

## PATELLAR DISLOCATION AND SUBLUXATION



### ■ ■ Description

Patellar dislocation and subluxation are injuries to the kneecap (patella) affecting the joint it forms with the thigh bone (femur). The patella is a V-shaped convex bone that sits within a V-shaped concave groove of the femur, known as the trochlea. *Patellar dislocation* is a condition in which the patella is displaced from its normal position and no longer sits in the trochlea. *Patellar subluxation* is a condition in which the patella is not centered within the trochlea, but the joint surfaces still touch; thus the patella is not in normal relationship to the trochlea. This tends to occur in adolescents and young adults.

### ■ ■ Common Signs and Symptoms

- Severe pain when attempting to move the knee and a feeling of the knee giving way
- Tenderness, swelling, and bruising of the knee
- Numbness or paralysis below the dislocation from pinching, cutting, or pressure on the blood vessels or nerves (uncommon)
- Often patellar dislocation to the outer side of the knee, causing an obvious deformity; often relocates on its own when the knee is straightened, leaving no deformity; damage is the same in both cases
- Lump on the inner knee, which is the end of the inner part of the thigh bone (femur)

### ■ ■ Causes

- Direct blow to the knee
- Twisting or pivoting injury to the lower extremity, such as with cutting (rapid change of direction)
- Powerful muscle contraction
- Congenital abnormality (you are born with it), such as a shallow or malformed joint surfaces

### ■ ■ Risk Increases With

- Participation in contact sports (football, soccer), sports that require jumping and landing (basketball, volleyball), or sports in which cleats are worn on shoes
- Persons with wide pelvis, knocked knees, or shallow or malformed joint surfaces
- Previous knee sprains or patellar dislocations
- Poor physical conditioning (strength and flexibility)

### ■ ■ Preventive Measures

- Appropriately warm up and stretch before practice or competition.
- Maintain appropriate conditioning:
  - Thigh, leg, and knee strength
  - Flexibility and endurance
  - Cardiovascular fitness

- For jumping (basketball, volleyball) or contact sports, protect the patella with supportive devices, such as elastic bandages, tape, braces, knee sleeves with a hole for the patella and a built-up outer side or straps to pull the patella inward, or knee pads.
- For sports that require cleats or spikes on the athletic shoe, use cleats or spikes of appropriate length for the sport and the turf or field conditions.

### ■ ■ Expected Outcome

With appropriate reduction (repositioning of the joint) and treatment, complete healing requires at least 6 weeks.

### ■ ■ Possible Complications

- Associated fracture or joint cartilage injury due to the dislocation or reduction (repositioning) of the patella
- Damage to nearby nerves or major blood vessels (rare)
- Prolonged healing or recurrent dislocation if activity is resumed too soon
- Excessive bleeding within the knee due to dislocation
- Patella pain and giving way, usually due to inadequate or incomplete rehabilitation
- Unstable or arthritic joint following repeated injury or delayed treatment

### ■ ■ General Treatment Considerations

After immediate reduction (repositioning of the bones of the joint), treatment consists of ice and medications to relieve pain. Reduction can be performed without surgery, although surgery may be necessary to remove loose fragments of bone or cartilage caused by the dislocation or reduction or to help prevent further dislocation. Elevating the injured knee at or above heart level helps in reducing swelling. Your doctor may drain the blood from your knee. Immobilization by splinting, casting, or bracing without immobilization for up to 6 weeks is may be recommended to protect the joint while the tissues heal. After immobilization, stretching and strengthening of the injured, stiff, and weakened joint and surrounding muscles (due to immobilization and the injury) are necessary. These may be done with or without the assistance of a physical therapist or athletic trainer.

### ■ ■ Medication

- Nonsteroidal anti-inflammatory medications, such as aspirin and ibuprofen (do not take 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.
- Strong pain relievers may be prescribed as necessary. Use only as directed and only as much as you need.

■ ■ **Heat and Cold**

- Cold is used to relieve pain and reduce inflammation for acute and chronic cases. 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**

- Pain, tenderness, or swelling worsens despite treatment
- You experience pain, numbness, or coldness in the foot
- Blue, gray, or dusky color appears in the toenails
- Any of the following signs of infection occur after surgery: fever, increased pain, swelling, redness, drainage, or bleeding in the surgical area
- New, unexplained symptoms develop (drugs used in treatment may produce side effects)

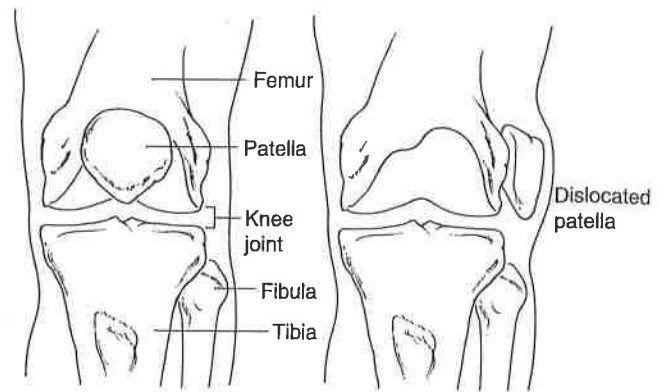


Figure 1

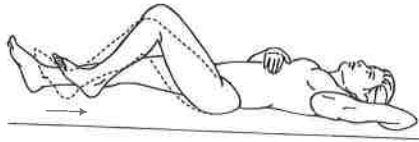
➤ **RANGE OF MOTION AND STRETCHING EXERCISES** • Patellar Dislocation and Subluxation—Phase I

**First Time Dislocations:** For *up to 6 weeks* after an initial (first time) patella dislocation or subluxation you *may* be placed in a knee immobilizer so that the injured tissues can begin to heal. This type of immobilizer will *usually* keep your knee completely straight. Sometimes your physician will allow some motion in a brace that has hinges or he or she will allow you to come out of your brace to bend and straighten your knee. If this is the case, follow your physician's specific instructions.

Once you are allowed to start moving your knee, 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.

**Chronic or Repeated Dislocations or Subluxations:** The person with a patella that suffers from chronic or repeated dislocations or subluxations will often not be placed in an immobilizer. This individual is often allowed to begin to bend and straighten his or her knee as much as is comfortable. 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.



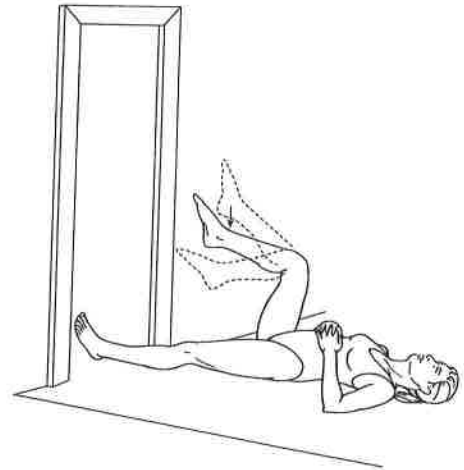
**RANGE OF MOTION** • Knee Flexion

1. Lie on your back with your legs out straight.
2. Slowly slide your heel toward your buttocks. Bend your knee as far as is comfortable to get a stretching sensation.
3. Hold for \_\_\_\_\_ seconds.
4. Return your leg to the starting position.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



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

1. Sit on the edge of a table or chair.
2. Use the uninjured/unaffected leg to straighten (extend) and bend (flex) the injured/affected leg.
3. **Flexion**—Cross your ankles, placing the uninjured or unaffected leg on top of the injured/affected leg. Pull your heel(s) backward under the surface you are sitting on to increase the amount you can bend your knee.
4. **Extension**—Cross your ankles, placing the uninjured or unaffected leg under the injured/affected leg. Pull your heel(s) backward under the surface you are sitting on to increase the how much you can straighten your knee.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



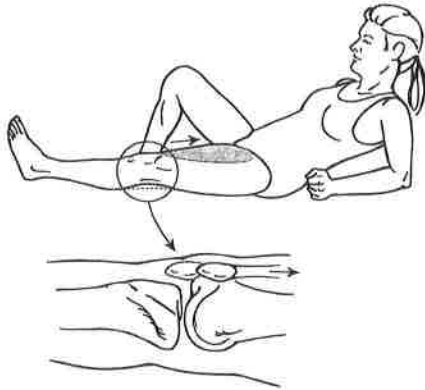
**RANGE OF MOTION** • Gravity Knee Flexion

1. Lie on the floor as shown with your toes/foot lightly touching the wall.
2. Allow your toes/foot to slide down the wall, allowing gravity to bend your knee for you.
3. Obtain a "comfortable" stretching sensation.
4. Hold this position for \_\_\_\_\_ seconds. Then return the leg to the starting position.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.

➤ **STRENGTHENING EXERCISES** • Patellar Dislocation and Subluxation—Phase I

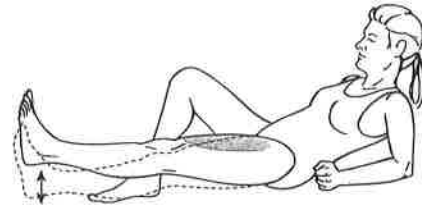
These are some of the *initial* exercises you may start your rehabilitation program with until you see your physician, physical therapist, or athletic trainer again or until your symptoms are resolved. Please remember:

- 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

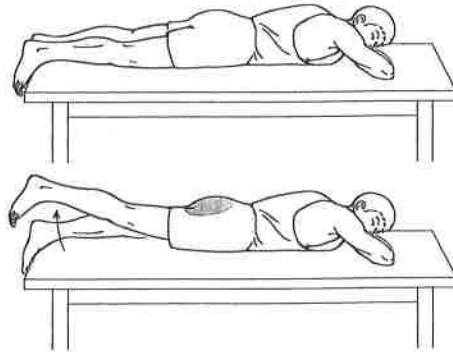
1. Lie flat or sit with your leg straight.
2. Tighten the muscle in the front of your thigh as much as you can, pushing the back of your knee flat against the floor. This will pull your kneecap up your thigh, toward your hip.
3. Hold the muscle tight for \_\_\_\_\_ seconds.
4. Repeat this exercise \_\_\_\_\_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



**STRENGTH** • Quadriceps, 7 Count

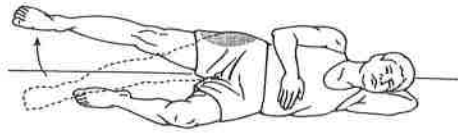
The quality of the muscle contraction in this exercise is what counts the most, not just the ability to lift your leg!

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.



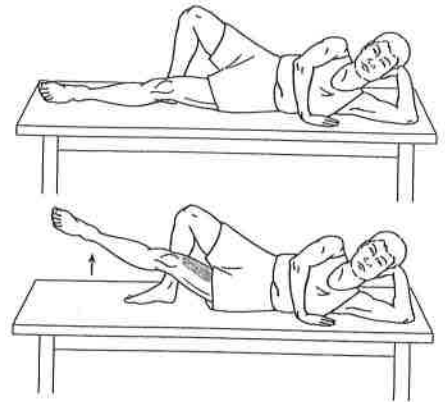
**STRENGTH** • Hip Extension

1. Lie on your stomach with your legs straight out behind you.
2. Raise your leg up behind you from your hip. Keep your knee straight. Hold this position for \_\_\_\_\_ seconds.
3. Slowly lower your leg to the starting position.
4. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



### STRENGTH • Hip Abduction

1. Lie on your side as shown with the injured/weak leg on top.
2. Bend the bottom knee slightly for balance. Roll your top hip slightly forward.
3. Lift your top leg straight up, leading with your heel. Do not let it come forward. Hold this position for \_\_\_\_\_ seconds.
4. Slowly lower your leg to the starting position.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



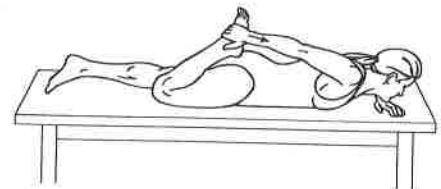
### STRENGTH • Hip Adduction

1. Lie on your side as shown with the injured/weak leg on the bottom.
2. Place the foot of your top leg flat on the floor for balance. It may be in front or behind the bottom leg.
3. Lift the bottom leg as shown. Hold this position for \_\_\_\_\_ seconds.
4. Slowly lower your leg to the starting position.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.

### > RANGE OF MOTION AND STRETCHING EXERCISES • Patellar Dislocation and Subluxation—Phase II

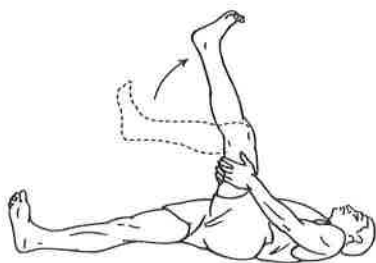
Phase II begins when you can bend your knee at least 100 to 110 degrees. At this time you are ready to start bending your knee farther and to start stretching your muscles again. These are some of the *initial* exercises you may start your rehabilitation program with until you see your physician, physical therapist, or athletic trainer again. Progress as your motion and symptoms allow. If you feel too much “pulling” and that your knee cap is coming “out of place,” stop them immediately and consult your physician, physical therapist, or athletic trainer. 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.



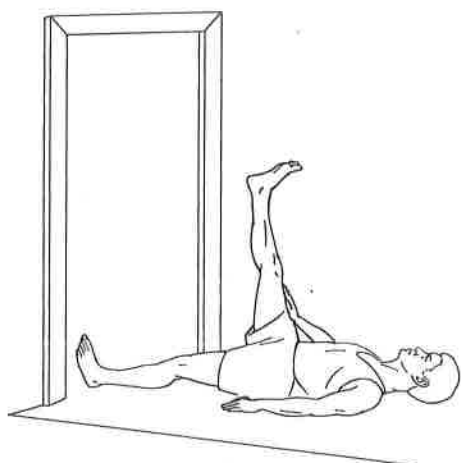
### STRETCH • Quadriceps, Prone

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.



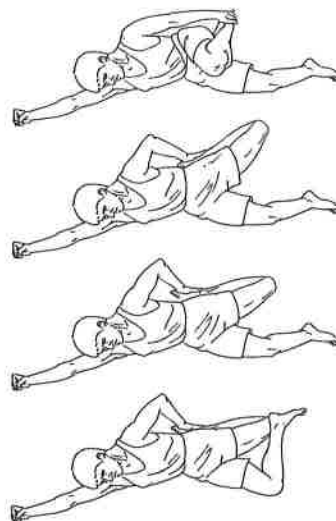
**FLEXIBILITY • Hamstrings**

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



**FLEXIBILITY • Hamstrings, Doorway**

1. Lie on your back near the edge of a doorway as shown.
2. Place the leg your are stretching up the wall keeping your knee straight.
3. Your buttock should be as close to the wall as possible and the other leg should be kept flat on the floor.
4. You should feel a stretch in the back of your thigh.
5. Hold this position for \_\_\_\_\_ seconds.
6. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



**ILIOTIBIAL BAND STRETCH**

1. Lie on your side as shown. The muscle/iliotibial band to be stretched should be on top.
2. With your hand, grasp your ankle and pull your heel to your buttocks and bend your hip so that your knee is pointing forward as in the top drawing.
3. Rotate your hip up so that your thigh is away from your body as shown and in line with your body. Keep your heel to your buttocks.
4. Bring the thigh back down and behind your body. Do not bend at the waist. Keep your heel pressed to your buttocks.
5. Place the heel of your opposite foot on top of your knee and pull the knee/thigh down farther. You should feel a stretch on the outside of your thigh near your kneecap.
6. Hold this position for \_\_\_\_\_ seconds.
7. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.



**PATELLA • Self Mobilization, Knee Flexed**

1. Sit with your knee bent 75 to 90 degrees and your foot flat on the floor.
2. Place the inside half of your palm (near your thumb) on top of the inside half of your kneecap.
3. Press down on the inside half of your kneecap, attempting to lift the outside edge up, stretching the fibers that are tight. You should feel a slight stretching sensation on the outside edge of your kneecap.
4. Hold this position for \_\_\_\_\_ seconds.
5. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.

> **STRENGTHENING EXERCISES** • Patellar Dislocation and Subluxation—Phase II

These are some of the exercises you may *progress to* in your rehabilitation program. These exercises are usually done during the second phase of your rehabilitation program. *Do not progress to these until you have been authorized to do so by your physician, physical therapist, or athletic trainer.* You may continue with all exercises started in Phase I also. 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.

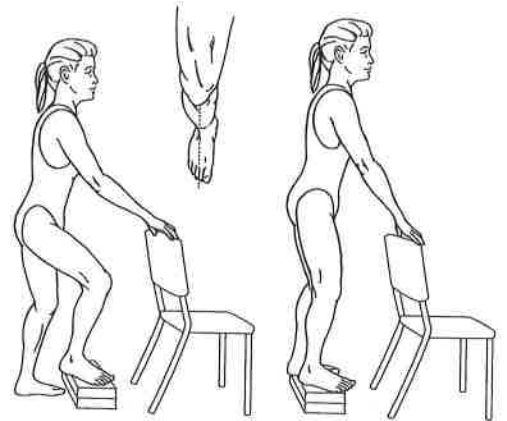


**STRENGTH** • Quadriceps, Short Arcs

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.

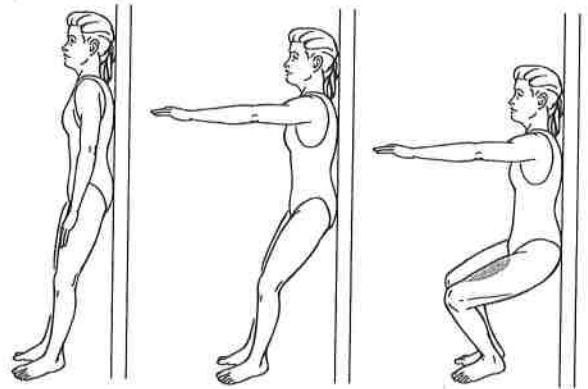
**Additional Weights: OK TO USE      DO NOT USE!!!**

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



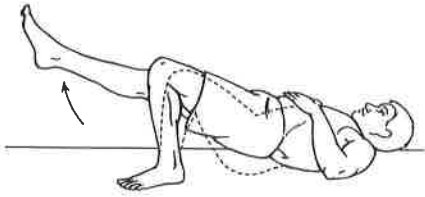
**STRENGTH** • Quadriceps, Step-Ups

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.



**STRENGTH • Hip Extension**

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



**STRENGTH • Isometric Quad/VMO**

1. Sit in a chair with your knee bent 75 to 90 degrees as shown in the drawing.
2. With your fingertips, feel the muscle just above the kneecap on the inside half of your thigh. This is the VMO.
3. Push your foot and leg into the floor to cause the thigh muscles to tighten.
4. Concentrate on feeling the VMO tighten. This muscle is important because it helps control the position of your kneecap.
5. Tighten and hold for \_\_\_\_\_ seconds.
6. Repeat exercise \_\_\_\_\_ times, \_\_\_\_\_ times per day.