

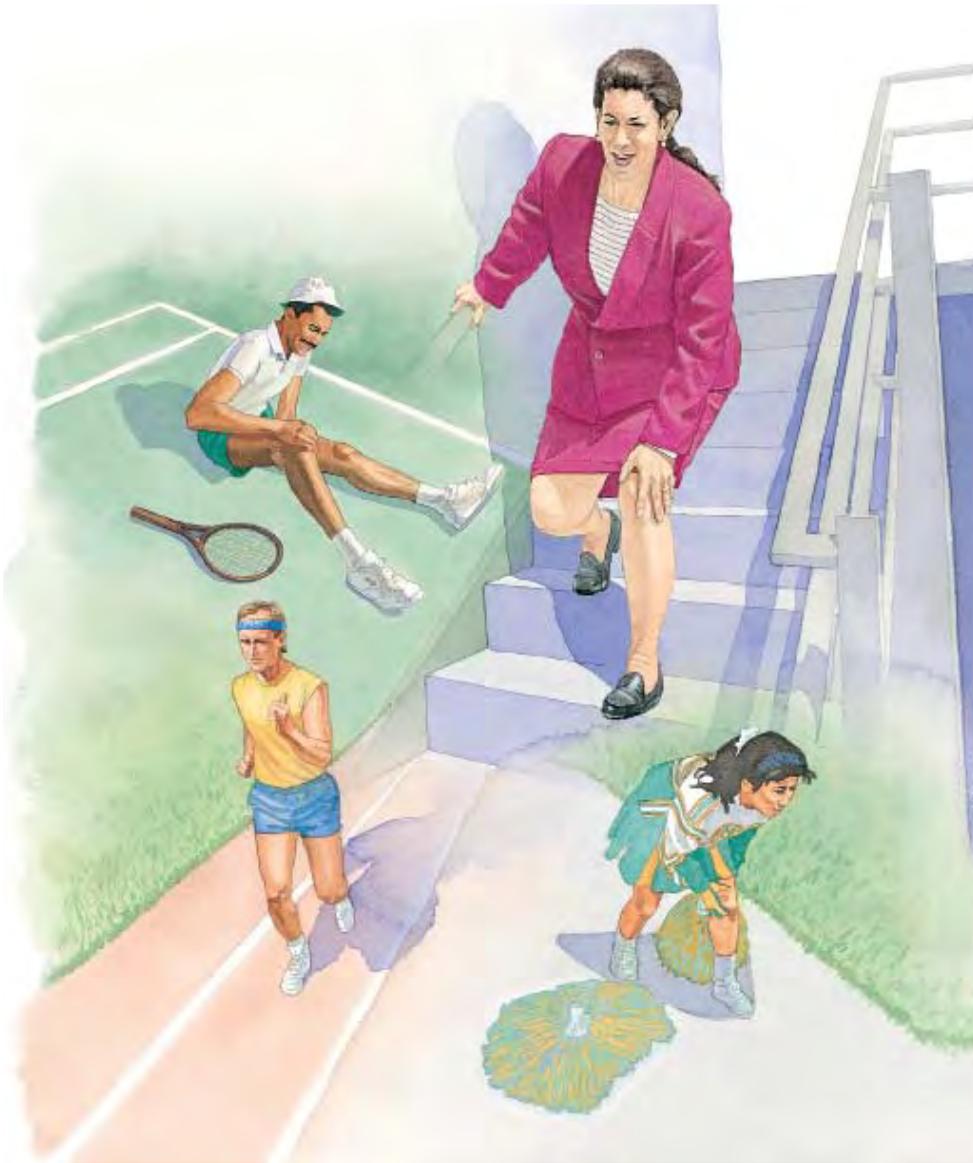
# Patella Pain



Treating  
Kneecap  
Problems

# Is Knee Pain Getting You Down?

There it is again — that pain in the front of your knee. Maybe you just try to ignore it, hoping it will go away. Or maybe the pain is enough to make you think twice about doing anything active, even walking down the stairs at work. But you hate having limits on your life. You may be wondering, “Is there something I can do to get back to normal?” This product will help answer that question.



## Treating Your Knee Pain

Pain in the front of the knee is often caused by a problem with the **patella** (kneecap). Read on to learn the steps you and your healthcare team can take to help relieve your pain. Then you can get back to your everyday activities.



# The Kneecap and the Knee Joint

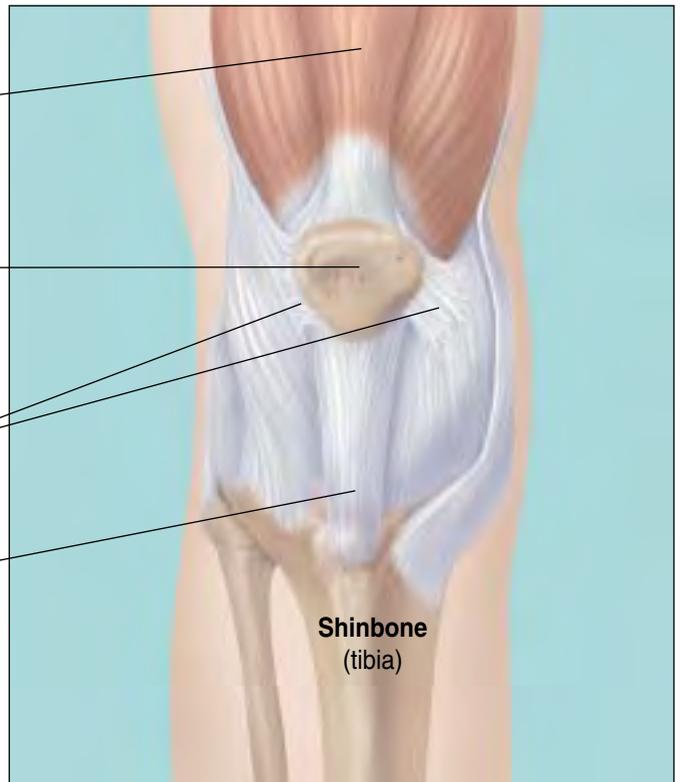
The kneecap (**patella**) is a small triangular bone. It is just one of the many parts that make up the knee joint. Some of the other parts are muscles, ligaments, and leg bones. The kneecap provides leverage for your muscles as they bend and straighten the leg. It also protects the knee joint.

**Quadriceps muscles** are at the front of the thigh. They help the kneecap slide against the thighbone. They also help straighten the leg.

**The kneecap (patella)** allows the quadriceps muscles to work better as they tighten. The kneecap also protects the bones and tissues under it.

**Retinacula** are fibrous bands on the sides of the knee. They help hold the kneecap in place.

**The patellar tendon** is a fibrous cord that connects the kneecap to the shinbone.



## The Kneecap Up Close

Take a closer look at this small bone to see how it works.

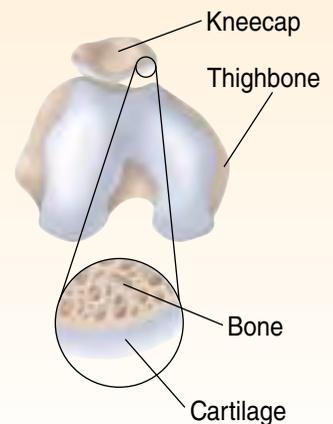
**From the front,** you can see the kneecap's slightly rounded, shield-like shape.



**From the back,** you can see cartilage. This is tough tissue that covers the bone. It helps the kneecap slide easily against the thighbone.



**From the top,** you can see that the kneecap sits in a groove or "track" in the thighbone.



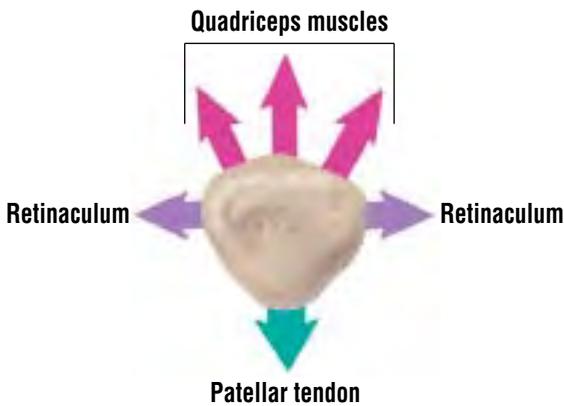
**A closer view** of the kneecap shows the difference between the smooth cartilage and the rougher bone beneath.

## The Kneecap in Action

As the leg moves, the kneecap moves, too. It slides up and down its track on the thighbone. But if the kneecap slides “off track” — even a little — pain and damage can result.

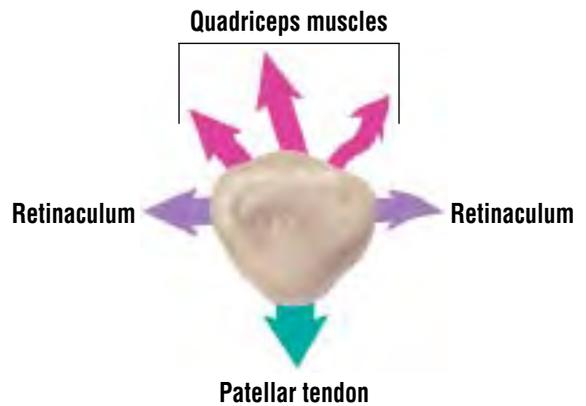
### When the Kneecap Is “On Track”

The kneecap is controlled by muscles and ligaments that work like a system of pulleys. This system includes the quadriceps muscles, retinacula, and patellar tendon. If all of these parts pull in just the right way, the kneecap stays in place and glides easily in its track. Pressure is spread evenly on the back of the kneecap.



### When the Kneecap Gets “Off Track”

An injury can cause some muscles or ligaments to pull too hard or not hard enough. When that happens, the kneecap no longer glides easily against the thighbone. Pressure may be spread unevenly on the back of the kneecap, causing wear and tear on the cartilage.



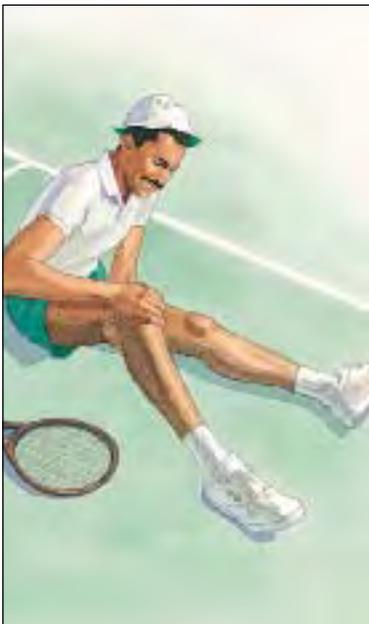
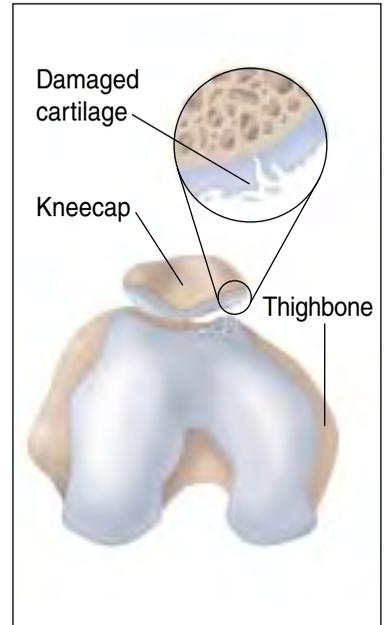
# Common Kneecap Problems

Even a slight tracking problem can cause uneven pressure on the back of the kneecap. This can cause pain and difficulty with movements such as walking and going down stairs. Below are some common causes of kneecap pain.



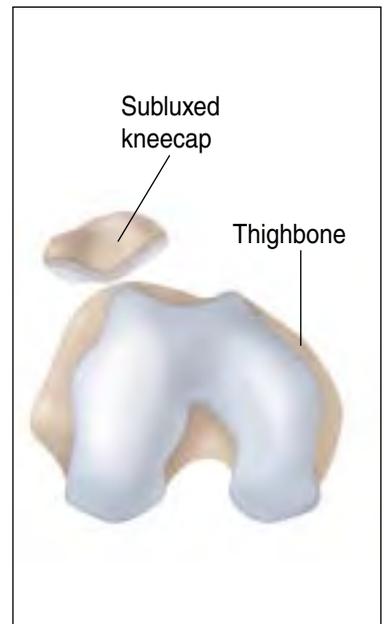
## Cartilage Damage

Sometimes the cartilage on the back of the kneecap or in the groove of the thighbone is damaged. Damaged cartilage can't spread pressure evenly. Uneven pressure wears down the cartilage even further. This often leads to pain and stiffness. And, since cartilage has little blood supply, it has a limited ability to heal.



## Dislocation

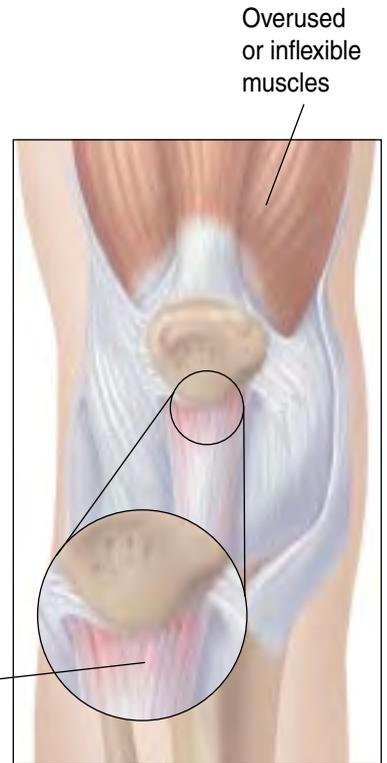
Sometimes a muscle or ligament in the knee is pulled the wrong way. Or the kneecap may be pushed too hard. Then the kneecap may move partly out of the groove (**subluxation**). It may even move completely out (**dislocation**). This can happen without warning. You may feel sudden, sharp pain or your knee may “give out.”





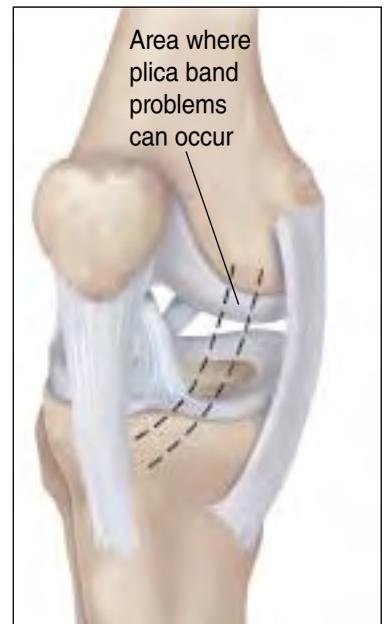
## Patellar Tendinitis

Patellar tendinitis (“jumper’s knee”) occurs when the quadriceps muscles are overused or tight. During movement, the patellar tendon absorbs more shock than usual. The tendon becomes irritated or damaged. This results in pain during motion or even when you’re resting.



## Plica Band Syndrome

Plica bands are tissue fibers that some people have near the kneecap. They usually cause no problems. But sometimes they can become irritated and inflamed. They may snap or catch on the end of the thighbone. This can cause wear and tear on the cartilage at the end of the bone.



# Your Evaluation

You can find out what is causing your knee pain by having a thorough evaluation. You may see an **orthopaedist** (a doctor who specializes in treating bone, muscle, and joint problems). Your doctor will work with you to find the cause of your knee pain and design a treatment plan for you.

## **Taking Your Medical History**

Your medical history gives your doctor clues about the cause of your knee pain. It helps your doctor set goals for your treatment. You'll be asked about your pain and which activities make it worse. Your doctor will also ask about prior knee problems.

## **Examining Your Knee**

A physical exam helps your doctor locate your specific knee problem. Your doctor will look at and move your knee to find signs of swelling or tenderness. Then he or she will check to see how well your kneecap tracks. Other tests of knee function may also be done.



## Performing Tests

Diagnostic tests may help your doctor learn more about your knee problem. **X-rays** show the alignment and position of your bones, including your kneecap. A **CT** (computed tomography) scan can show more alignment details. An **MRI** (magnetic resonance imaging) can show bone, cartilage, ligament, or muscle problems. **Arthroscopy** uses a tiny camera to let your doctor see inside your knee joint. This diagnostic procedure may be done under general or local anesthesia.



MRI scan of the knee



X-ray of the patella

## Planning Your Treatment

Your treatment plan depends on the cause of your kneecap problem. Your plan is designed to fit your goals and activity level.

The most common treatment for kneecap pain is nonsurgical. This includes **rehabilitation** (rehab) and taking **anti-inflammatories**, such as aspirin or ibuprofen. Your rehab may be guided by a **physical therapist** (a movement and exercise specialist).

**Surgery** may help if your knee problem is severe or if rehab doesn't improve it. Your doctor will discuss the risks and complications of surgery with you. After healing from surgery, you'll start a new rehab program.

# Rehabilitation: The Physical Therapist's Role

Are you hoping to run a marathon? Or do you simply want to be able to walk to the corner store? Whatever your goals, your doctor may recommend that you see a physical therapist to help you reach them. First, your therapist does an evaluation. Then he or she works with you to reduce any pain and swelling. As you improve, your therapist will help you build muscle flexibility and strength around your knee.



## Your Physical Therapy Exam

Your physical therapist will examine you to see how your kneecap moves and what kinds of movements cause pain. He or she will test the stability of your knee joint and the strength of your leg muscles. Your physical therapist will also check your **range of motion** (how far your knee can bend and straighten). Testing other joints may help your therapist find movement problems that are adding to your kneecap pain. After the exam, your physical therapist will design a rehab program for you.

## Your Rehab Program

Whenever possible, the goal of your 3-stage rehab program is to get you back to your normal activities. This is done by helping your knee heal and by exercising your knee and its supporting muscles. This reduces the stress on your kneecap.

### Stage

# 1

#### Starting to Heal

You'll work with your physical therapist or doctor to reduce pain and swelling. Then you can begin to increase your knee's pain-free range of motion.



### Stage

# 2

#### Improving Your Knee's Function

You'll begin flexibility and strengthening exercises. This helps build up the muscles around your knee.



### Stage

# 3

#### Practicing Everyday Moves

You'll get your knee and leg ready for everyday activities. You'll work to relearn movements and improve your ease and quickness.



# Starting to Heal

Stage

1

Right now you're in pain. One goal of Stage 1 rehab is to reduce pain and swelling. Another is to increase your knee's pain-free range of motion. Your physical therapist will work with you to reach these goals. You may also be given instructions to follow at home.

Icing, elevation, and electrical stimulation can help reduce inflammation.



## Reducing Pain and Swelling

Many treatments can help reduce pain and swelling in your knee. Your doctor or physical therapist may suggest one or more of the following treatments:

- **Icing your knee** helps reduce swelling. You may be asked to ice your knee more than once a day.
- **Keeping your leg raised** above your heart helps excess fluid flow out of your knee joint. This reduces swelling.
- **Compression** means wrapping an elastic bandage or neoprene sleeve snugly around your knee. This keeps fluid from collecting in your knee joint.
- **Electrical stimulation** can help reduce excess fluid in your knee joint.
- **Anti-inflammatory medicines** may be prescribed by your doctor. You may take pills or receive injections in your knee.
- **Isometric (contracting) exercises** strengthen the muscles that support your knee joint. They also help reduce excess fluid in your knee.
- **Massage** helps fluid drain away from your knee.

## Increasing Your Knee's Range of Motion

Swelling, tight muscles, or scar tissue may make it hard to move your knee. After reducing pain and swelling, you and your physical therapist work to increase your knee's range of motion. Any of the following treatments may be used.



Passive range-of-motion exercises help increase your knee's mobility.

- **Ultrasound** uses sound waves to create deep heat. This increases circulation. It may prevent or break down scar tissue in your knee.
- **Patella mobilization** (moving your kneecap) is done by your physical therapist. It prevents buildup of scar tissue and increases range of motion.
- **Bracing or taping** is used to correct a tracking problem.
- **Passive range-of-motion exercises** gently bend and straighten your knee joint. Your leg is moved by your physical therapist or a machine.
- **Assistive range-of-motion exercises** also move your knee. You use your own strength with help from your physical therapist or a machine.
- **Active range-of-motion exercises** are done by bending and straightening your knee under your own power.

# Improving Your Knee's Function

## Stage

# 2

Stage 2 starts with exercise to increase flexibility. This helps reduce pressure on your kneecap. It also prepares your muscles for strengthening. These warm-up and flexibility exercises may be suggested by your therapist. Repeat each exercise as many times as instructed.

## Warming Up

### Elliptical Trainer

- Use your hands for balance only. Don't lean on them.
- Set the tension and incline low. Gradually increase your speed and exercise time.
- Exercise for 10 to 20 minutes.



Using an elliptical trainer limits the impact on your knee joint.



### Treadmill Walking

- Start slowly, with the incline set low. Then gradually increase your speed and exercise time.
- Walk for 10 to 20 minutes.

Wear comfortable shoes that support your feet.

## Muscle-Loosening Stretches

### Knee Flexion

- Sit with your legs extended, foot flexed. Place a towel around one heel. Hold one end of the towel in each hand.
- Pull the towel toward you, sliding your heel toward your rear end. Keep your heel in contact with the mat.
- You should feel a stretch across the front of your knee. Hold for 10 seconds. Then slowly slide your foot back out.



### Calf Muscles

- Face a wall, standing about 2 feet away.
- Step toward the wall with one foot. Keep your forward knee bent and your back knee straight.
- Lean forward, keeping both heels on the ground. Feel the stretch in your back leg.
- Repeat with the back leg slightly bent.

### Hamstrings

- Sit with one leg extended and your back straight. Bend your other leg so that the sole of your foot rests against your mid-thigh.
- Reach toward your ankle. Keep your knee, neck, and back straight.
- Feel the stretch in the back of your thigh.



Stop any exercise that causes pain and discuss it with your physical therapist or doctor. During the exercises, be sure not to bounce.

# Improving Your Knee's Function

Stage 2 continues with exercises that build strong, balanced leg muscles. This protects your kneecap and helps it track properly. Make sure to adjust exercise machines as instructed by your physical therapist. He or she will tell you how many times to do each exercise.

## Developing Strong Muscles

### Electrical Stimulation

- Use the electrical stimulation unit to tighten weak quadriceps muscles.
- As the unit begins to tighten your muscle, increase the contraction by tightening the muscle yourself.
- Your physical therapist may direct you to wear the unit while you exercise.



### Straight Leg Raise

- Sit on the floor, with one leg straight and the other bent.
- Point the toes on your straight leg toward the ceiling. Slowly raise the leg a few inches.
- Hold a few seconds; slowly lower.
- Repeat with toes turned out to strengthen inner thigh muscles.

### Hip Pulls

- Stand with one leg about a foot away from a wall. The other foot (attached to a pulley or rubber tubing) should be a step behind.
- Pull your attached foot forward, keeping your knee straight but not locked.
- Return slowly and steadily to your starting position.
- Point your toe straight forward unless advised otherwise by your therapist.



### Leg Press

- Start with your leg at a 90° angle.
- Push with your leg until it is almost completely straight.
- Slowly and steadily return your leg to its original position.



### Hamstring Curls

- Lying on your stomach, pull one leg up as far as you comfortably can.
- Let your leg uncurl slowly and steadily.
- Take care not to arch your back.

### Wall Slide

- Start with your back against a wall, feet about 18 inches from the wall and hip-width apart.
- Slowly slide down to a near-sitting position. Don't let your hips go lower than your knees. Hold for 20 seconds. Slide back up.
- Repeat with feet turned out to strengthen inner thigh muscles.



To prevent injury, always warm up and stretch before your strengthening exercises. Stop any exercise that causes pain. Discuss it with your physical therapist or doctor.

# Practicing Everyday Moves

Stage

3

Once your leg muscles are flexible and strong, it's time to get ready for everyday activities. These exercises prepare you for climbing stairs or running to catch the bus. Your physical therapist will choose exercises to fit your activities.

## Relearning Daily Moves

### Climbing

- Use your hands for balance only. Don't lean on them.
- Keep your hips over your knees and your back straight.
- Exercise for 5 to 10 minutes to start; gradually increase your time and the size of your steps.



Using a stair climber is a low-impact way to strengthen your knee.

### Walking

- If using a machine, keep the resistance or speed set low at first.
- Walk with a normal stride.
- Exercise for 20 minutes to start. Gradually increase your speed, incline, and time.



Treadmill walking helps prepare you for hiking, running, and cross-country skiing.



Walk on a soft, even surface to reduce the risk of injury to your knee.

### Side-to-Side Movement

- Keeping your knees bent, step from side to side.
- Keep your toes facing forward. Be careful not to twist at your waist or your knees.
- Exercise for 2 to 3 minutes to start. Gradually increase your time.



Hopping sideways, using rubber tubing, increases inner thigh strength.



A trampoline trains your muscles to absorb shock while bearing your weight.

### Jumping

- Always work with your knees bent to absorb shock.
- Exercise for 2 to 3 minutes to start. Gradually increase your time.



A shuttle helps your muscles improve rebounding and landing strength without bearing your weight.

To prevent injury, always warm up and stretch before these exercises. Don't lock your knees. Stop any exercise that causes pain. Discuss it with your physical therapist or doctor.

# Practicing Everyday Moves

The next step in practicing everyday moves is to increase your ease and quickness of movement. These exercises copy complex everyday moves. The exercises chosen for you depend on the type of activities you'll be doing. Always stretch before and after exercising. Stop any exercise that causes pain.

## Increasing Your Agility

### Figure 8's

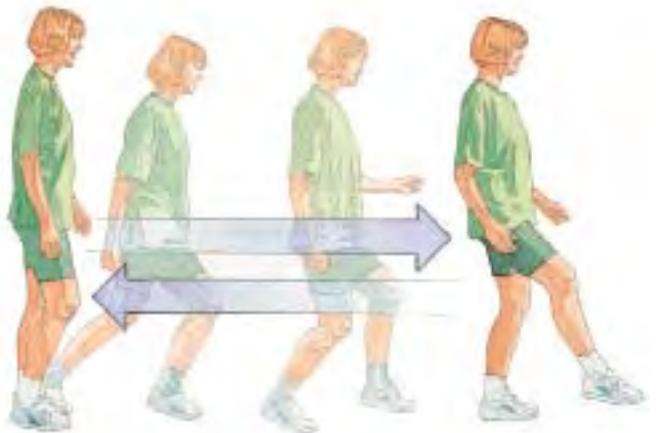
- Follow a large figure 8 at a slow jog or brisk walk.
- Keep at it for 2 to 3 minutes. Then reverse directions.
- Gradually decrease the size of the figure 8 and increase your speed and time.



Figure 8's help you to move around corners and to pivot.

### Short Sprints

- Sprint forward 10 to 15 feet. Stop. Feel your muscles absorb the shock. Sprint backward.
- Continue for 2 to 3 minutes.
- Gradually increase your distance, speed, and total exercise time.



Sprinting forward and backward prepares you for quick stops and starts.

## Cross Steps

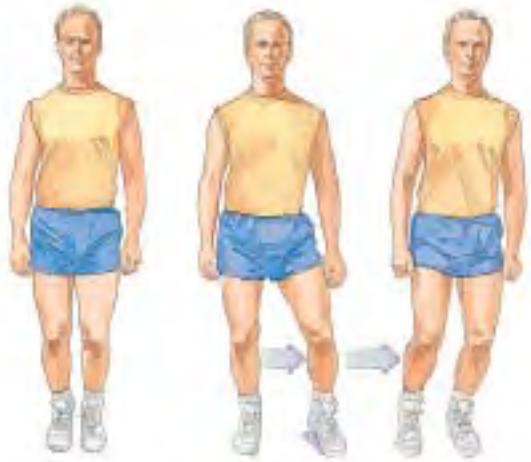
- Start with knees bent and feet shoulder-width apart.
- Cross your right foot in front of your left.
- With your left foot, step to the left.
- With your right foot, step behind your left foot.
- With your left foot, step to the left.
- After doing the cross-step sequence, switch directions.
- Repeat the entire exercise 10 times.



Cross steps prepare you for activities like dancing or skating.

## Side Steps

- Start with knees bent and feet together.
- Step to the side with your left foot.
- Step with your right foot to meet your left foot.
- Keep your steps short and comfortable.
- Repeat the sequence in the opposite direction.
- Continue for 2 to 3 minutes.



Side steps prepare you for activities like racquetball and tennis.



## From Rehab to Real Life

Even when you're back to daily activities, your rehab program isn't over. Your physical therapist may ask you to work out a few times each week. This maintains the muscle strength around your knee, helping to prevent new injuries.

# Kneecap Surgery

Surgery may be used when pain severely limits your activities. Or it may be done when a rehab program just isn't helping enough. Some procedures may be done using **arthroscopy**. This method uses tiny incisions and special instruments to look and work inside the knee joint. Other procedures require open surgery. Your doctor will tell you how to prepare for surgery. He or she will also discuss the risks and complications of surgery with you.

## Kneecap Realignment

The kneecap can be realigned to improve its tracking. To do this, soft tissues may be cut or moved.

**Releasing tissue (lateral release)** is done with either arthroscopy or open surgery. Releasing (cutting) the retinaculum reduces the pull on the kneecap so that it moves into its proper place. Releasing a plica band may also reduce pain.



**Moving a quadriceps muscle (quad transfer)** balances pull from the upper leg. This is done through open surgery. Part of the muscle is detached. Then it is reattached at a new place on the kneecap.



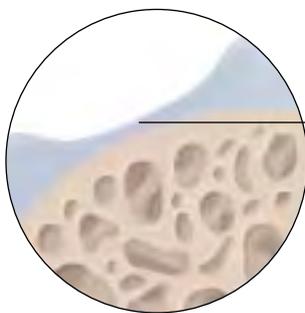
**Shifting the attachment of the patellar tendon (patellar realignment)** improves tracking. Part of the tendon and the bone underneath are moved to a new location. Then they are anchored with screws. This procedure is done using open surgery.



## Cartilage Removal

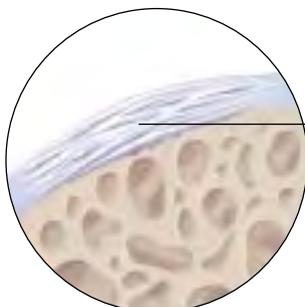
Damaged cartilage is removed from the back of the kneecap or from the groove in the thighbone. This is often done using arthroscopy.

**Debriding** removes damaged cartilage. This creates a smoother surface between the kneecap and thighbone.



Cartilage removed to create a smooth surface

**Burring** is done when the cartilage is worn down to the bone. Burring into the bone reaches the blood supply. This makes a new fibrous covering grow.



Fibrous covering fills burred area

## Recovering from Surgery

As you recover, you can aid the healing process by taking it easy at first. Your knee may be bandaged, wrapped, or iced to keep swelling down. You may be given a brace to protect your knee. This helps improve your range of motion and speed healing. Keep your leg raised above your heart so fluid can drain away and swelling is reduced. Surgery is often followed by a rehabilitation program.



You'll use crutches as you begin to heal. Your doctor or physical therapist may also give you light exercises to do.

# A Strong Knee for an Active Life

To overcome kneecap pain, you need to stick with your exercise program. Keeping up with your program after you finish rehab will help maintain your strength and flexibility. This increases your chances of remaining active for many years to come.



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