



# Osteoarthritis, Knee (Degenerative Arthritis, Degenerative Joint Disease)

Exercises:  
10 seconds  
10 times  
1 time per day

## DESCRIPTION

Articular cartilage is the white, firm, rubbery, very smooth tissue that lines the ends of bones in a joint. In fact, cartilage rubbing on cartilage is smoother than ice rubbing on ice. Arthritis is degeneration of the articular cartilage at a joint. Usually in arthritis, there is growth of bone "spurs" that can inflame the surrounding tissue, including the joint lining (*arthro* means joint, and *itis* means inflammation). Arthritis can involve any joint but is found most commonly in fingers, feet, knees, hips, and the spine, and it usually affects adults over 45. Arthritic inflammation includes thinning of the fluid within the joint and joint swelling. In the knee, it may involve one, two, or all three compartments, or it may occur where the kneecap (patella) meets the thigh bone (femur) or at the inner or outer portion, where the thigh bone meets one of the lower leg bones (tibia).

## COMMON SIGNS AND SYMPTOMS

- Joint stiffness and pain
- Start-up pain and stiffness upon arising from sleep and when getting up to walk after prolonged sitting or standing
- Aching that increases with weather changes, especially cold, damp, or rainy weather
- Loss of knee motion
- Swelling of knee joints
- Limping
- Crepitation (crackling) or grating sounds with knee movement
- Weakness of the thigh muscle that may result in kneecap pain and pain with sitting for prolonged periods, getting up from a seated position, kneeling, squatting, and going up or down hills

## CAUSES

- The exact cause of osteoarthritis is unknown, but it appears to be a combination or interaction of biologic, mechanical, biochemical, inflammatory, genetic and immunologic factors.
- Previous joint injury (ligament or meniscus tear, fracture, articular cartilage injury) or surgery (meniscus surgery, ligament surgery, cartilage surgery) may result in degenerative arthritis.

## FACTORS THAT INCREASE RISK

- Obesity
- Occupations that stress joints, such as dancing, playing football, or manual labor

- Stress on the joints caused by activity and aging (almost all people over age 50 have some osteoarthritis)
- Injury to the joint or joint lining
- Breaking a bone in the knee joint
- Kneecap dislocation
- Previous surgery
- Malalignment of the legs (excessively bowlegged or knock-kneed)

## PREVENTIVE MEASURES

- Maintain a normal weight for your height and body structure.
- Be physically active, but avoid activities that lead to joint injury, especially after age 40.
- Regular stretching and yoga exercises may be beneficial.

## EXPECTED OUTCOME

Symptoms can usually be relieved, but joint changes are permanent and usually progressive. Pain may begin as a minor irritant, but it can become severe enough to interfere with daily activities and sleep.

## POSSIBLE COMPLICATIONS

- Osteoarthritis is sometimes crippling.
- Muscles around affected joints, particularly the thigh muscles and sometimes the calf muscles, may become smaller and weaker because of decreased use as a result of pain.
- Joint motion may be lost.
- Osteoarthritis tends to be progressive.

## GENERAL TREATMENT CONSIDERATIONS

The overall treatment plan involves understanding the disorder, and it may include medication and rehabilitation to support activities of daily living. Initial treatment consists of medication and ice to relieve pain. Using heat, especially in the morning or in cold weather, can be beneficial in relieving the stiffness and pain that often is associated with arthritis as the day begins and cold, damp weather. Avoid chilly weather and either wear thermal underwear or avoid outdoor activity in cold weather. Stretching and strengthening exercises of the knee and thigh can help reduce stiffness, slow the progression of loss of joint motion, and maintain muscle strength. These all can be carried out at home, although referral to a physical therapist or athletic trainer for further evaluation and treatment may be helpful. Activity modification that



includes reducing or eliminating high-impact activity, such as running or jogging, and other activities that stress the arthritic joint should be considered to help slow the degenerative process. Weight loss for those who are overweight can help relieve pain and slow the progression of the disease. Occasionally, a knee sleeve or knee brace may be recommended for those with knee arthritis, and a heel wedge in the shoe may be beneficial for some forms of knee arthritis. Massaging the thigh muscles may help, but massaging the knee is usually not helpful. Rest is important during acute phases, as is allowing adequate time for recovery after exercises. Acupuncture may also be of benefit, along with medications such as acetaminophen or nonsteroidal antiinflammatory drugs for pain and joint swelling. Injections with cortisone or hyaluronic acid may be helpful as well. When particularly severe, the use of braces, crutches, or a cane may also provide relief. Surgery or arthroscopy to wash out or clean up a joint may be helpful. Other surgical procedures include arthroplasty (joint replacement with metal and plastic) or arthrodesis (fusion to immobilize the joint by getting the bone surfaces to heal to each other).

## MEDICATION

- Nonsteroidal antiinflammatory medications such as aspirin and ibuprofen (do not take for 7 days before surgery) are used to reduce inflammation. Take these as directed by your physician, and contact your doctor immediately if any bleeding, stomach upset, or an allergic reaction occurs.
- Over-the-counter pain relievers such as acetaminophen may also be used, although these help reduce pain only and do not affect inflammation.
- Glucosamine with or without chondroitin may be beneficial in reducing the pain associated with arthritis. The mechanism of action is not known, but it appears to provide some benefit. Take as directed.
- Stronger pain relievers may be prescribed as necessary. Do not take prescription pain medication for longer than 4 to 7 days. Use it only as directed, and take only as much as you need.
- Cortisone injections are often beneficial for painful, stiff joints. This is particularly true if there is associated swelling of the joint, however, these usually provide only temporary relief.
- Hyaluronic acid (HA) injections are often beneficial in the treatment of knee arthritis. These are usually given as a single injection or in a series of three to five injections. These provide temporary relief of symptoms without the potential side effects of cortisone injections. HA injections restore thickness to the joint fluid while also relieving pain and, to some degree, reducing inflammation.

## HEAT AND COLD

- Cold is used to relieve pain and reduce inflammation for acute and chronic cases. It should be applied for 10 to 15 minutes every 2 to 3 hours as needed and immediately after any activity that aggravates your symptoms. Use ice packs or an ice massage.
- Heat may be used upon arising from sleep or prior to performing stretching and strengthening activities. Apply heat to painful and stiff knee joints for 20 minutes up to two to three times a day. Use hot towels, hot tubs, infrared lamps, moist heat packs, warm soaks, electric heating pads, or deep heating ointments or lotions. Swim in a heated pool, or move around in a whirlpool spa.

## WHEN TO CALL YOUR DOCTOR

- Symptoms get worse or do not improve in 2 weeks despite treatment.
- The knee locks or becomes red and extremely painful.
- You or a family member has joint stiffness.
- New, unexplained symptoms develop. Drugs used in treatment may produce side effects.

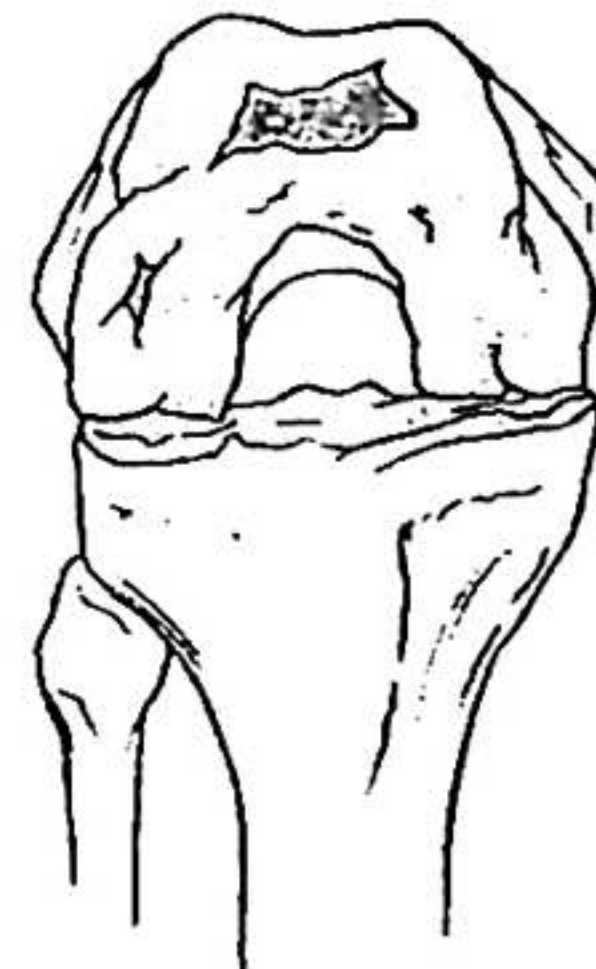


FIGURE 1

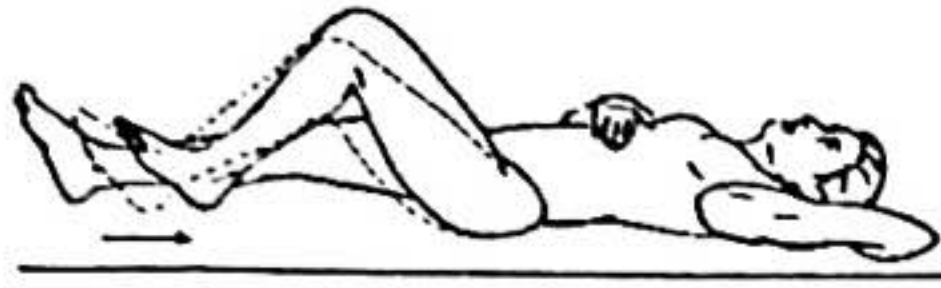
## RANGE OF MOTION AND STRETCHING EXERCISES

Knee Osteoarthritis

These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. Please remember:

- Flexible tissue is more tolerant of the stresses placed on it.
- A gentle stretching sensation should be felt.





**RANGE OF MOTION • Knee Flexion**

1. Lie on your back with your legs out straight.
2. *Slowly* slide your heel toward your buttocks. Bend your knee as far as you can comfortably to get a *gentle* stretching sensation.
3. Hold for \_\_\_\_ seconds, and return to the starting position.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



**RANGE OF MOTION • Knee Flexion/  
Extension**

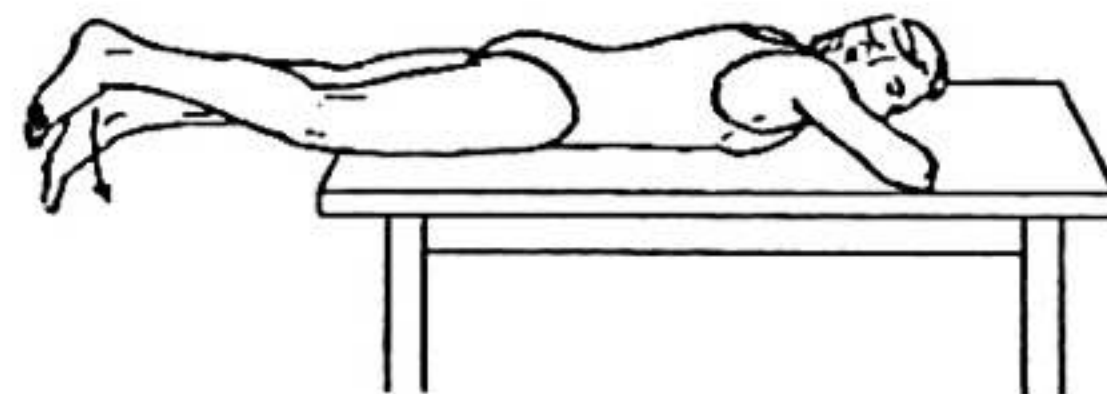
1. Sit on the edge of a table or chair, and use your unaffected leg to straighten (extend) and bend (flex) your affected leg.
2. *Flexion:* Cross your ankles, placing your unaffected leg on top of your other leg. Pull your heels backward under the surface you are sitting on to increase the bend in your knee.
3. *Extension:* Cross your ankles, placing your unaffected leg under your other leg. Straighten your uninjured leg to increase how much you can straighten your injured knee.
4. Repeat these exercises \_\_\_\_ times, \_\_\_\_ times per day.



**RANGE OF MOTION • Knee Extension**

1. Sit on a chair or other flat surface with your heel propped up on another surface as shown. You may also prop your foot up on a rolled-up towel, table, or footstool.
2. Relax and let gravity straighten your knee.
3. Hold this position for \_\_\_\_ seconds.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

*If authorized by your physician, physical therapist, or athletic trainer, you may place a \_\_\_\_ pound weight on your thigh, just above your kneecap, to obtain a more effective stretch.*



**RANGE OF MOTION • Knee Extension**

1. Lie on a bed or sturdy table with your kneecap off the edge.
2. Allow gravity to straighten your knee for you, and hold this position for \_\_\_\_ seconds.
3. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

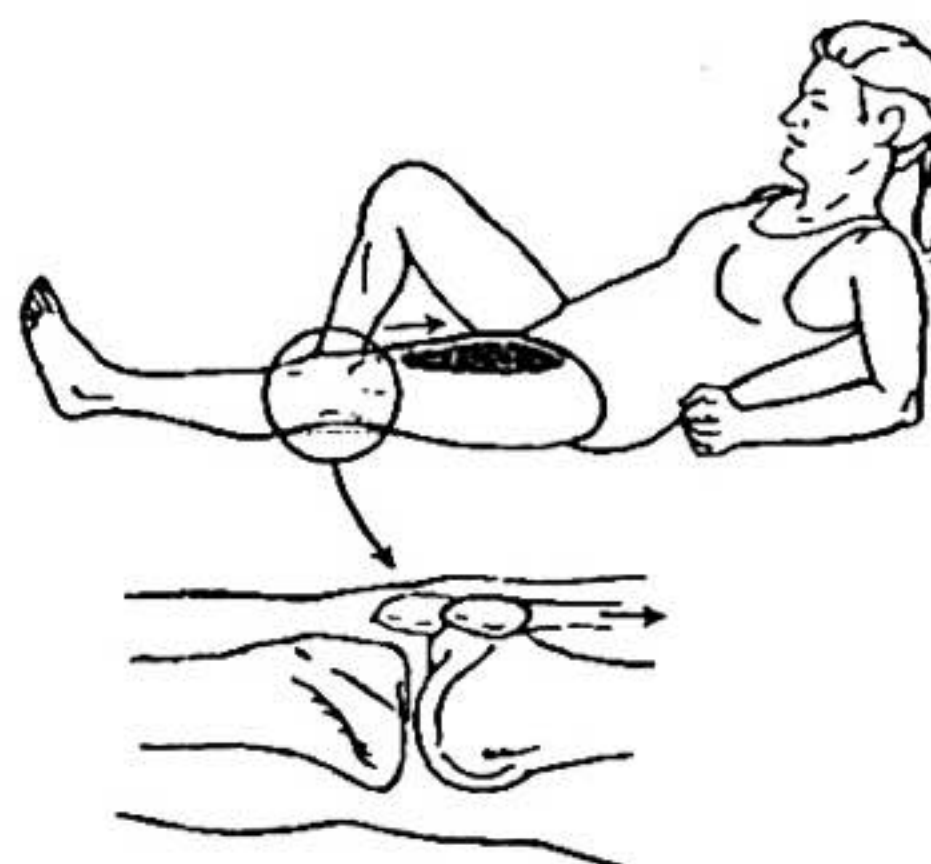
*If authorized by your physician, physical therapist, or athletic trainer, you may place a \_\_\_\_ pound weight on your ankle to obtain a more effective stretch.*





### FLEXIBILITY • Hamstrings Stretch

1. Lie on your back with your leg bent and both hands holding onto it behind the thigh as shown.
2. Your hip should be bent to 90 degrees with your thigh pointing straight at the ceiling.
3. Straighten your knee as much as you can, keeping your thigh pointing straight toward the ceiling. Keep the other leg flat on the floor.
4. Hold this position for \_\_\_\_ seconds.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



### STRENGTH • Quadriceps, Isometric

1. Lie flat or sit on the floor with your leg out straight in front of you.
2. Tighten the muscle in the front of your thigh as much as you can, pushing the back of your knee flat against the floor. This will pull your kneecap up your thigh toward your hip.
3. Hold the muscle tight for \_\_\_\_ seconds.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

## STRENGTHENING EXERCISES Knee Osteoarthritis

These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. Please remember:

- Strong muscles with good endurance tolerate stress better.
- Do these exercises as *initially* prescribed by your physician, physical therapist, or athletic trainer. Progress slowly, with each exercise, under their guidance, gradually increasing the number of repetitions and weight used.



### STRENGTH • Quadriceps, Seven Count

The quality of the muscle contraction in this exercise is what counts, not just your ability to lift the leg.

1. Lie flat or sit on the floor with your leg out straight in front of you.
2. Tighten the muscle in the front of your thigh as much as you can, pushing the back of your knee flat against the floor.
3. Tighten this muscle *harder*, and lift your heel 4 to 6 inches off the floor.
4. Tighten this muscle *harder*.
5. Lower your heel to the floor, keeping the muscle in the front of your thigh as tight as possible.
6. Tighten this muscle *harder*.
7. Relax.
8. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

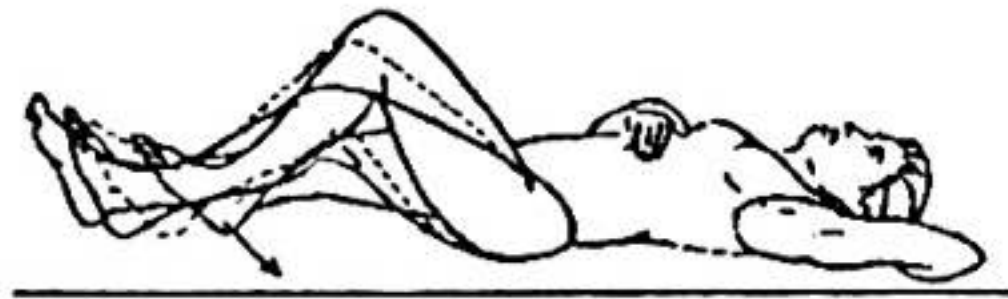




**STRENGTH • Quadriceps, Short Arcs**

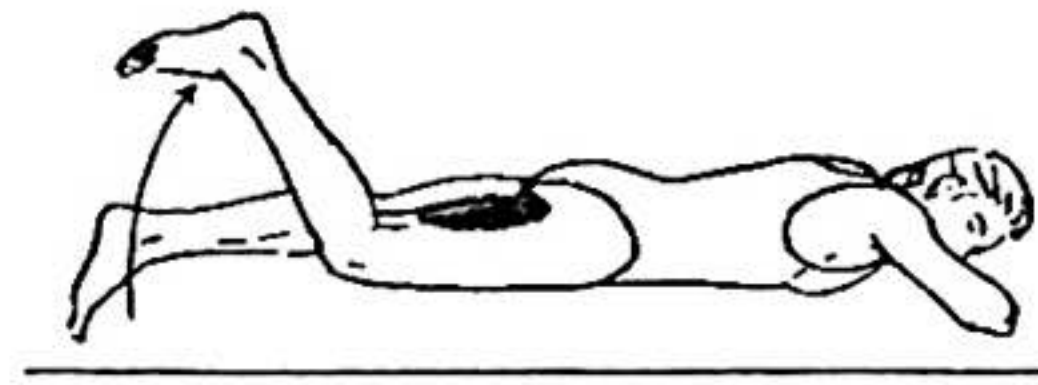
1. Lie flat or sit on the floor with your leg out straight in front of you.
2. Place a \_\_\_ inch roll under your knee, allowing it to bend.
3. Tighten the muscle in the front of your thigh as much as you can, and pick your heel up off the floor.
4. Hold this position for \_\_\_ seconds.
5. Repeat this exercise \_\_\_ times, \_\_\_ times per day.

*If allowed by your physician, physical therapist, or athletic trainer, a \_\_\_ pound weight may be placed around your ankle for additional resistance.*



**STRENGTH • Hamstrings, Isometric**

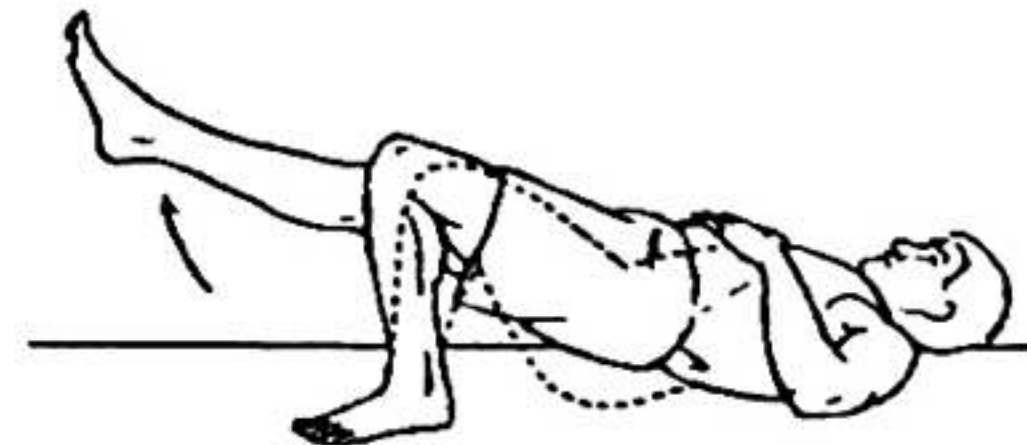
1. Lie on your back on the floor or on a bed, and bend your knee approximately \_\_\_ degrees.
2. Pull your heel into the floor or bed as much as you can.
3. Hold this position for \_\_\_ seconds. Rest for \_\_\_ seconds.
4. Repeat this exercise \_\_\_ times, \_\_\_ times per day.



**STRENGTH • Hamstrings, Curls**

1. Lie on your stomach with your legs out straight.
2. Bend your knee to 90 degrees, and hold this position for \_\_\_ seconds.
3. *Slowly* lower your leg to the starting position.
4. Repeat this exercise \_\_\_ times, \_\_\_ times per day.

*If allowed by your physician, physical therapist, or athletic trainer, a \_\_\_ pound weight may be placed around your ankle for additional resistance.*



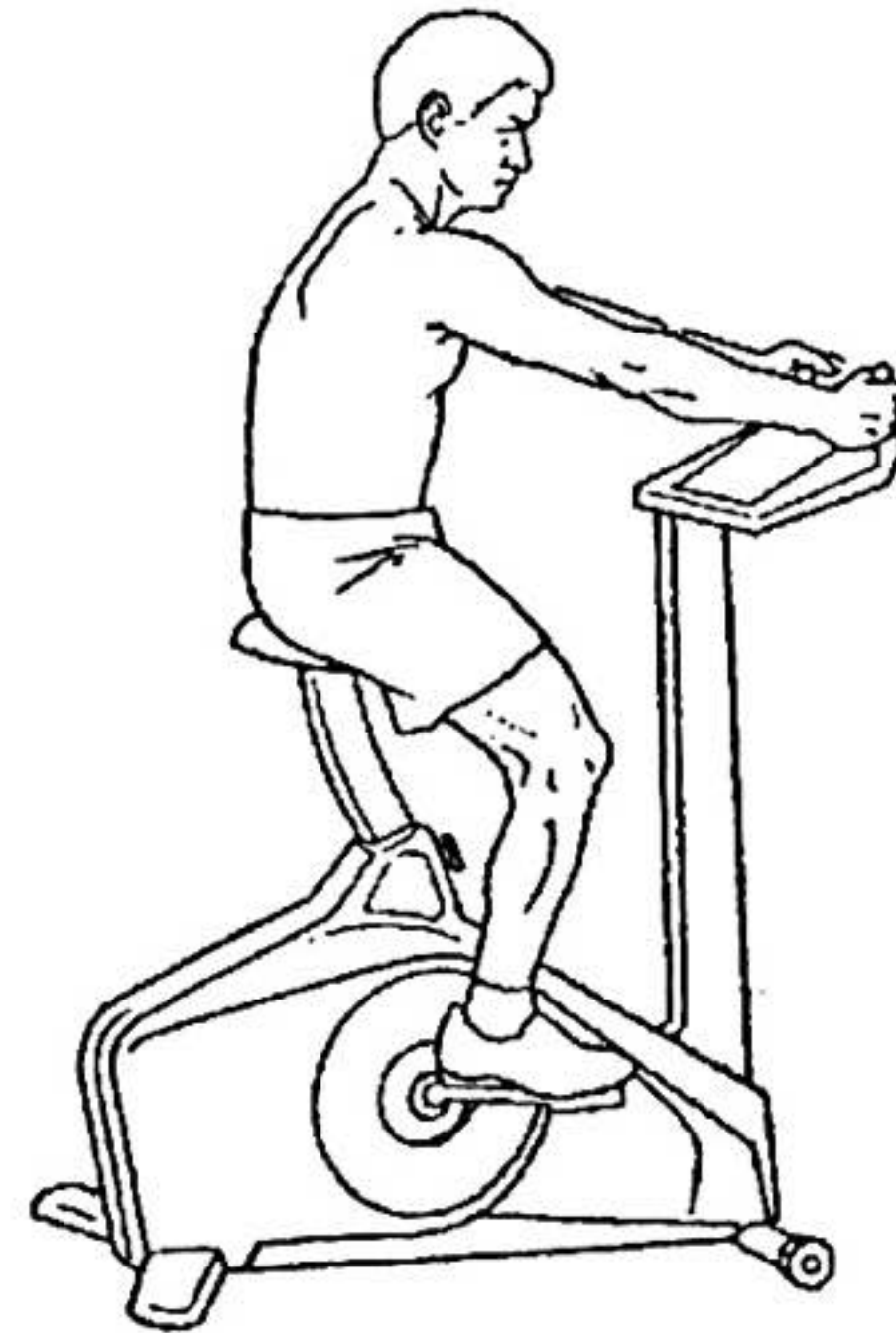
**STRENGTH • Hip Extension**

1. Lie on your back with your knees bent and your feet flat on the floor.
2. Push down, raising your buttocks off the floor. Keep your pelvis level, and do not allow it to turn.
3. You may do this exercise with both legs, which is easier, or with just one leg as shown. Hold this position for \_\_\_ seconds.
4. *Slowly* return to the starting position.
5. Repeat this exercise \_\_\_ times, \_\_\_ times per day.



**STRENGTH • Hip Abduction**

1. Sit in a chair or on a table as shown.
2. Place a rubber tubing/band around your thighs just above your knees.
3. Spread your legs as widely as possible. Hold this position for \_\_\_\_ seconds.
4. *Slowly* return to the starting position.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



**STRENGTH • Stationary Bike**

1. Sit on a stationary bike with the seat adjusted to a height that allows your knee to be fully extended when the heel is on the pedal with the pedal in the down position.
2. To increase the motion of your knee and/or hip:
  - a. Slowly begin to pedal forward until you feel a stretch, then reverse direction and pedal backward until you feel a stretch.
  - b. Repeat this until you are able to easily pedal around.
3. When cleared by your physician, physical therapist, or athletic trainer, you may add resistance to the stationary bike to increase the strength of your knee and/or hip. For this to occur:
  - a. You should have sufficient motion to cycle without any pain or discomfort in your knee or hip.
  - b. Adjust the tension on the bike to the desired level.
4. Start cycling \_\_\_\_ minutes per day, \_\_\_\_ times per day. Increase your time by \_\_\_\_ minutes every \_\_\_\_ day.