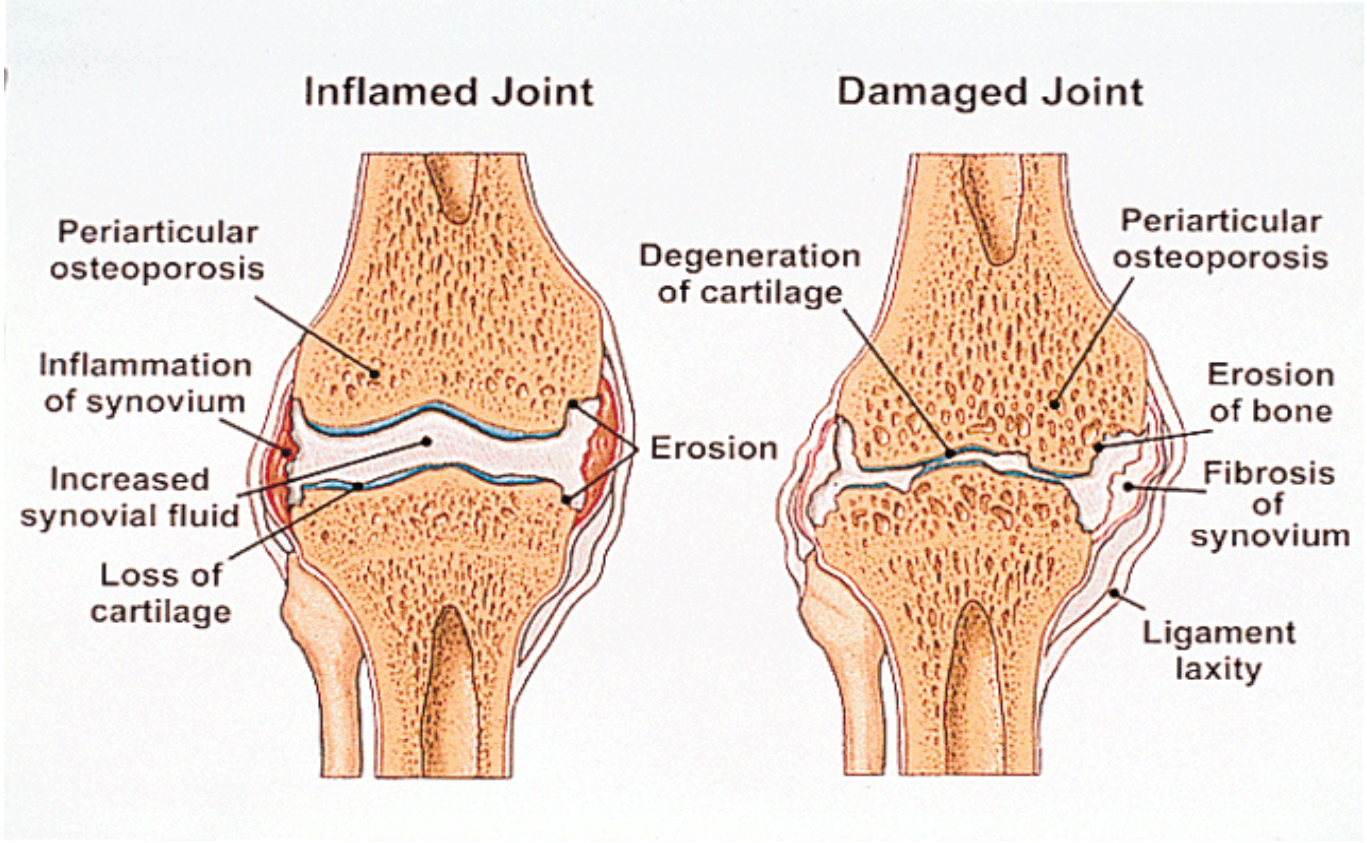
Rheumatoid Arthritis

- Onset younger age
- Gradual or rapid onset of symptoms/pain
- Worse pain in the morning and at end of day

- Primarily affects synovium and may include internal organs
- Typically small joints of hands and wrist *symmetrically* with ulnar deviation
- "Crippling" arthritis
- AM stiffness *over 30 minutes to several hours*
- Red, swollen, warm, tender joints
- Inflammatory, systemic, autoimmune disease w/ fatigue, fever, loss of energy, malaise and may have rheumatoid nodules

Rheumatoid Arthritis (RA)

Inflammation in the synovium causes changes in the joint as well as ligament laxity and loss of strength. Notice the irregular joint surfaces when compared with osteoarthritis.



Early Detection of RA

If you are working with a client who exhibits the symptoms of RA, encourage him/her to see a physician or rheumatologist *immediately*.

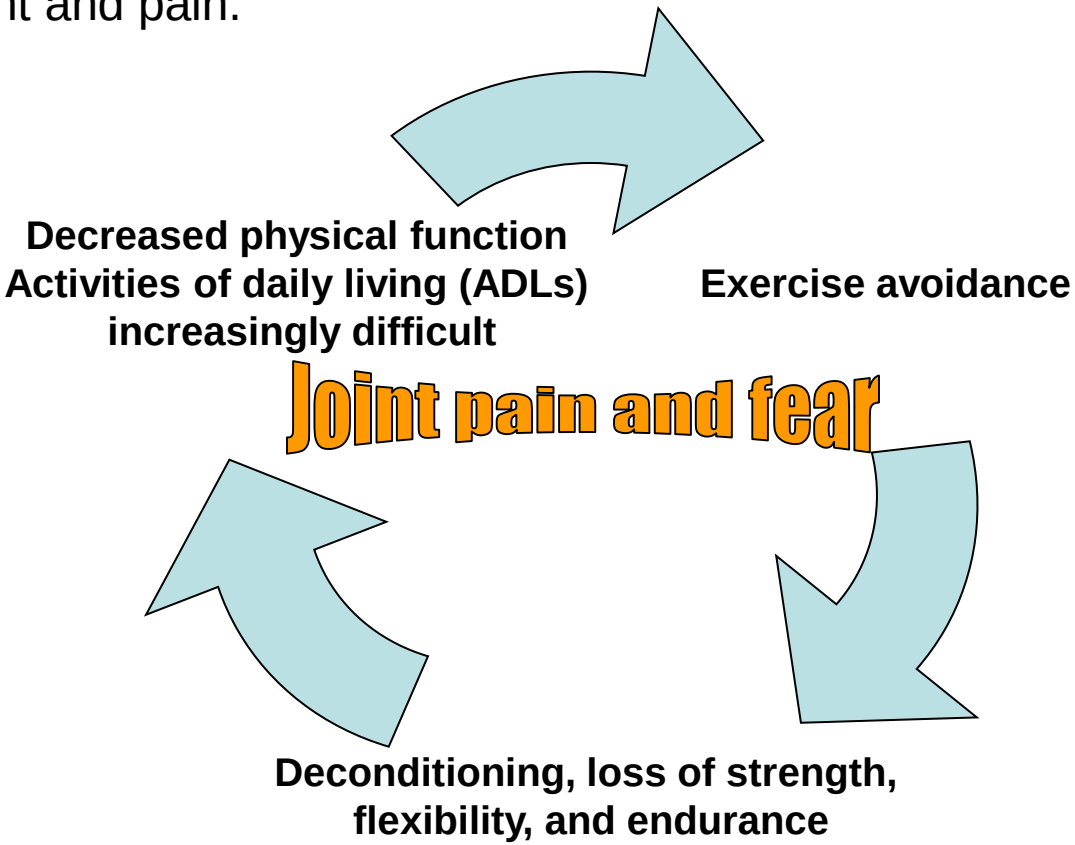
New research has shown that there is a narrow window of opportunity for early treatment that can literally stop the disease in its tracks.

Timely diagnosis and treatment can prevent the progression of RA and the associated joint destruction.

Review the RA symptoms, because you could be a life-changing force for your clients.

Cycle of Pain

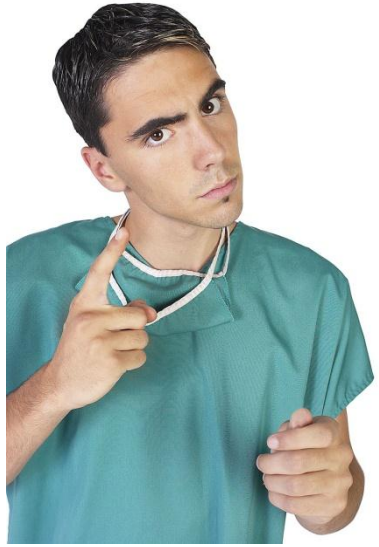
Unfortunately, fear of pain and further joint damage causes many individuals with arthritis to avoid physical activity. This can lead to a cycle of increasing impairment and pain.



Traditional Management of Arthritis

The traditional approach to the treatment of arthritis involved a cautious approach to physical activity. Physicians used to tell their patients:

- “Be careful of exercise since it may aggravate your joints.”
- “Take it easy. Rest.”
- “Do not strain yourself.”
- “Protect your joints.”



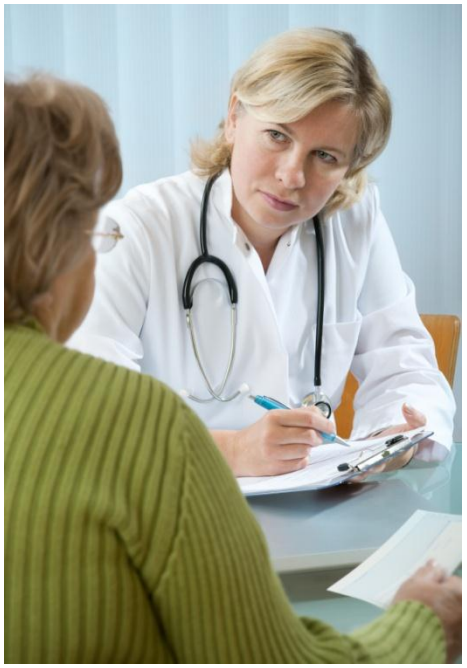
Our current understanding of this disease has created a new approach to arthritis management. ***Exercise is a cornerstone***.

Overview of Treatment Approaches for OA

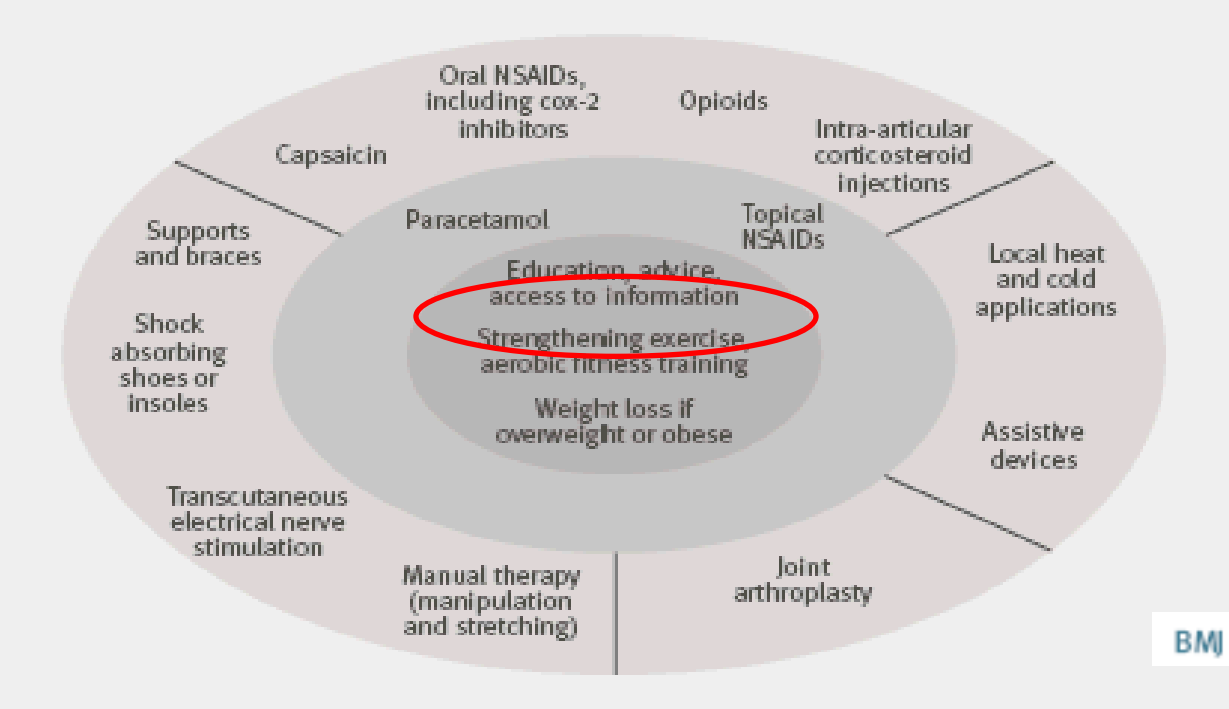
The best practice treatment recommendations for people with OA are based on expert opinions and a limited number of imperfect research studies of short duration and small sample size.

Core treatments include:

- Education-to increase understanding of the disease and dispel myths–such as the pervasive belief that exercise further damages osteoarthritic joints
- Exercise-including muscle strengthening, aerobic fitness, and flexibility training to maintain mobility
- Weight loss to limit joint stress.



Overview of Treatment Approaches for OA



Notice that exercise is at the center of the treatment wheel.

Conaghan, PG

BMJ | 1 MARCH 2008 | VOLUME 336

Treatments for osteoarthritis in adults. Starting at the centre and working outwards, the treatments are arranged in the order in which they should be considered, taking into account individuals' different needs, risk factors, and preferences. The core treatments (centre) should be considered first for every person with osteoarthritis. If further treatment is required, consider the drugs in the second circle before the drugs in the outer circle. The outer circle also shows adjunctive treatments (both non-pharmacological and surgical), which have less well proved efficacy, provide less symptom relief, or increased risk to the patient compared with those in the second circle

Most Common Interventions for OA

Rheumatologists (physicians specializing in the treatment of rheumatologic diseases including OA) and other healthcare providers utilize a variety of interventions including pharmacological and surgical treatments. (Conaghan et al, 2008). These include:

- Medications and Injections
- Patient Education
- Rest
- Splinting/Bracing
- Therapeutic Exercise
- Weight Control
- Joint protection/energy conservation
- Physical and Occupational Therapy
- Surgery

Osteoarthritis: Therapeutic Management

Physical therapy and occupational therapy are integral to the management of patients with rheumatic disease.

Rehabilitation strategies assist in:

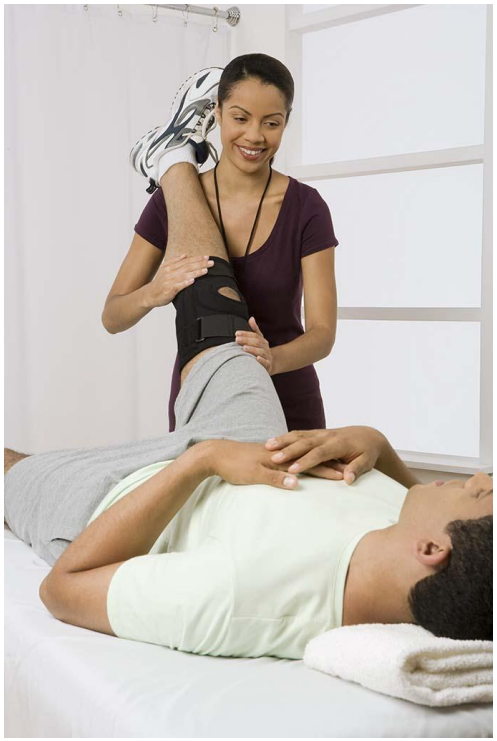
- Controlling inflammation
- Reducing pain and fatigue
- Optimizing function
- Preventing joint deformities
- Increasing mobility, strength and cardiovascular fitness
- Maintaining or restoring valued roles (employment, parenting, school, recreational activities etc)
- Improving quality of life and decreasing depression

Challenges of Managed Care

Physical therapy is often authorized for only a limited number of visits by insurance companies because osteoarthritis is a chronic diagnosis. Therapists must focus on patient education and self-management with limited time for exercise coaching.

Fitness professionals can close the gap between rehab/therapy to help restore a client's function and fitness.

Clients will come to health clubs with co-morbidities (multiple medical conditions affecting each other). The ability to exercise can affect many health challenges and improve daily function.



Challenges of Managed Care

As a fitness professional, you can make a difference. It's important to collaborate with your client's physician/physical therapist when developing a training plan, particularly related to exercise contraindications.

Many individuals seek pain relief without a proper diagnosis or treatment plan. Refer your client to his/her healthcare provider for diagnosis and/or treatment if he/she:

- ✓ experiences joint pain that presents a barrier to training or gets worse with exercise
- ✓ regularly consumes over-the-counter pain or anti-inflammatory medications to be able to tolerate exercise participation
- ✓ constantly wears a commercial brace/elastic sleeve during exercise

Referrals from Healthcare Providers

When seeking a medical referral or exercise guidelines, initially work through administrative or nursing staff in the practice office.
MDs and PTs typically have packed schedules and limited patient appointment times. They appreciate efficient, concise communication and the utilization of support staff.

- Ask your client to sign a release form of medical information, if you'll be requesting patient information (HIPAA client privacy).
- The medical referral form should be simple to complete (i.e., check boxes). Fill out as much info as you can with the exception of provider-specific recommendations and contraindications.
- Acknowledge the healthcare provider's expertise and your desire to work effectively with his/her patients.

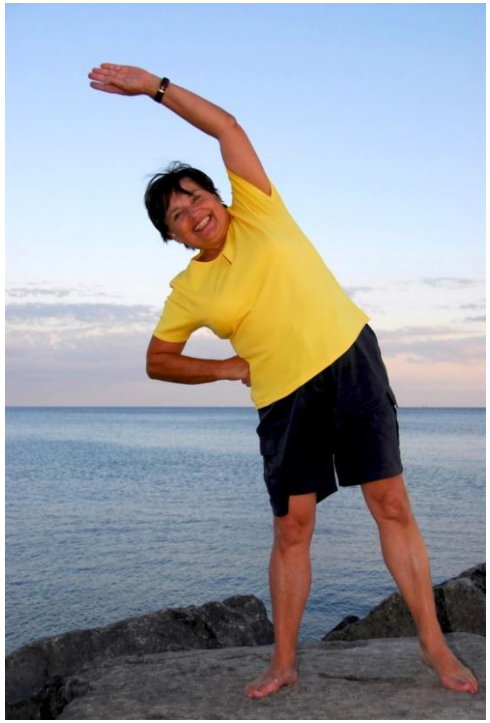
Referrals from Healthcare Providers

- If your client is in physical therapy, request to observe a treatment session or final appointment to learn more about the client's capabilities and limitations. Invite the therapist to join you in your training environment/setting.
- Send brief thank you notes and concise progress reports. Build relationships. Collaborate and share resources/referrals.
- Fitness professionals can be an extension of physical therapy (a big bonus due to insurance limitations in the clinic).
- Make your business cards/bio info available to the office staff/healthcare provider.

Benefits of Exercise

Clients with OA can benefit from regular exercise in many ways:

- Increase flexibility, muscle strength, fitness and endurance
- Improve cardiovascular status and overall health
- Decrease depression and anxiety and improve mood
- Promote weight loss and reduction in body fat
- Improve sleep and promote relaxation
- Decrease joint swelling and pain
- Improve physical function
- Enhance joint nutrition
- Increase bone health
- Decrease fatigue



Benefits of Exercise

Exercise is an important component in the management of OA. In fact, expert groups have convened to develop consensus recommendations and guidelines on the role of exercise in the treatment of OA based on the latest research and expert opinion. (MOVE Guidelines: Roddy 2005, Osteoarthritis Research Society Intl. (OARSI) recommendations: Zhang 2008)

Several review papers have reported that land and water-based exercise can positively influence physical function, quality of life and pain. (Lange, 2008, Bartels, 2007, Fransen, 2008, Hernandez-Molina, 2008).

Here is a summary of the MOVE recommendations…

The MOVE Consensus: Recommendations for the Role of Exercise in the Management of Osteoarthritis of the Hip or Knee

1. Both strengthening and aerobic exercise can reduce pain and improve function and health status in patients with knee OA*, and presumably hip OA.
2. There are few contraindications to the prescription of strengthening or aerobic exercise in patients with hip or knee OA.
3. Prescription of both general (aerobic fitness training) and local (strengthening) exercises is an essential, core aspect of management for every patient with hip or knee OA.
4. Exercise therapy for OA of the hip or knee should be individualized and patient-centered taking into account factors such as age, co-morbidity, and overall mobility.
5. To be effective exercise programs should include advice and education to promote a positive lifestyle change with an increase in physical activity.*
6. Group exercise and home exercise are equally effective and patient preference should be considered.*
7. Adherence is an important predictor of long-term outcome from exercise in patients with knee or hip OA.*
8. Strategies to improve and maintain adherence should be adopted, e.g. long-term monitoring/review and inclusion of spouse/family in exercise.*
9. Improvements in muscle strength and propioception gained from exercise programs may reduce the progression of knee and hip OA.

Note: statements with * are supported by research; those without are based primarily on expert opinion.

Exercise Tips for OA

We'll now discuss some general rules and guidelines for working with clients with OA. As with any client, the workout should be individualized based on the client's health history, current level of function and fitness, age, health and fitness goals, individual preferences, skills and response to exercise.

Stages of Joint Involvement

When designing an exercise program, the degree of joint involvement should guide the emphasis of the program.

- Acute (symptoms less than 7 days)–Focus on maintaining flexibility only. Do exercise daily during this phase to prevent loss of motion and contractures (muscle/tendon tightening that prevents normal movement).
- Sub-acute (symptoms lasting 1-6 wks)–Work on maintaining/increasing flexibility and strength. Some cardiovascular activity can be done.
- Chronic (symptoms lasting longer than 6 wks)–Focus on progressive strengthening and increase cardiovascular fitness.

Exercise Tips for Clients with OA

The following guidelines will help clients improve fitness and function while decreasing the risk of accelerated joint degeneration.

- Exercise daily when pain and stiffness are the least (when medications have the greatest effect and/or energy is highest).
- Perform gentle ROM exercises for the affected joint(s) in both the morning (before rising) and evening to reduce stiffness.
- Respect pain–use it as a ‘warning’ sign. “No pain, no gain” is *not* true with arthritis.
- Include all planes of movement around the affected joint and adjacent structures/joints.
- Avoid overexertion and extreme ranges of joint flexion or extension.

More Exercise Tips for Clients with OA

Joint symptoms require exercise modification, creativity and exercise plan flexibility. To avoid an increase in joint pain, explore different exercise methods. Consider modifying exercises by:

- Decreasing the resistance and/or exercise frequency
- Changing the equipment used
- Altering the body position to avoid pain–standing, sitting, prone, supine, side-lying (a non-weight bearing position may be better tolerated).
- Limiting the joint range of motion
- Reducing the number of repetitions or exercise duration (cardio)
- Reducing the number of weekly training sessions in which a client performs the same exercise (expand cross training) or insert break days.

More Exercise Tips for OA

- Sequencing can be important-alternate large and small joints.
- Exercise on ‘good’ and ‘bad’ days-just cut back as needed.
- Help your client move at an individualized pace.
- Use joint protection strategies (more on this later).
- Consult with the client’s physician when the client has a history of joint replacement.
- You won’t usually know the extent of your client’s OA. Err on the side of caution.

Too Much of a Good Thing?

When should you modify or discontinue a specific exercise or element of the exercise program? When your client experiences:

- Joint pain/discomfort *during* the exercise or continuing pain (pain that lasts more than 2 hours after exercising and/or exceeds pain severity before exercise)
- Increased joint swelling/tightness immediately after or the day following activity
- Decreased range of motion
- Increased weakness
- Altered gait following participation in a weight-bearing activity
- Unusual or persistent fatigue

Exercise and Osteoarthritis

We'll now discuss specific guidelines and exercises for ROM/flexibility, strength and cardiovascular training for individuals with osteoarthritis.

Please refer to the "Strength Exercise Progressions" list that accompanies this course. It will coincide with the pictures and descriptions for many of the exercises covered in the following section. The "Strength Exercise Progressions" list can serve as a quick reference guide for the following exercises.

ROM/Flexibility Guidelines for OA

Active range of motion (ROM) exercises decrease joint stiffness, maintain normal ROM and load/unload the joint to promote joint circulation of nutritional substances (in) and metabolic byproducts (out).

Static stretching can increase ROM by lengthening soft tissue structures.

Both ROM and stretching exercises should be performed regularly.

ROM/Flexibility Guidelines for OA

- Joint motion may be maintained by performing active range of motion exercises through the entire range, 3-5 times daily.
- Move slowly and gently through full ROM, but *not* past the point of usual pain/discomfort.
- Reduce the number of repetitions with active inflammation and avoid overstretching. Move the affected joint GENTLY. Use a slow, steady rhythm and do not bounce.
- Adapt by using self-assisted techniques (wand or pulley) to perform gentle ROM or stretching.
- A warm environment promotes elasticity.

Arthritis Foundation (AF) & American College of Sports Medicine (ACSM) & Association of Rheumatology Health Professionals (ARHP)

ROM/Flexibility Guidelines for OA

- Intensity: Lengthen to a position of mild tension with prolonged static stretching. *Move the affected joint gently and do not bounce. Teach the difference between muscle stretch and joint pain.*
- *Duration: 20-30 seconds/repetition*
- *Frequency: Daily or 2-3 times per week*
- *Repetitions: 1-3 times*

ARHP & AF & ACSM

The following exercises provide a sample of ROM and stretching exercises that will benefit a client with OA in specific joints...

ROM/Flexibility Exercises - Knee

1. Heel slide: Client is in supine position.
Slowly slide one foot towards the buttocks as far as possible. Hold. Slowly return to start.

- May use a towel/strap to assist movement.

ROM/Flexibility Exercises - Knee

2. Supine Knee to chest with hands *under* knee. This exercise also benefits the hip without putting undue force on the knee.

Caution: Knee Flexibility Exercises

These exercises are *not* generally recommended. Use with caution because of excessive mechanical stress on the knee. Many clients with osteoarthritis may also be extremely tight and have difficulty maintaining good posture during these stretches (lumbar hyperextension).

ROM/Flexibility Exercises - Calf

Calf flexibility can be beneficial for the knee and hip by promoting normal gait and reducing the amount of work required for knee extension, thereby minimizing knee joint stress.

1. Wall calf stretch – with straight leg or bent knee.
2. Step heel drop

Hip Flexibility Exercises

The following stretches can help to increase synovial lubrication in the hip joint, reduce joint pressure and improve flexibility. Improved hip mobility can positively affect stress on the knee and spine as well.

As with all exercises, find which stretches work best for your client, given your client's unique physical limitations and level of restriction/tightness.

ROM/Flexibility Exercises - Hip

1. Sitting external hip rotation: Client crosses one leg over the other as shown and sits tall in chair (or bends forward from the hips). Can apply gentle pressure to inner thigh.

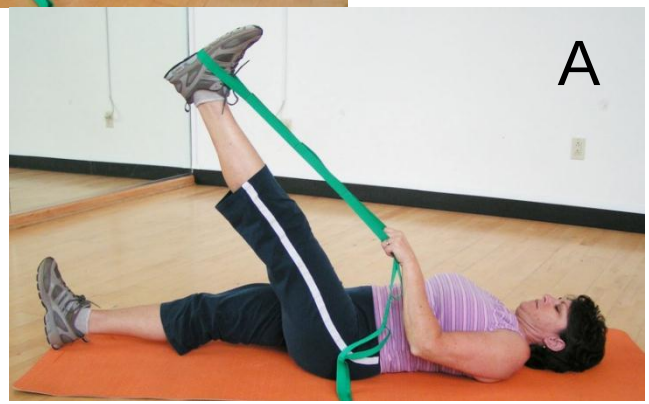
Modified for client with limited mobility: Client sits with one leg almost straight. Cross the other across shin and apply gentle pressure to inner thigh.

ROM/Flexibility Exercises - Hip

2. Mat Piriformis Stretches: With the stretch below, instruct client to tighten the buttocks to push hips into the floor.

ROM/Flexibility Exercises - Hip

3. Hamstring Stretches: A supine hamstring stretch places the spine in the position of lowest load on the discs and protects the back. The sitting position may be more comfortable for those with significant hip/hamstring tightness.



Caution: Hamstring Flexibility Exercises

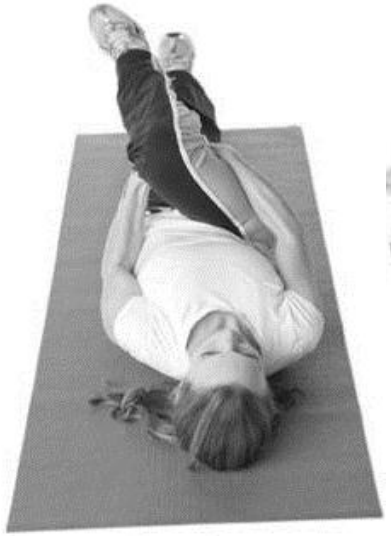
These stretches are *not* generally recommended. Use caution with the long-sitting stretch, because many individuals will compensate for hamstring/hip tightness with trunk flexion. A single limb stance for an extended time period may place unnecessary compressive forces on the knee of the stance leg with OA.

ROM/Flexibility Exercises - Hip

4. Complex Hip Stretches (supine): Be careful and aware of spine and knee involvement with these stretches. If your client has a hip joint replacement, check with the client's MD/PT since certain movements may need to be avoided. For example, don't cross the midline on internal hip rotation or limit hip flexion to 90 degrees.

A

B



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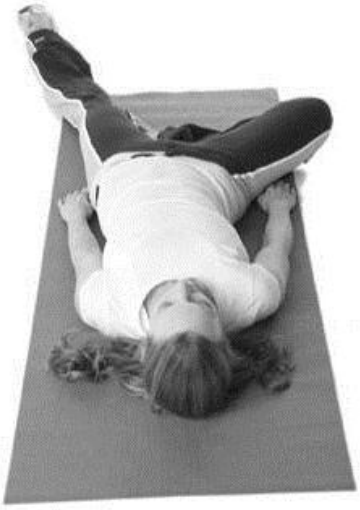


ROM/Flexibility Exercises – Spine

1. Cat/Camel

2. Lower Trunk Rotation

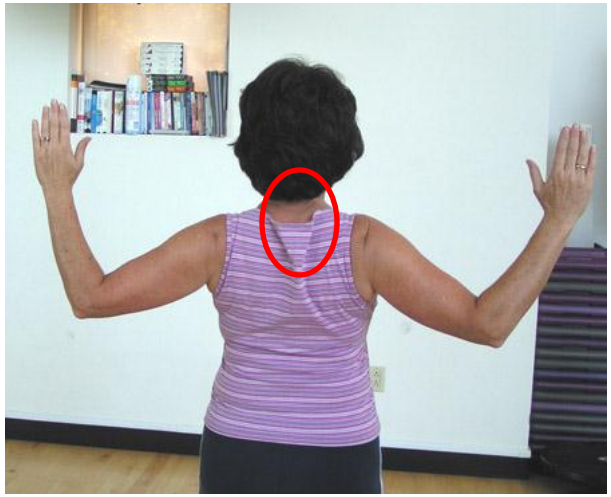
ROM/Flexibility Exercises – Spine

3. Pec Stretch - A pectoral stretch can be performed in a corner or doorway using multiple arm positions. Use a split stance and pelvic tilt. You may incorporate a hip flexor or calf stretch. Protect hands with forearms on wall

4. Thoracic extension over a foam roller

ROM/Flexibility Exercises – Spine

5. Butterfly Shoulder ROM Exercises: Raise arms so that elbows come together. Continue to raise arms as high as possible without pain, keeping elbows together. You should feel a stretch between shoulder blades. Keeping the elbows bent, open arms wide, pinching the shoulder blades together. You should feel a stretch across the chest and shoulders. Bring elbows down, keeping hands back in a line behind your ears. Return to starting position. Remember to keep head and neck in neutral and maintain good posture.



ROM/Flexibility Exercises – Hands

Clients with hand OA may benefit from these exercises.

1. Digit Mobility:

Make a fist and open.

2. Opposition of thumb:

Bring each finger down to touch the thumb and then straighten out fully.

Loss of Muscle Strength in Arthritis

Contributing factors to the loss of muscle strength in arthritis include:

- Intra-articular and extra-articular inflammatory disease processes and co-morbidities
- Reflex inhibition in response to pain and joint effusion
- Impaired proprioception leading to decreased protective muscular reflexes
- Loss of mechanical integrity around the joint
- Contributing factors to joint stress/malalignment can be an imbalance between weak and tight muscles
- Side effects of medications
- Disuse

Strength Training & Arthritis

Multiple studies show that strength training is associated with dramatic improvements in muscle strength, muscle endurance, pain relief and improved muscular efficiency.

This enables individuals with OA to perform other types of health-promoting, calorie-burning exercise.

A key goal of strength-training programs for clients with OA is to increase muscular support to the joints to decrease joint stress and thereby decrease pain.

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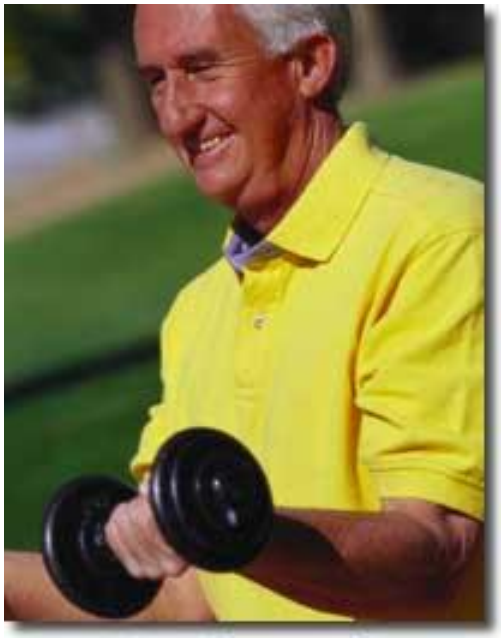

Strengthening Tips for OA

- When working with clients with OA in a given joint, start with isometric or low load exercises. Observe your client's response and gradually transition your client to isotonic/dynamic exercises and functional movements.
- Resistance level should first be determined by the response of the joint and *not* muscle fatigue.
- Although it is ideal to perform an exercise through the complete range of motion, it may be necessary for your client to perform a certain strength exercise in a more limited range of motion to avoid joint pain.
- If your client can handle more challenging exercises in joints *not* affected by OA, adapt the program accordingly.

Strengthening Tips for OA

- Progression guidelines:
  - Ensure that your client can easily perform an exercise correctly during at least 2 consecutive workouts.
  - Increase resistance by no more than 10% each week.
  - Don’t change too many things at a time; if your client experiences joint symptoms, you’ll know what may have caused the problem.
- Review posture, alignment and body mechanics. The joint being exercised should be in line with the equipment fulcrum or biomechanical stresses may increase on an unstable/misaligned joint.
- Watch your client’s neck/spine position, particularly during abdominal work. Keep in neutral.
- Don’t forget about the hands/grasp and thumb/fingers involvement.

Strength Training & Arthritis

Many types of equipment can be used to apply resistance:

- Free weights/dumbbells–Because these exercises involve the use of synergistic and stabilizing muscles across the joint and develop neuromuscular control, they can be very beneficial for clients with OA.
- Rubber resistance bands–Resistance bands often require spinal stabilization and can be used to help your client exercise in the home environment.
- Partial/whole body weight–Although a deconditioned client with OA may be unable to perform full body-weight exercises such as push-ups or squats, partial body weight exercises such as “kitchen counter push-ups” and partial squats or sit-to-stand exercises can provide functional training.

Isometric Muscle Strengthening for OA

Isometric strengthening is appropriate for deconditioned clients or those with joint pain during isotonic or dynamic movement.

Isometric exercise allows a client to strengthen the muscle without moving the joint, minimize atrophy, maintain/increase static strength/endurance and improve tone to prepare for dynamic and weight-bearing activity.

- Perform each exercise at multiple angles throughout the range to simulate function.
- Intensity: Good quality contraction of the muscle (moderate to hard intensity)
- Frequency: Start with 5-10 reps daily. Proceed to 3 x 15 reps.
- Duration: Hold isometric contractions 5-10 seconds.

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Isometric Muscle Strengthening - Knee

Here is a sample progression utilizing isometric quadriceps exercises.

- 1. Quad Sets - Client is in supine position with a towel roll placed underneath the knee for support. Contract quadriceps muscle. You may place the client's hand on the quad to feel muscle tension.

- 2. Single Leg Raise (SLR) - Perform isometric quad exercise. While muscle is contracted, client lifts the leg about 45 degrees from the floor. Pause and slowly lower. Don't touch the floor between reps, if possible.

Dynamic/Isotonic Muscle Strengthening

Dynamic or isotonic exercises maintain/increase muscle power and endurance, simulate functional movements, enhance synovial blood flow and promote strength of bone and cartilage.

- Intensity: Start w/ light resistance (10% 1 RM) and progress to light to moderate resistance (40-60% 1 RM)
- 1 x 10 → 2 x 10 → 3 x 10 → 3 x 15
- Frequency: 2 - 3 times per week on alternate days
- Duration: 15–30 min. Progress by first increasing repetitions (10-15 reps/exercise), then increase weight by 10% week or to pain tolerance.
- Use lower resistance bands/weights to decrease stress on joint and adjust equipment for good biomechanics
- Put weights more proximal (closer) to the joint to decrease lever arm.

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Dynamic Muscle Strengthening

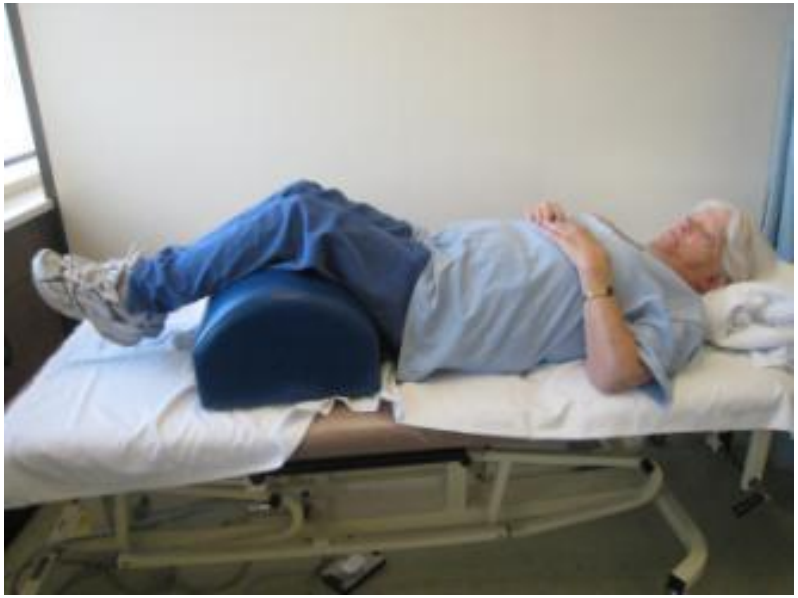
The following exercises may be used as part of a strength-training program for clients with osteoarthritis.

Strengthening exercises for the hip can also be important for individuals with knee OA. Weakness of the quadriceps, hip abductors and hip extensors can promote faulty alignment at the knee to accelerate asymmetrical wear on the articular cartilage.

Several studies have shown that improving quadriceps strength can positively influence function in individuals with knee OA.

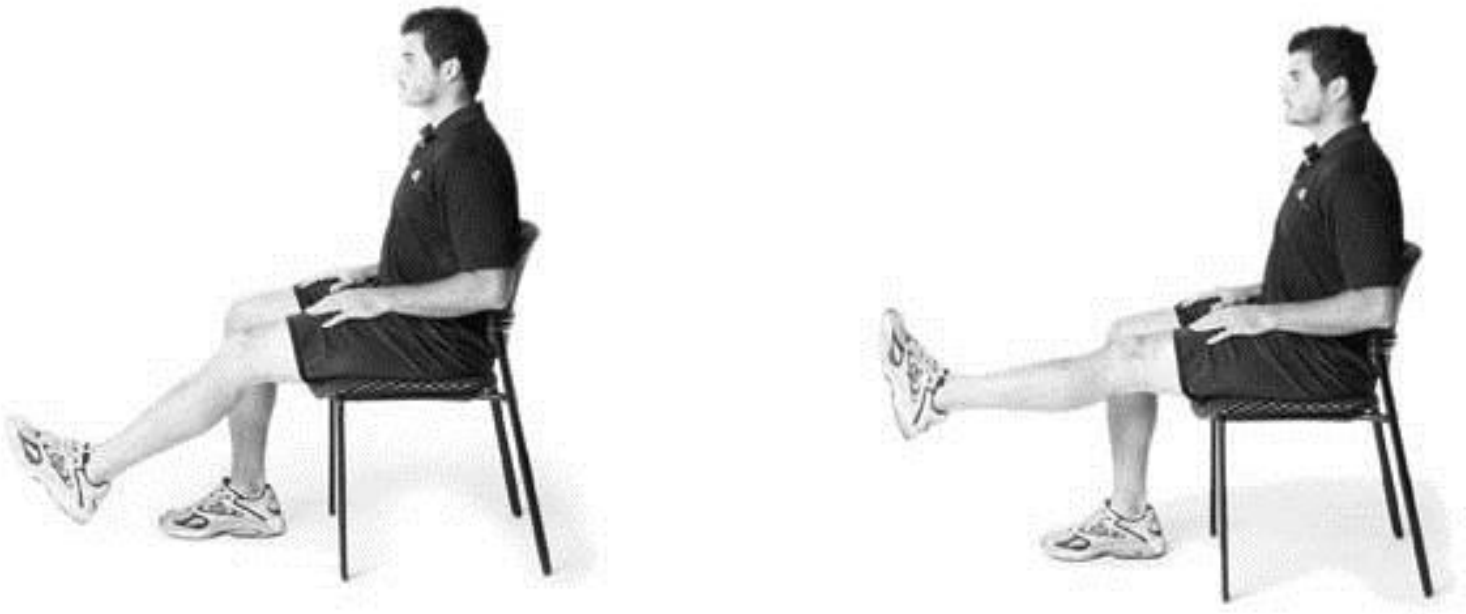
However, typical quad exercises such as full ROM knee extensions may actually exacerbate symptoms and contribute to further degeneration of the joint. We'll present some better alternatives for improving quadriceps strength.

Dynamic Muscle Strengthening - Knee



3. Short arc quad extensions can be performed with/without ankle weights. Quadriceps strengthening in the **last 30 degrees of knee extension** minimizes joint compression forces and can prevent further degeneration of articular cartilage.

Dynamic Muscle Strengthening - Knee



4. Terminal Knee Extensions - Short arc knee extensions can also be performed in a seated position with or without ankle weights, or using the leg extension machine. Use the pin to limit ROM.

Dynamic Muscle Strengthening - Knee

5. Terminal Knee Extension (closed chain) - This exercise represents a closed chain and more functional version of terminal knee extension. The support leg moves into 30 degrees of flexion. Actively contract the quads when moving back into full extension. If tolerated, progress to a modified (partial) lunge. Use bar for balance.

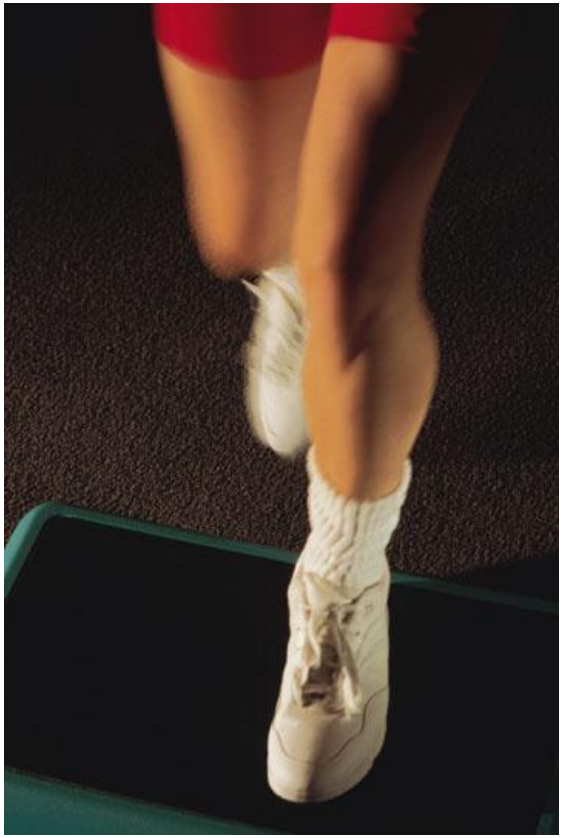
Dynamic Muscle Strengthening - Knee

6. Step-ups - Stair-stepping is a closed chain, functional activity likely to be performed on a regular basis by your client.

Begin with a low step (4-8”).

Step up and down completely on the box. Progress to stepping up and down on one leg only.

Keep knees directly over toes. Add hand weights, if desired.



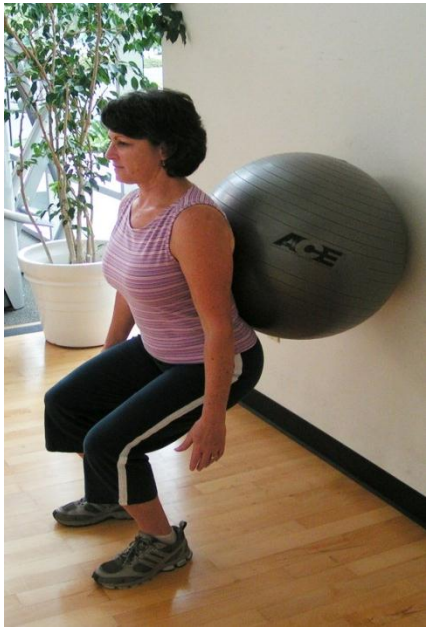
Dynamic Muscle Strengthening - Knee

7. Leg Press - The leg press is a functional, closed chain LE strengthening exercise that is ideal when a client cannot tolerate full weight-bearing. Single leg presses allow a client to perform bilateral strengthening in preparation for many ADLs and fitness activities. *Limit the degree of knee flexion in accordance with the joint response (30 degree terminal knee extension).*

Dynamic Muscle Strengthening - Knee

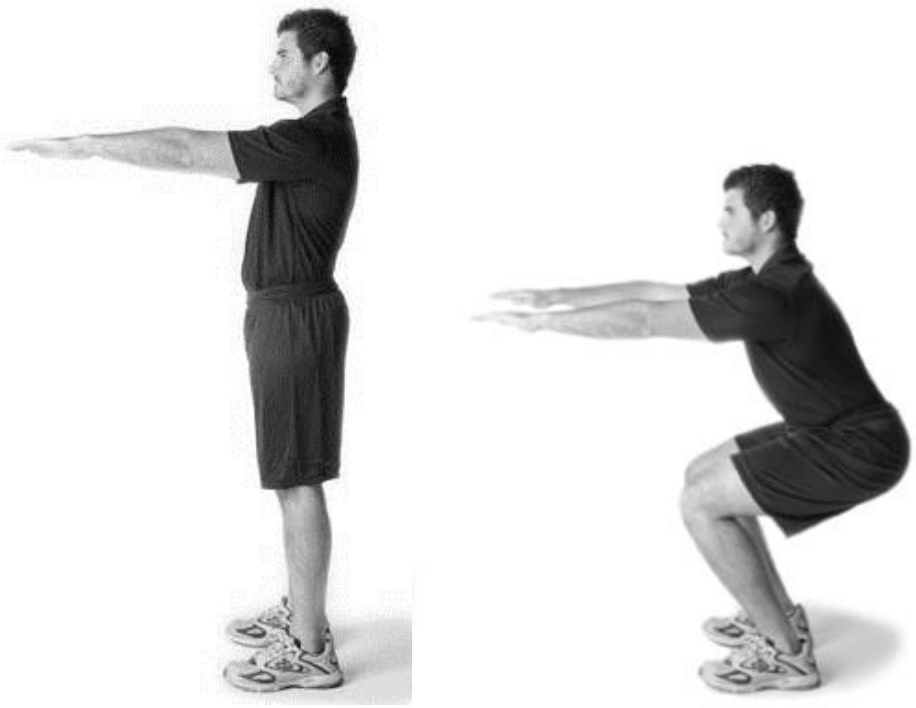
8. Wallslide

9. Wall ball partial squat



To promote proper squatting form, a stability ball can be placed in the small of the back between the wall. Instruct the client to move the buttocks under the ball as she lowers the body. Knees straight ahead and over toes. Limit knee flexion based on the joint response.

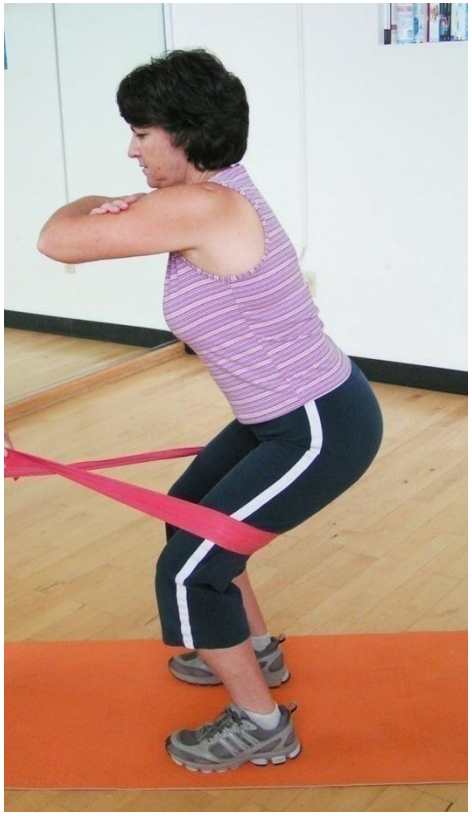
Dynamic Muscle Strengthening - Knee



10. Partial Squat - Coach your client to “stay ABOVE the pain”–don’t go any lower than the knees can tolerate. Initiate the movement with hip-hinging (pull buttocks back). Knees over toes–don’t collapse inward.

Dynamic Muscle Strengthening - Knee

11. Squat with band - If a client has difficulty performing a partial leg press or squat exercise without the knee(s) collapsing inward (valgus), you may want to coach your client to activate and strengthen the hip abductors (which are often weak) *during* the movement.



This can be done using a strap and gently pulling inward just above the knee throughout the movement. **Instruct the client to push outward against the resistance *to maintain ideal knee alignment.***

Stop if this exercise causes patellofemoral pain.

Dynamic Muscle Strengthening - Hip

1. Clamshell

2. Side-lying Hip ADD-ABduction

Hip AB/Adduction and rotation exercises can be performed using machines or resistance bands/ankle weights in a side-lying or standing position.

Dynamic Muscle Strengthening - Hip

3. Prone Hip Extension

4. Quadriped Hip Extension

Dynamic Muscle Strengthening - Spine

Stabilization exercises can be beneficial for clients with spine, hip and knee OA by improving a client's ability to control the hips and pelvis and improving gait patterns. The difficulty of the exercise must be appropriate for the client's level of strength.

Dynamic Muscle Strengthening - Spine

1. Quadriped Progression - Progress your client through each level, observing her ability to maintain a neutral spine/hip position. Levels include (1) extending each arm only, (2) each leg only and (3) contralateral arm and leg.

Dynamic Muscle Strengthening - Spine

2. Supine Stabilization Progression- Coach your client to pull the belly button in towards the spine and maintain a neutral spine position (just slightly arched) during movement of the extremities.

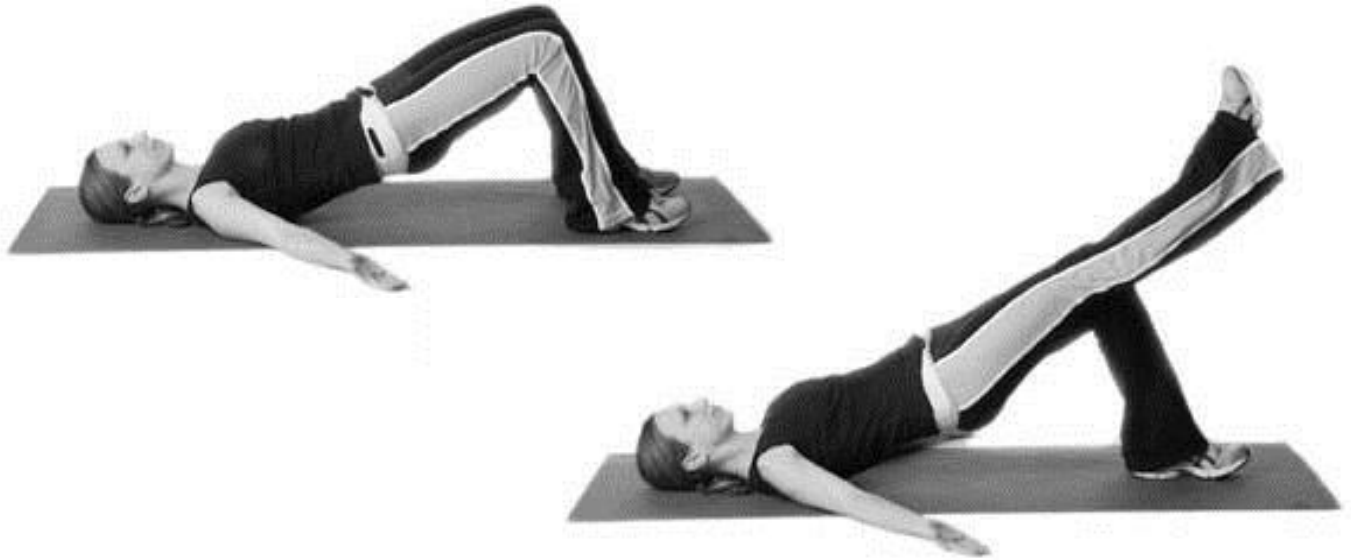
A. Raise one arm overhead at a time.

B. Lift one leg at a time off the floor with both knees bent. Alternate.

C. Progress to sliding one leg along the mat into extension while the other knee is bent. Alternate legs.

Keep your client focused on maintaining a neutral spine!

Dynamic Muscle Strengthening - Spine



3. Hip Bridges - The client should be instructed to lift the hips so they are in a straight line with the knees and shoulders. The client will activate the low back, glutes and hamstrings to promote hip extensor strength and endurance.

Dynamic Muscle Strengthening - Spine

Modified Prone Plank

Prone Plank

4. Plank Progression - The client should engage the gluteals, hamstrings and spinal extensors to lift the hips, so they are level with the shoulders and knees. Begin with the modified plank. Progress to the straight-leg position, but end the exercise, if client cannot maintain a straight body position.

Dynamic Muscle Strengthening - Spine

Modified Side Plank

Side Plank

5. Side Plank Progression - The elbow is positioned under the shoulder and knees are in line with the hips. Lift the hips by engaging the deep spinal muscles (quadratus lumborum). It's important to keep the hips straight–not sagging below the level of the shoulders. Be cautious and aware of other joint involvement since this is a high-level activity.

Strength Training and the Spine

If your client has been diagnosed with spine OA, use caution when using free weights in sitting or standing, because weight-bearing forces acting through the spine may cause undue stress.

Avoid using the overhead shoulder press or deltoid raise machines, because high overhead loads can also place stress on degenerating joints of the spine.

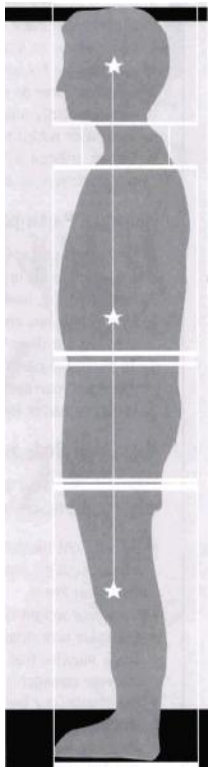
Functional Training

Functional training is important for clients with OA, because the disease often affects their ability to perform activities of daily living (ADLs).

- Practice ADLs with impeccable form, such as standing up from a chair/bench and picking an item off the floor/mat.
- If kneeling or sit-to-stand is difficult, try breaking the movement into components to strengthen the involved muscular structures.
- Adapt exercises based on client fitness, lifestyle and goals–sport-specific or work-specific.

Other Exercise Considerations-Posture

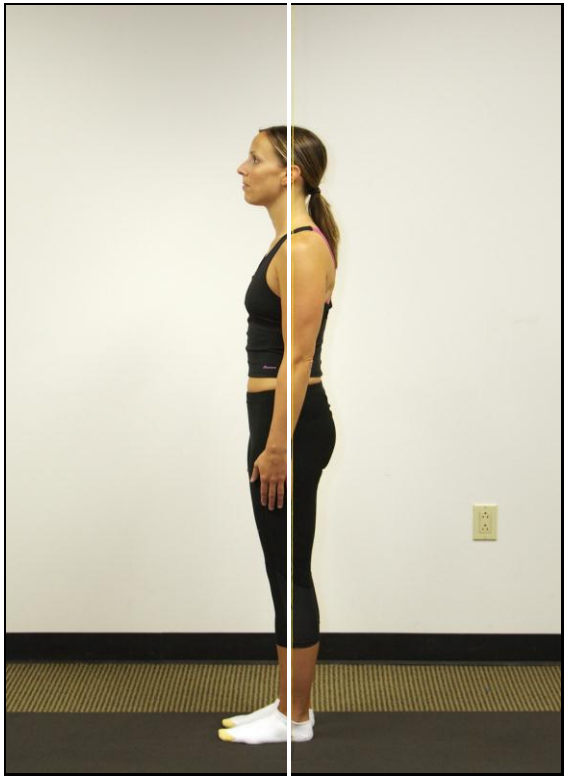
Provide your client with postural reminders during exercise, when handling weights and transitioning between exercises. The middle of the shoulders, knee, and ankle should be in alignment.



- Useful instructional cues: “Chest up, chin in, shoulders back, belly button pulled in, buttocks tight, and knees soft”
- Not just for aesthetics–but for biomechanical alignment and energy efficiency (i.e., reaching overhead and breathing deeply are more difficult when slouching)
- Correct body position conserves energy efficiency (Belza)

Posture: Neutral Alignment

- Knees slightly bent
- Pelvis neutral
- Shoulders/scapulae back
- Head upright



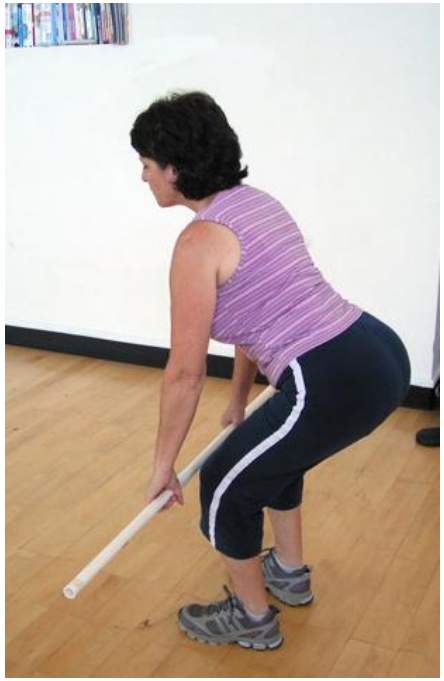
Postural Training

To promote good posture, incorporate exercises that lengthen the anterior structures of the trunk (pec and anterior shoulder stretches) and strengthen the posterior ones (strengthen upper back, posterior shoulder, scapular retractors).

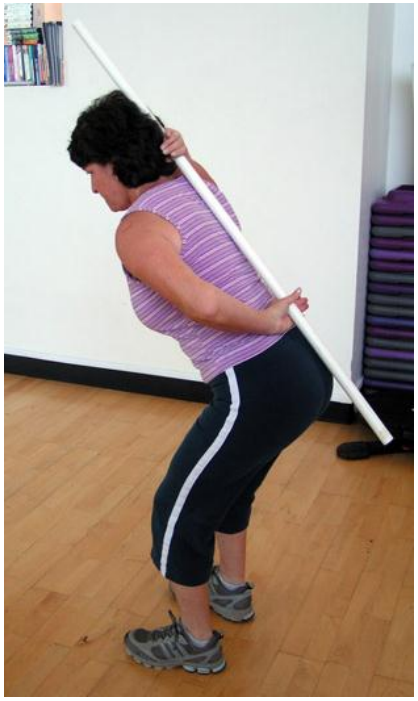
Depending on the strength of the client, scapular retraction exercises can be progressed to a prone or standing position with higher load.

Body Mechanics Training

Your client should strive to maintain the natural curves of the spine whenever possible, to strengthen the muscles that support the spine and lengthen muscles that promote ease of movement.



Three basic rules of good body mechanics related to lifting and reaching include:



1.Maintain an upright spine.

2.Hold objects close to the body.

3.Avoid twisting. Turn the shoulders and hips together.

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Balance Training

The pain, stiffness, joint instability and muscular weakness associated with OA can alter proprioception and prevent efficient, controlled and integrated movement. Stiff and painful movements require more energy and increase fatigue. Help your client develop static and dynamic balance by introducing progressive balance challenges:

- ✓ Progression from double limb to single limb stance activities
- ✓ Tiptoe walking, retrowalking and lateral walking.
- ✓ Use equipment with unsteady surfaces: BAPS and rocker boards, balance discs, BOSU balls, foam cushions and rolls

Aerobic Exercise for Osteoarthritis

Aerobic exercise is an integral part of an exercise program for individuals with osteoarthritis and is associated with the following benefits:

- Improved cardiovascular function
- Increased muscular strength and flexibility
- Improved physical (14-39%) and social activity levels
- Reduced fatigue
- Decreased depression (18-46%) and anxiety
- Decreased pain (12-30%)
- Decreased or unchanged disease activity(10-40%)

Harkcom, Minor, Perlman, Hootman

Aerobic/Endurance Exercise

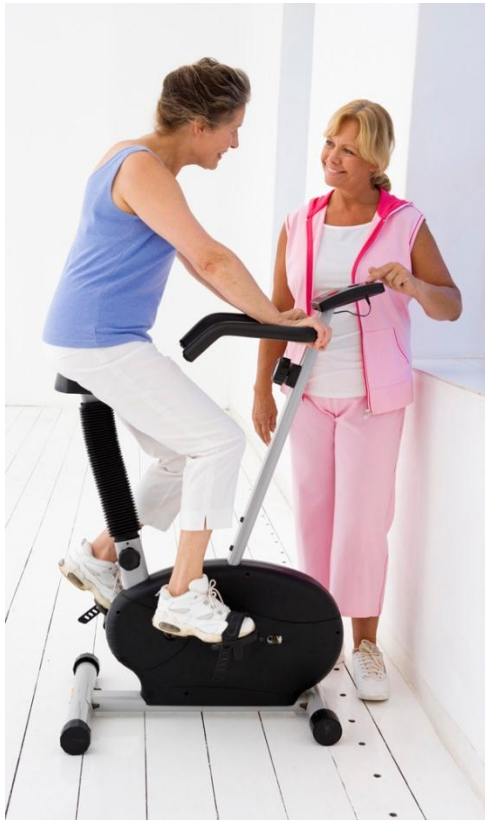
Modes of aerobic exercise that work particularly well for individuals with OA include:

- Walking
- Bicycling
- Swimming or water exercise
- Low impact aerobics/chair exercise

Aerobic Exercise Issues in Arthritis

- People with arthritis report that one of first adaptations they make is to give up leisure and recreational activities (primary source of physical activity for adults).
- People with arthritis are less fit than non-affected peers.
- Inactivity produces many of the same symptoms, impairments and disabilities as the arthritis disease process. (1-5% of strength lost per day from inactivity)
- Participation in a regular exercise program can help prevent or reduce the functional decline associated with aging.

Aerobic Activities



Tips for Aerobic Exercise for Arthritis

- Individualize the exercise program beginning with low to moderate intensity aerobic activity.
- Avoid repetitive, high-impact activities. Remember that low impact exercise may provide high-intensity training.
- Use alternate forms of exercise that vary weight-bearing and involved joints for cross-training (standing vs. sitting). Variety can reduce repetitive stress on joints while helping to develop cardiovascular fitness, prevent boredom and ensure alternatives for changing circumstances (musculoskeletal challenges, weather, access to facilities, etc). For example, combine cycling, walking and water exercise in a week *or* short, consecutive bouts of cycling, treadmill walking and elliptical exercise in a specific workout.
- Incorporate pelvic stabilization for core conditioning to support good dynamic posture and promote biomechanical efficiency.

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Aerobic Exercise Parameters

Intensity

- For individuals who have not exercised in over 3 months/deconditioned, start at 40-60% Heart Rate Reserve (HRR/Karvonen)
- For patients at average levels of fitness >60% HRR is appropriate. More fit patients can tolerate higher intensity levels depending upon joint mode and the presence of joint symptoms.
- Monitoring techniques include:
  - ✓ Heart rate
  - ✓ Perceived exertion – Borg CR 10 Customized for Pain Measurement Scale
  - ✓ Talk test

Aerobic Exercise Parameters

Duration

- The initial phase should consist of short bouts (5-10 minutes).
- Progress to 20-30 minutes above daily activity (150 min./week of moderate intensity) to increase fitness level.
- Clients may tolerate more daily exercise by breaking it up into multiple bouts.

  For example, a 30-minute walk may produce knee discomfort or swelling.

  Two 15-minute walks may be tolerated without symptoms.
- Focus on duration before intensity.

Frequency

- 3–5 days/wk–individualize based on fitness and joint response (provided the patient is not in the acute phase).

Cycling Tips

Cycling can improve stamina with low joint stress. Many clients with knee and hip OA can tolerate cycling exercise.

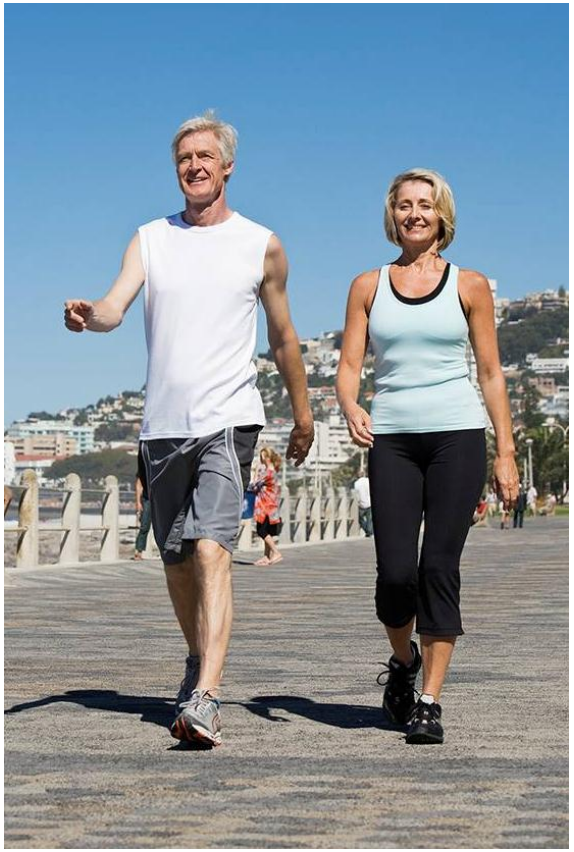
- Pay attention to seat height. Look for a slight knee bend at the downstroke. Hips should NOT rock on the seat.
- Increase intensity by increasing RPMs (repetitions per minute) *before* increasing resistance.
- When cycling outside, instruct clients to maintain a consistent pedaling cadence by *changing gears* to accommodate inclines. This can significantly minimize knee stress.

More Cycling Tips

- An upright posture may reduce wrist and spine stress. Encourage your client with spine or hand OA to select a bike that requires a more upright body position or take frequent breaks by “sitting up”.
- Many seat/saddle options allow for a comfortable cycling experience–wider, more padding, cut-outs.
- Limit standing on pedals in spinning class to reduce knee stress.

Walking Tips

- Avoid uneven/banked surfaces, if your client is walking outside on a trail or sidewalk. Use caution on hills, because clients may experience increased knee stress.
- Start with a flat, smooth course or 0-2% grade on the treadmill.
- Choose supportive athletic shoes with good shock absorption to help maintain joint alignment and provide adequate support.
- Recommend socks with a low cotton content to reduce friction. Cushioned sock footpads may increase comfort.
- Clients with hip or knee OA may better tolerate 2-3 short bouts of walking/day rather than one long bout.



A Sample Beginner Walking Program

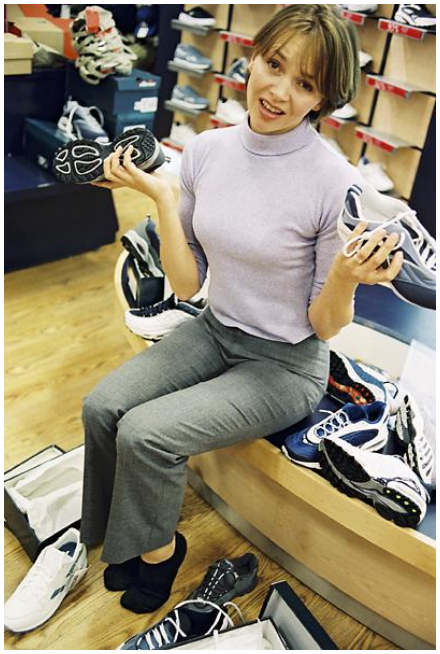
Month 1: 3-5 days per week			
Week 1: 5 minutes 3x/day	Week 2: 6-7 minutes 2-3x/day	Week 3: 10 minutes 2-3x/day	Week 4: 12-14 minutes 2x/day
Month 2: 5-7 days per week			
Week 1: 15-20 minutes 1x/day	Week 2: 20-25 minutes 1x/day	Week 3: 25-30 minutes 1x/day	Week 4: 30 minutes 1x/day
Month 3: 5-7 days per week, 30 minutes daily			
Week 1: 1 block x 4 fast intervals (1 block rest)	Week 2: 1 block x 6 fast intervals (1 block rest)	Week 3: 2 blocks x 4 fast intervals (2 blocks rest)	Week 4: 2 blocks x 4 fast intervals (1 block rest)

Adapted from Millar, ACSM Action Plan for Arthritis, 2003

Exercise Shoes–Fit Tips

Supportive, well-fitting and appropriately cushioned athletic shoes can minimize hip, knee joint stress. Encourage your client to look for the following features when purchasing athletic shoes.

- Look for a thumb's width between the longest toe and the end of the shoe. A roomy toebox accommodates toe/foot deformities.
- The shoe should be comfortable.
- The shoe should have removable inserts, if the client wears orthotics.
- Look for a snug fit in the heel.



Exercise Shoes–More Fit Tips

- Shop for shoes at the end of the day when the feet are slightly swollen. This will mimic increased blood flow during exercise. Wear the athletic socks intended for activity.
- If you have hand arthritis, look for shoes with velcro closures or elastic shoelaces.
- Look for shoes with the following combined materials: polyurethane, air cushioning and gel.
- The American Academy of Podiatric Sports Medicine publishes a frequently updated list of recommended running, walking and sport shoes for individuals with varying foot types. Visit: www.aapsm.org

Shoe Support Quick Tests

YES!

NO!

These simple tests can be done by clients at the shoe store or on their current shoes to determine whether the shoe provides basic stability and support.

Flexion Stability

The shoe should bend at the hinge joint (ball) of the foot–*not* in the arch. If the shoe bends in the wrong place, it will not support the natural motion of the foot and also wear out more quickly.

Shoe Support Quick Tests

YES!

NO!

Heel Stability

The stiff heel counter sewn into the rear of the shoe provides stability at the heel. Place the thumb and index finger near the base of the heel counter and squeeze. The heel counter should not collapse inward.

Shoe Support Quick Tests

NO!

Torsional Stability

Try to twist the shoe like you're wringing a towel.You should observe some motion but the shoe should not collapse easily.This test is most important when individuals are participating in lateral movement activities.

If your client reports continued foot or knee pain, refer him/her for an shoe/orthotics evaluation by a podiatrist or sports medicine specialist.

Aquatic Exercise Tips

Water exercise/swimming provide excellent aerobic and muscular conditioning for individuals with lower extremity OA or multiple-joint OA. The water environment takes pressure off weight-bearing joints, provides resistance in multiple planes and promotes improved circulation via increased hydrostatic pressure.

- Water exercise classes utilize resistive devices and buoyancy aides. To increase resistance, clients can move faster, move into shallower water or avoid holding on to the edge of the pool.
- Functional training can also be done in a buoyancy-assisted environment.

Aquatic Exercise Tips

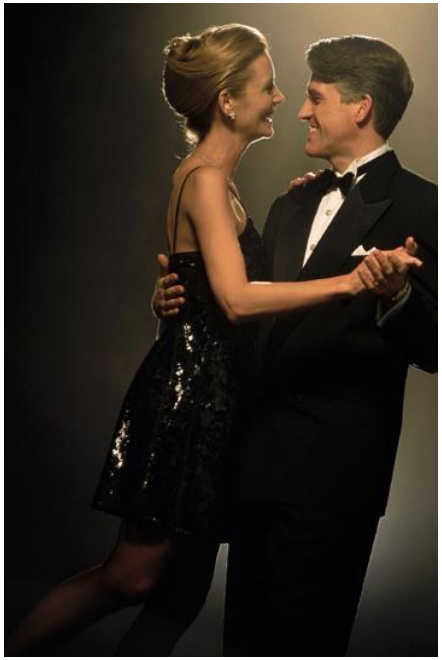
- The Arthritis Foundation recommends that water exercise classes be held in a warm water environment between 83°F (28.3°C) and 90°F (32.2°C) for joint comfort and to promote muscle elasticity.
- Swimming is skill-dependent. Clients may benefit from swim lessons or coaching in master's swim programs. Start with easy to moderate intensity intervals and short duration (4-10 laps). Vary strokes.

Elliptical TrainerTips

- Some clients enjoy and tolerate elliptical training. However, different elliptical trainers have varying footpad dimensions and fore/aft excursions and may place your client in poor dynamic alignment. Observe and monitor joint symptoms.
- Pay attention to posture. Coach your client to utilize a heel-to-toe rocking motion, instead of standing on the balls of the feet, and use a gentle grip on handlebars/rails.
- Lower incline settings may minimize joint stress.
- When mounting the trainer, make sure your client uses the lowest footpad to avoid falls.

Dancing Tips

Many forms of dance (ballroom, folk, country, belly dancing, etc) provide an excellent opportunity for movement and energy expenditure. When possible, minimize jumping, stomping and rapid changes of direction

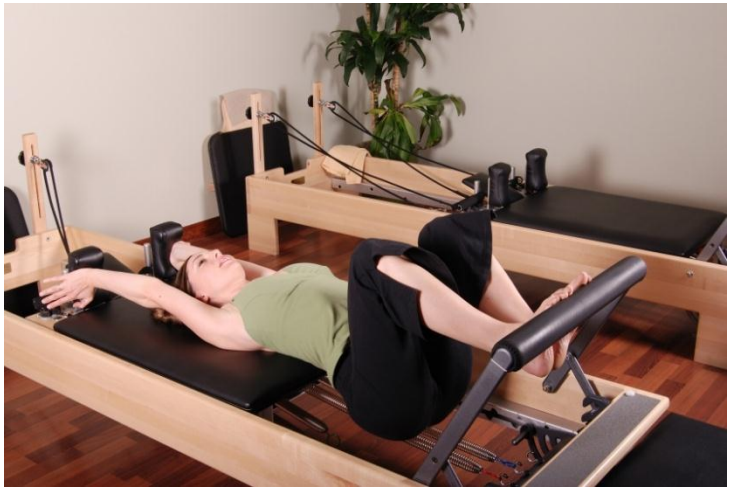


The Softer Side of Fitness

Yoga

Pilates, Gyrotonics

Tai Chi, Qui Gong



Yoga Tips

- Recommend a class for beginners, or titled “gentle” or “restorative”.
- Encourage clients to use aids such as blocks, mats, and grab bars.
- Encourage clients to seek out an experienced instructor. Inform the instructor of the OA and ask for help with modifications.
- Some modifications include:
  - Avoid stressful poses (i.e. Plow)
  - Limit single leg stance time
  - Modify ROM
  - Shorten pose time
  - Feel free to opt out of some poses
  - Start with partial class

Tai Chi and Qui Gong Tips

Mindful martial arts may be beneficial due to slow, controlled movements through full ROM with minimal lower extremity impact. These practices can improve balance and flexibility.

- Clients should seek out an experienced instructor and classes targeting beginners (i.e. shorter routines with more basic movements)
- Clients should be encouraged to modify movements to reduce joint strain.
- Limit single leg stance time.

Pilates/Gyrotonics

Pilates and gyrotonics focus on core strength and flexibility. Pilates utilizes linear movement whereas gyrotonics utilizes rotary movement patterns.

Some physical therapy practices incorporate these disciplines into treatment or aftercare. Caution should be used, as many pilates exercises require significant core strength to stabilize the spine.

Arthritis Foundation OA Exercise Resources

The following resources for clients with OA or other types of arthritis are available through the Arthritis Foundation (AF). Contact your local Arthritis Foundation office for classes, handouts, collaborations or to become an AF instructor.

- Website: http://www.arthritis.org
- 24-hr Information Hotline-English and Spanish: 1.800.568.4045
- Local chapters can be found through the AF website

AF Exercise Programs

- The Arthritis Foundation Exercise Program
- The Arthritis Foundation Aquatic Program
- Tai Chi from the Arthritis Foundation

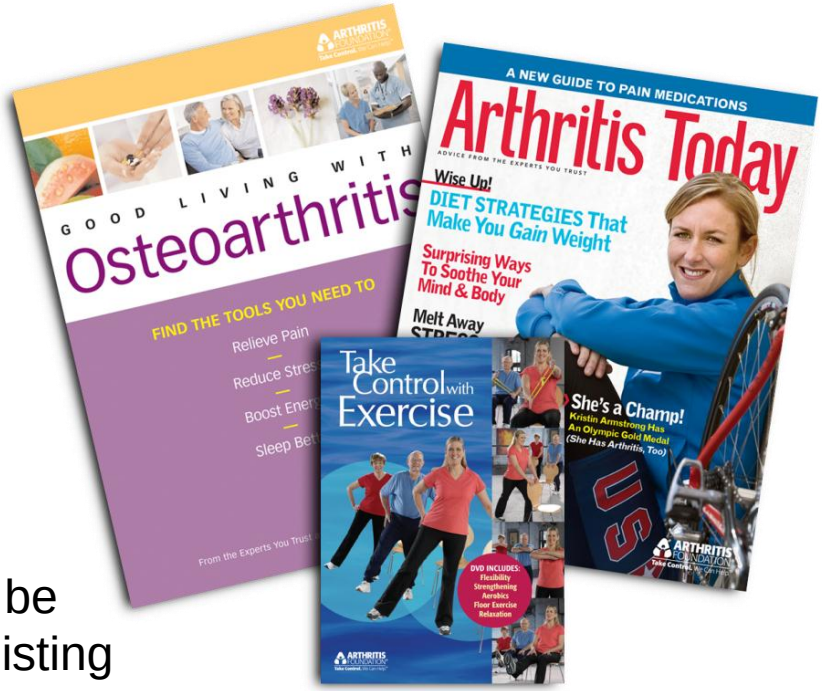
More Arthritis Foundation Resources

DVDs

- Take Control with Exercise
- Arthritis Water Exercise
- Tai Chi for Arthritis DVD - Parts I, II or combo

Books/Print

- The Arthritis Foundation's Guide to Living With Arthritis
- Arthritis Today magazine
- Other books and brochures can be found in the complete resource listing at the back of the PDF document accompanying this course entitled "A Fitness Professional's Guide to Training Clients with Osteoarthritis



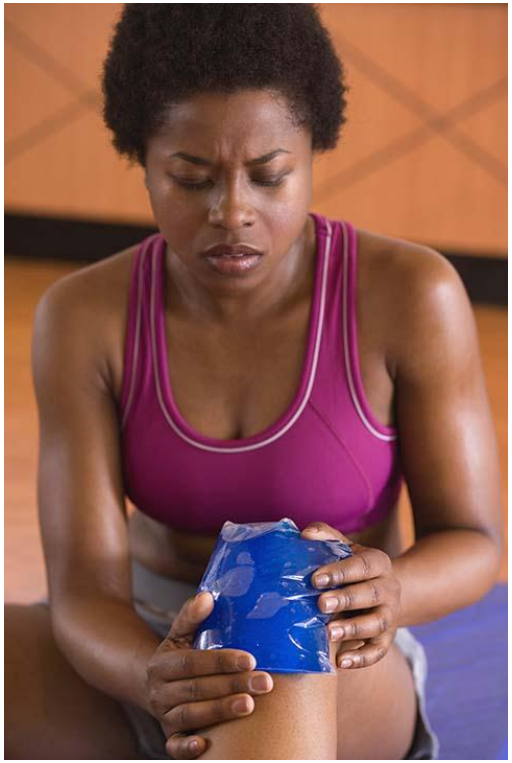
Community Resources for Exercise for OA

More exercise programs/DVDs for clients can be found through the following resources:

- Yoga for Arthritis
  www.mobilityltd.com
- Tai Chi for Arthritis
  www.taichiproductions.com
- Arthritis Exercise Video
  www.sprintaquatics.com
- Good Moves DVD
  http://www.marrtc.org/warmup

Heat vs. Cold for OA

Individuals with OA can utilize heat and cold therapy to reduce pain and improve function, particularly in combination with exercise.



Heat (hot packs, warm showers, hot tubs) is best for reducing stiffness and to decrease pain/spasm. Heat is indicated for sub-acute or chronic pain.

Cold (ice/cold pack or ice massage) is recommended for acute inflammatory pain, especially 24-48 hours after inflammation, exercise or injury. *When in doubt, use ice.*

Rule of Thumb:
Use heat *before* exercise and cold *after* activity.

Why Heat or Cold Therapy?

HEAT

•Promotes the release of endorphins that block pain transmission

•Increases relaxation of muscle around joint

•Reduces muscle spasm

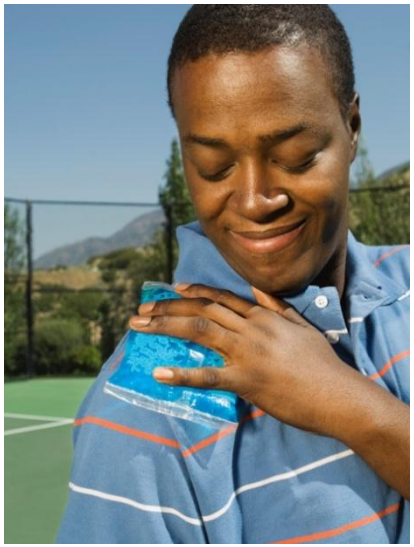
•Enhances flexibility of muscles and peri-articular structures

•Apply for 15-20 minutes

•Contraindicated with acutely inflamed joints

COLD

- Local analgesic/pain killer
- Reduces inflammation and swelling
- Most helpful within 48 hours following injury/irritation
- Reduces muscle spasm
- Apply for 15-20 mins
- Nature's anti-inflammatory!



Joint Protection

The following joint protection strategies help clients with OA avoid overstressing the joints during exercise and activities of daily living.

- Avoid undue stress when joints are “hot”.
- Use the strongest and /or largest joint for tasks.
- Limit repetitive activities or prolonged positions involving affected joints. Variety, cross-training and low to moderate intensity interval training are extremely helpful.
- Use the whole body to move heavy objects.
- Cushion joints from shock and vibration. (for example supportive shoes or padded weight-lifting gloves)
- Modify activities to avoid overuse or deforming joint forces.

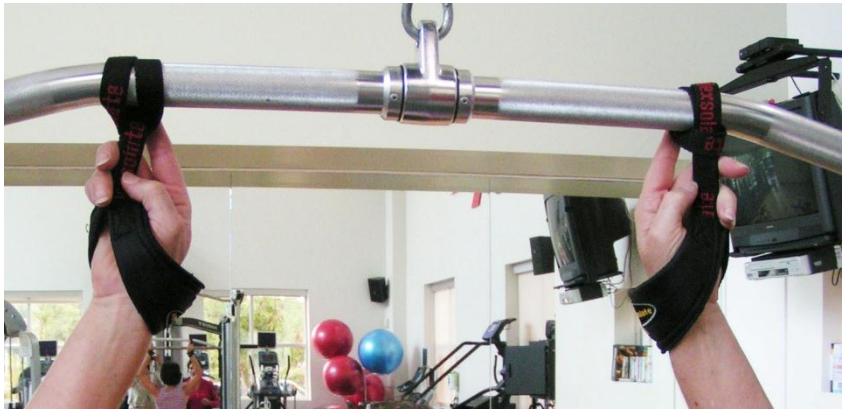
Joint Protection-Hands

The following tips can help your client lift weights without aggravating the joints of the hands.

- When lifting a weight, position both palms upward and rest the weight in the palm of the hand, *not* on the fingers.
- Keep the wrists neutral and avoid ulnar deviation (hand bent towards small finger). For example, avoid excessive loading of the wrists during push-ups by using push-up grips.
- Hold handles/weights straight across the palm.
- Use thick grips/handles or slide objects when possible.

More Joint Protection-Hands

- Avoid a tight grip and staying in one position for prolonged time periods. Relax hands between sets.
- Consider the use of straps to reduce the need for gripping (for example, during lat pull down).
- Avoid excessive and constant pressure against the pad of the thumb. A neoprene thumb support (can be found in drugstores) may be helpful for clients with thumb OA.
- If the weight can be controlled, eliminate oppositional position of the thumb to improve comfort.



Summary Recommendations

Let’s summarize some key recommendations for exercise in clients with OA of the spine, hip, knee and hand.

Spine OA Recommendations

- Focus on posture and neutral alignment.
- Make sure there is a good base of support.
- Body mechanics are critical.
- Various forms of exercise are tolerated.
- Assess your client for alignment and muscle imbalance
  - ✓ *Strengthen* spinal extensors, abdominals, quadriceps and hip girdle
  - ✓ *Stretch* anterior chest, hamstrings, hip flexors and calf

Hip OA Recommendations

- Fewer interventions have been studied for hip OA exercise.
- Water exercise has been particularly effective.
- Focus on lengthening the calf and hip flexors.
- The bike and elliptical trainer are tolerated about 50% of the time. Find what cardio combination works for your client.
- Assess your client for alignment and muscle imbalance.
  - ✓ *Strengthen* hip extensors and abductors, abdominals and upper back.
  - ✓ *Stretch* IT band, adductors, calf, quadriceps and hamstring

Hochberg, Hinman, Liang, Minor

Knee OA Recommendations

- Focus on quadriceps strengthening (follow the knee exercise guidelines in this course).
- Decrease obesity to reduce joint stress.
- Choose activities that imitate ADLs (closed-chain activities are usually better tolerated).
- The bike and elliptical trainer are tolerated about 50% of the time. Find what works for your client.
- Assess your client for alignment and muscle imbalance.
  - ✓ *Strengthen* the hip, especially the extensors and AB/Adductors.
  - ✓ *Stretch:* IT band, adductors, calf, quad, hamstring, hip flexors.
- Foot pronation can be corrected with footwear and orthotics. This will produce optimal dynamic movement at the knee joint.

Felson, Kovar, et al, 2006

Hand OA Recommendations

- Modify grip and/or exercise as needed to accommodate the joints involved.
- Do *not* emphasize strengthening of the hand. Focus on proximal support and strengthening, especially the shoulder and upper back.
- Decrease additional biomechanical forces on the hand/thumb. For example, watch alignment and avoid a tight, sustained grip.
- Teach your client the arthritis handshake. Reach forward with both hands around the other person's hand instead of letting the fingers get crushed with a typical one-hand shake.

The Bottom Line

Symptoms require exercise modification and creativity. Explore different methods of exercise in alternative positions.

When in doubt about an exercise plan, collaborate with your client's healthcare providers to ensure an optimal outcome.

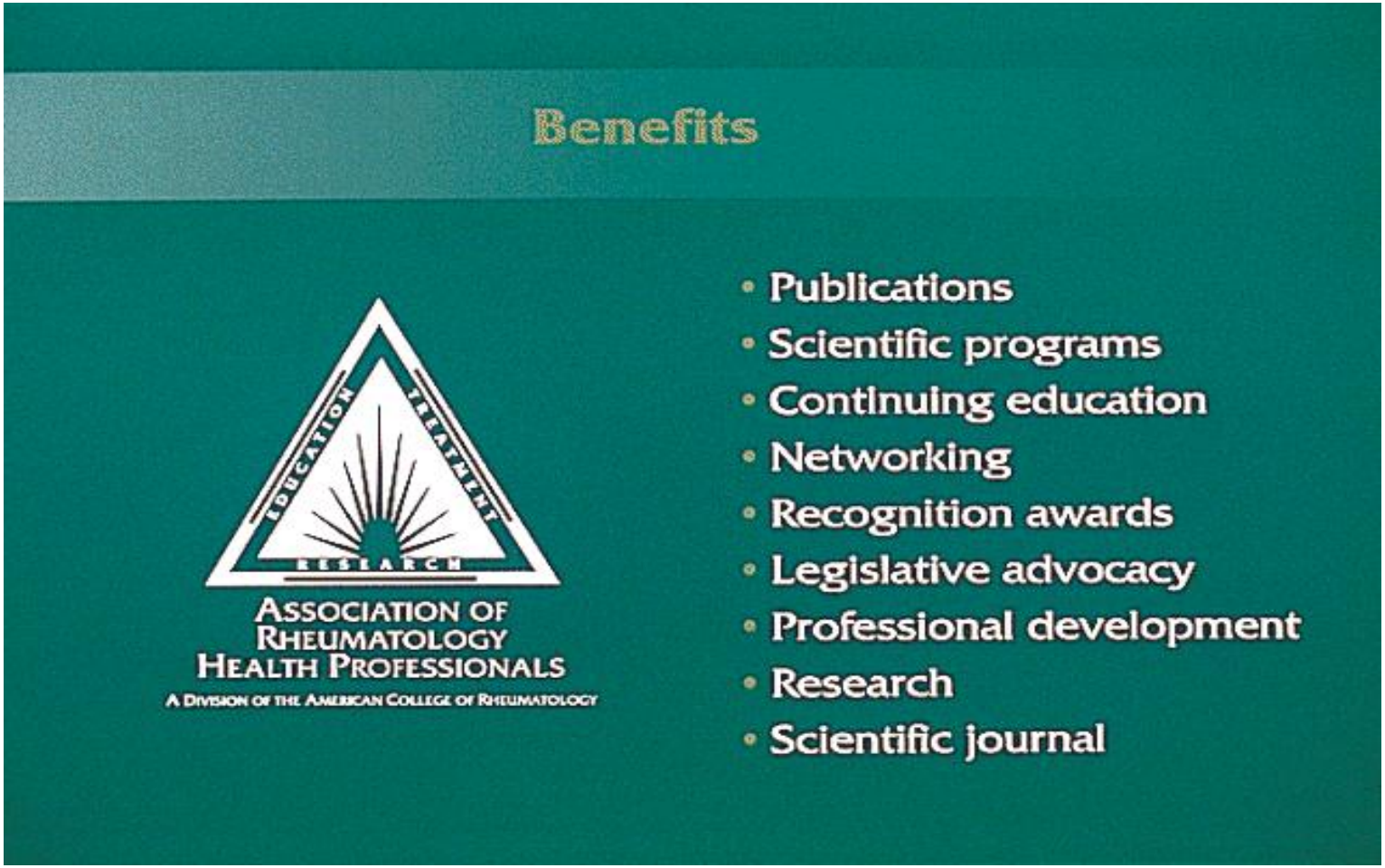
Teach individuals to become ACTIVE participants in the management of their disease. Performing a daily routine of exercise will help your client to maintain or achieve a higher level of function and improve quality of life. Move beyond exercise coaching to educate and empower your client to maintain an active lifestyle.

You Can Make a Difference

Recommended Resources

- American Council on Exercise (ACE)-acefitness.org
- Arthritis Foundation (AF)-arthritis.org/exercise
- American College of Rheumatology (ACR) and Association of Rheumatology Health Professionals (ARHP)-rheumatology.org
- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)-niams.nih.gov
- American Academy of Orthopaedic Surgeons (AAOS) -aaos.org
- Medline Plus: Osteoarthritis nlm.nih.gov/medlineplus/osteoarthritis.html

ARHP as a Resource



Client Education

- WebMD: www.webmd.com
- National Institutes of Health: www.nih.gov/
- MayoClinic.com: www.mayoclinic.com
- Johns Hopkins Arthritis Center: www.hopkins-arthritis.org/corner/corner.html
- Stanford SOM Self-Management Programs: http://patienteducation.stanford.edu

Patient Advocacy Web Sites

- Scleroderma Foundation: www.scleroderma.org
- Lupus Foundation of America: www.lupus.org
- Arthritis Foundation: www.arthritis.org
- Spondylitis Association of America: www.spondylitis.org
- Myositis Association: www.myositis.org
- National Psoriasis Foundation: www.psoriasis.org

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The American Council on Exercise would like to thank the following individuals for their assistance with the development of this course:

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