

QUADRICEPS STRAIN



■ ■ ■ Description

Quadriceps strain is characterized by inflammation and pain in the front of the thigh along the quadriceps muscles. There are four muscles that comprise the quadriceps muscle group, going from the hip across the knee to the leg. This muscle group is important for straightening your knee and bending your hip and is used for running and jumping. This is usually a grade 1 or 2 strain of the muscle-tendon unit. A *grade 1 strain* is a mild strain. There is a slight pull without obvious tearing (it is microscopic tearing). There is no loss of strength, and the muscle-tendon unit is the correct length. A *grade 2 strain* is a moderate strain. There is tearing of fibers within the substance of the muscle or tendon or where the tendon meets the bone. The length of the muscle-tendon-bone unit is increased, and there is decreased strength. A *grade 3 strain* is a complete rupture of the tendon.

■ ■ ■ Common Signs and Symptoms

- Pain, tenderness, swelling, warmth, or redness over the quadriceps muscles at the front of the thigh
- Pain that is worse during and after strenuous activity
- Muscle spasm in the thigh
- Pain or weakness with running, jumping, or straightening the knee against resistance
- Crepitation (a crackling sound) when the tendon is moved or touched
- Bruising in the thigh 48 hours following the injury
- Loss of fullness of the muscle or bulging within the area of muscle with complete rupture

■ ■ ■ Causes

- Strain from overuse of the lower extremity or sudden increase in amount or intensity of activity
- A single violent blow or force to the knee or the quadriceps area of the thigh

■ ■ ■ Risk Increases With

- Sports that require quick starts (sprinting or running races and other track events, racquetball, squash, badminton)
- Sports that require jumping (basketball and volleyball)
- Contact sports such as soccer or football
- Poor physical conditioning (strength and flexibility)
- Inadequate warm-up before practice or play
- Previous quadriceps or knee injury

■ ■ ■ Preventive Measures

- Appropriately warm up and stretch before practice or competition.
- Maintain appropriate conditioning:
 - Hip and thigh flexibility
 - Muscle strength and endurance
 - Cardiovascular fitness
- Wear proper protective equipment (thigh pads).

■ ■ ■ Expected Outcome

This condition is usually curable within 6 weeks if treated appropriately.

■ ■ ■ Possible Complications

- Prolonged healing time if not appropriately treated or if not given adequate time to heal
- Chronically inflamed tendon, causing persisting pain with activity that may progress to constant pain
- Recurrence of symptoms if activity is resumed too soon
- Proneness to repeated injury

■ ■ ■ General Treatment Considerations

Initial treatment consists of medication and ice to relieve the pain, stretching and strengthening exercises (particularly bending the knee), and modification of the activity that initially caused the problem. 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. An elastic bandage or neoprene (wetsuit material) sleeve may help reduce swelling and reduce symptoms. If the strain is severe and the athlete is limping, crutches may be recommended for the first 24 to 72 hours, until the pain and inflammation settle down. Rarely surgery is necessary to reattach muscle if it pulls off bone (uncommon) or if chronic, persistent pain

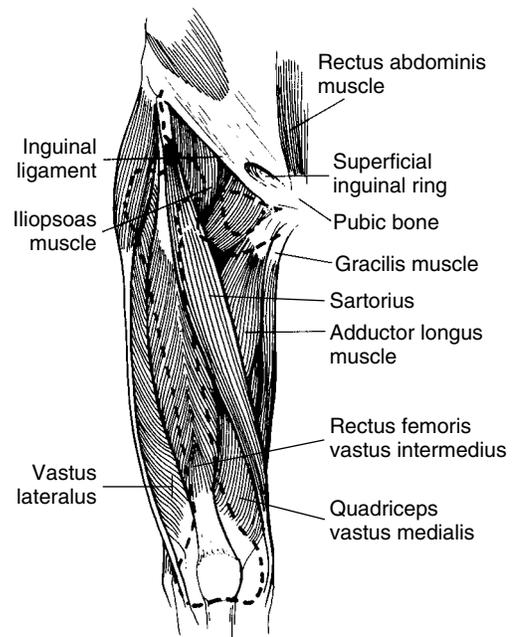


Figure 1

From DeLee JC, Drez D Jr.: Orthopaedic Sports Medicine: Principles and Practice. Philadelphia, WB Saunders, 1994, P. 1103.

exists for more than 3 months despite appropriate conservative treatment for strains. Suturing or sewing torn muscle is usually not successful, although complete tendon rupture often requires surgical repair. Single muscle ruptures are not usually fixed surgically because these rarely cause problems.

■ ■ ■ Medication

- Nonsteroidal anti-inflammatory medications, such as aspirin and ibuprofen (do not take for the first 3 days after injury or within 7 days before surgery), or other minor pain relievers, such as acetaminophen, are often recommended. Take these as directed by your physician. Contact your physician immediately if any bleeding, stomach upset, or signs of an allergic reaction occur.
- Topical ointments may be of benefit.
- Pain relievers may be prescribed as necessary by your physician. Use only as directed.

- Injections of corticosteroids may be given to reduce inflammation, although not usually for acute injuries.

■ ■ ■ Heat and Cold

- Cold is used to relieve pain and reduce inflammation. Cold should be applied for 10 to 15 minutes every 2 to 3 hours for inflammation and pain and immediately after any activity that aggravates your symptoms. Use ice packs or an ice massage.
- Heat may be used before performing stretching and strengthening activities prescribed by your physician, physical therapist, or athletic trainer. Use a heat pack or a warm soak.

■ ■ ■ Notify Our Office If

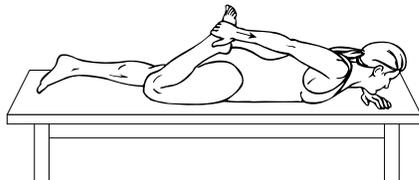
- Symptoms get worse or do not improve in 2 to 4 weeks despite treatment
- New, unexplained symptoms develop (drugs used in treatment may produce side effects)

EXERCISES

➤ RANGE OF MOTION AND STRETCHING EXERCISES • Quadriceps Strain

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

- Flexible tissue is more tolerant of the stresses placed on it during activities.
- Each stretch should be held for 20 to 30 seconds.
- A *gentle* stretching sensation should be felt.



STRETCH • Quadriceps, Prone

1. Lie on your stomach as shown.
2. Bend your knee, grasping your toes, foot, or ankle. If you are too "tight" to do this, loop a belt or towel around your ankle and grasp that.
3. Pull your heel toward your buttock until you feel a stretching sensation in the front of your thigh.
4. Keep your knees together.
5. Hold this position for _____ seconds.
6. Repeat exercise _____ times, _____ times per day.



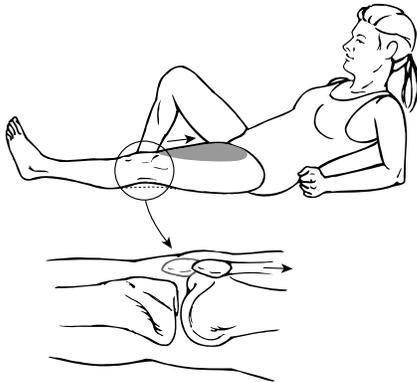
FLEXIBILITY • Hip Flexors, Lunge

1. Assume the position shown in the diagram.
2. Lunge forward, leading with your hips. Do not bend forward at the waist. Keep your chest upright.
3. Hold this position for _____ seconds.
4. Repeat exercise _____ times, _____ times per day.

> **STRENGTHENING EXERCISES** • Quadriceps Strain

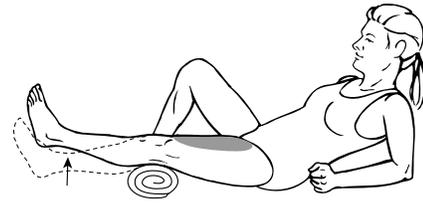
These are some of the *initial* exercises you may start your rehabilitation program with until you see your physician, physical therapist, or athletic trainer again or until your symptoms are resolved. Please remember:

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



STRENGTH • Quadriceps, Isometrics

1. Lie flat or sit with your leg straight.
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.

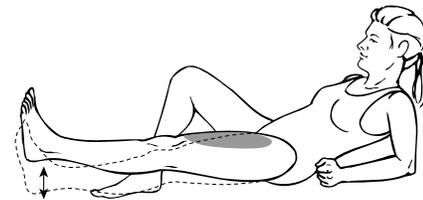


STRENGTH • Quadriceps, Short Arcs

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

Additional Weights: OK TO USE DO NOT USE!!!

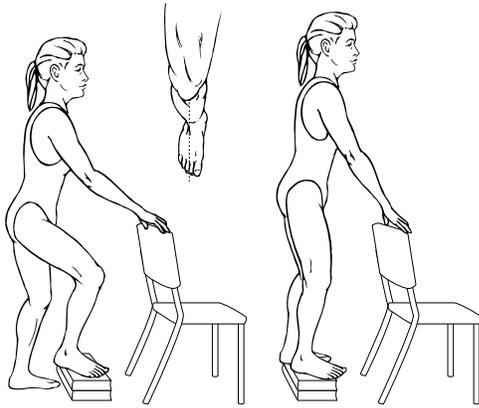
If okay'd by your physician, physical therapist, or athletic trainer, a _____ pound weight may be placed around your ankle for additional weight.



STRENGTH • Quadriceps, 7 Count

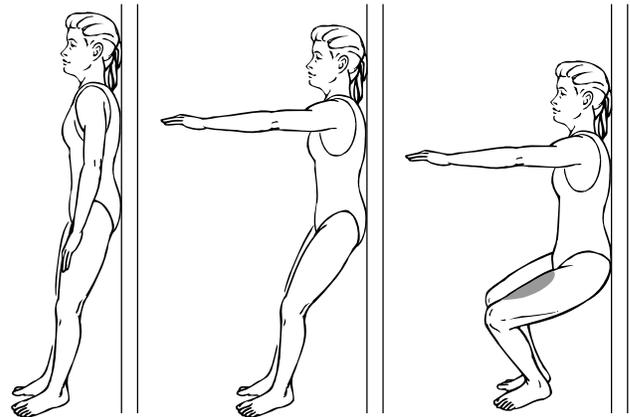
The quality of the muscle contraction in this exercise is what counts the most, not just the ability to lift your leg!

1. Tighten the muscle in front of your thigh as much as you can, pushing the back of your knee flat against the floor.
2. Tighten this muscle *harder*.
3. Lift your leg/heel 4 to 6 inches off the floor.
4. Tighten this muscle *harder again*.
5. Lower your leg/heel back to the floor. Keep the muscle in front of your thigh as tight as possible.
6. Tighten this muscle *harder again*.
7. Relax.
8. Repeat exercise _____ times, _____ times per day.



STRENGTH • Quadriceps, Step-Ups

1. Use a step or books.
2. Place your foot on the step or books approximately _____ inches in height. Make sure that your kneecap is in line with the tip of your shoe or your second toe.
3. Hold on to a hand rail, chair, wall, or another object for balance if needed.
4. Slowly step up and down. Make sure that the kneecap is always in line with the tip of your shoe or your second toe. Lightly touch the heel of the opposite leg to the floor and return to the starting position.
5. Repeat exercise _____ times, _____ times per day.



STRENGTH • Quadriceps, Wall Slide

1. Stand with your back against the wall. Your feet should be shoulder-width apart and approximately 18 to 24 inches away from the wall. Your kneecaps should be in line with the tip of your shoes or your second toe.
2. Slowly slide down the wall so that there is a _____ degree bend in your knees. (*Your physician, physical therapist, or athletic trainer will instruct you how to progress the amount of bend based on your symptoms and diagnosis.*)
3. Hold this position for _____ seconds. Stand up and rest for _____ seconds.
4. Repeat exercise _____ times, _____ times per day.

Notes:

(Up to 4400 characters only)

Notes and suggestions