# Knee Problems, Questions and Answers

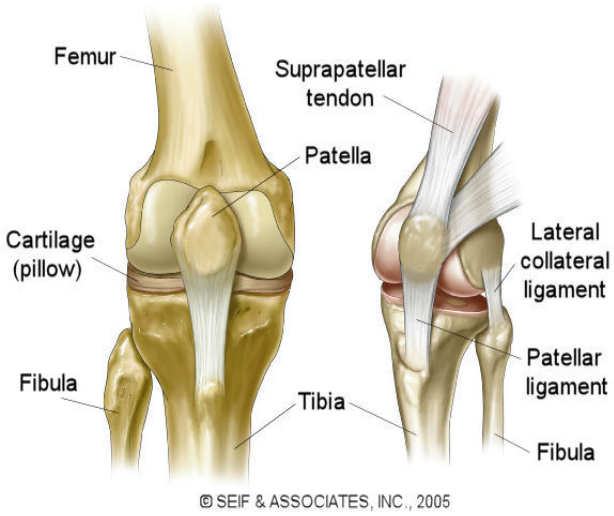
Knee problems are common in young people and adults. This document contains general information about several knee problems. It includes:

- Descriptions of the different parts of the knee.
- Diagram of the different parts of the knee.

Individual sections describe specific types of knee injuries and their:

- Symptoms.
- Diagnosis.
- Treatment.

Information on how to prevent these problems is also provided.




## WHAT DO THE KNEES DO? HOW DO THEY WORK?

The knees provide stable support for the body. Knees allow the legs to bend and straighten. Flexibility and stability are needed for standing and for motions like:

- Walking.
- Jumping.
- Running.
- Turning.
- Crouching.

Supporting and moving parts help the knees do their job, these parts include:

- Bones.
- Cartilage.
- Muscles.
- Ligaments.
- Tendons.

Any of these parts can be involved in knee pain or a knee not working right (*dysfunction*).

## WHAT CAUSES KNEE PROBLEMS?

There are two general kinds of knee problems: mechanical and inflammatory.

1. **Mechanical Knee Problems** are problems that result from:
   - Injury, such as a direct blow or sudden movements that strain the knee beyond its normal range of movement.
   - Overuse, repetitive motions that produce partial fiber failure in tendon or ligaments.
   - Osteoarthritis in the knee, result from wear and tear on its parts.
2. **Inflammatory Knee Problems** are inflammation that occurs in certain rheumatic diseases, such as:
   - Rheumatoid arthritis.
   - Systemic lupus erythematosus.

## JOINT BASICS

- The point at which two or more bones are connected is called a *joint*.
- In all joints, the bones are kept from grinding against each other by the tissue lining the ends of the bones called *cartilage*.
- Bones are joined to bones by strong, elastic bands of tissue called *ligaments*.
- *Tendons* are tough cords of tissue that connect muscle to bone.
- *Muscles* work in opposing pairs to bend and straighten joints. While muscles are not technically part of a joint, they are important because strong muscles help support and protect joints.

## WHAT ARE THE PARTS OF THE KNEE?

Like any joint, the knee is composed of bones and cartilage, ligaments, tendons, and muscles.

**BONES AND CARTILAGE**

The knee joint is the junction of four bones:

1. The thigh bone or upper leg bone (*femur*).
2. The shin bone or larger bone of the lower leg (*tibia*).
3. The small bone on the outside of the knee where ligaments attach (*fibula*).
4. The knee cap (*patella*). The patella is 2 to 3 inches wide and 3 to 4 inches long. It sits over the other bones at the front of the knee joint and slides when the leg moves. It protects the knee and gives leverage to muscles.

The ends of the bones in the knee joint are covered with *articular cartilage*, a tough, elastic material that helps absorb shock and allows the knee joint to move smoothly. Separating the bones of the knee are pads of connective tissue which are called *meniscus*. The plural is *menisci*. The menisci are divided into two crescent-shaped discs positioned between the tibia and femur on the outer and inner sides of each knee. The two menisci in each knee act as shock absorbers, cushioning the lower part of the leg from the weight of the rest of the body as well as enhancing stability.

**MUSCLES**

There are two groups of muscles at the knee.

- The *quadriceps* muscle are four muscles on the front of the thigh that work to straighten the leg from a bent position.
- The *hamstring* muscles, which bend the leg at the knee, run along the back of the thigh from the hip to just below the knee.

Keeping these muscles strong with exercises such as walking up stairs or riding a stationary bicycle helps support and protect the knee.

**TENDONS AND LIGAMENTS**

- The quadriceps tendon connects the quadriceps muscle to the patella and provides the power to extend the leg. The patella is a bone within this tendon. Four ligaments connect the femur and tibia and give the joint strength and stability:
  - The medial collateral ligament (MCL) provides stability to the inner (medial) part of the knee.
  - The lateral collateral ligament (LCL) provides stability to the outer (lateral) part of the knee.
  - The anterior cruciate ligament (ACL), in the center of the knee, limits rotation and the forward movement of the tibia.
  - The posterior cruciate ligament (PCL), also in the center of the knee, limits backward movement of the tibia.
- Other ligaments are part of the knee capsule. This is the protective, fiber-like structure that wraps around the knee joint. Inside the capsule, the joint is lined with a thin, soft tissue called *synovium*. This tissue produces the fluid (*synovial fluid*) which lubricates the joint.

## HOW ARE KNEE PROBLEMS DIAGNOSED?

Caregivers use several methods to diagnose knee problems:

- Medical history--The patient tells the caregiver details about:
  - Symptoms.
  - Injuries.
  - Medical conditions.
- Physical examination-- To help the caregiver understand how the knee is working, the patient may be asked to stand, walk or squat. The caregiver, to discover the limits of movement and the location of pain in the knee, may:
  - Bend the knee.
  - Straighten the knee.
  - Rotate (turn) turn the knee.

- Press on the knee to feel for injury.

- Diagnostic tests--The caregiver uses one or more stress tests to determine the nature of a knee problem.
  - X-ray (radiography)--An x-ray beam is passed through the knee to produce a two-dimensional picture of the bones.
  - Computerized axial tomography (CAT) scan--X-rays are passed through the knee at different angles, detected by a scanner, and analyzed by a computer. This produces a series of clear cross-sectional images ("slices") of the knee tissues on a computer screen. CAT scan images show details of bone structure, show soft tissues such as ligaments or muscles to a limited degree, can give a three-dimensional view of the knee.
  - Bone scan (radionuclide scanning)--A very small amount of radioactive material is injected into the patient's bloodstream and detected by a scanner. This test detects blood flow to the bone and cell activity within the bone and can show abnormalities. This may help the caregiver understand what is wrong.
  - Magnetic resonance imaging (MRI)--Energy from a powerful magnet (rather than x-rays) stimulates knee tissue to produce signals. These signals are detected by a scanner and analyzed by a computer. Like a CAT scan, a computer is used to produce three-dimensional views of the knee during MRI. The MRI provides precise details of ligament, tendon and cartilage structure.
  - Arthroscopy--The surgeon manipulates a small, lighted optic tube (*arthroscope*) that has been inserted into the joint through a small incision in the knee. Images of the inside of the knee joint are projected onto a television screen. While the arthroscope is inside the knee joint, removal of loose pieces of bone or cartilage, or the repair of torn ligaments and menisci can be preformed.
  - Biopsy--The caregiver removes tissue to examine under a microscope.
  - Aspiration of fluid from the knee--The laboratory will analyze the fluid for cell count, presence of crystals that produce inflammation (as in gout where Uric Acid crystals are the cause of the inflammation) and check for infection.

## WHAT IS ARTHRITIS OF THE KNEE?

- Arthritis of the knee is most often *osteoarthritis*. In this disease, the cartilage in the joint gradually wears away. It may be caused by excess stress on the joint from:
  - Trauma.
  - Deformity.
  - Repeated injury.
  - Excess weight.
- It most often affects middle-aged and older people. A young person who develops osteoarthritis may have an inherited form of the disease or may have experienced continuous irritation from an unrepaired knee injury or other injury.
- In *rheumatoid arthritis*, which can also affect the knees, the joint becomes inflamed and cartilage may be destroyed. Rheumatoid arthritis often affects people at an earlier age than osteoarthritis and often involves multiple joints.
- Arthritis can also affect supporting structures such as muscles, tendons, and ligaments.

## WHAT ARE SIGNS OF ARTHRITIS OF THE KNEE?

- Someone who has arthritis of the knee may experience:
  - Pain.
  - Swelling/ fluid on the knee.
  - A decrease in knee motion.
- A common symptom is morning stiffness. This generally improves as the person moves around.
- Sometimes the joint locks or clicks. These signs may occur in other knee disorders as well.
- The caregiver may confirm the diagnosis by:
  - Performing a physical examination.
  - Examining x-rays, which typically show a loss of joint space.
- Blood tests may be helpful for diagnosing rheumatoid arthritis, but other tests may be needed.

- Analyzing fluid from the knee joint may be helpful in diagnosing some kinds of arthritis.
- The caregiver may use arthroscopy to directly see damage to cartilage, tendons, and ligaments and to confirm a diagnosis. Arthroscopy is usually done only if a repair procedure is to be performed.

## WHAT IS TREATMENT FOR ARTHRITIS OF THE KNEE?

- Most often osteoarthritis of the knee is treated with pain-reducing medicines, such as:
  - Nonsteroidal anti-inflammatory drugs (NSAID's)
- Exercises to restore joint movement and strengthen the knee.
- Losing excess weight can also help people with osteoarthritis.
- Rheumatoid arthritis of the knee may require physical therapy and more powerful medicines. In people with severe arthritis of the knee, a seriously damaged joint may need to be replaced with an artificial one.

## WHAT IS CHONDROMALACIA?

- Chondromalacia refers to softening of the articular cartilage of the knee cap. This disorder occurs most often in young adults. Instead of gliding smoothly across the lower end of the thigh bone, the knee cap rubs against it, thereby roughening the cartilage underneath the knee cap. The damage may range from a slightly abnormal surface of the cartilage to a surface that has been worn away to the bone. It can be caused by:
  - Injury.
  - Overuse.
  - Misalignment of the patellar tendon.
  - Muscle weakness (generally the quadriceps).
- Chondromalacia related to injury occurs when a blow to the knee cap tears off either a small piece of cartilage or a large fragment containing a piece of bone.

## WHAT ARE SYMPTOMS OF CHONDROMALACIA?

- The most frequent symptom is a dull pain around or under the knee cap. This pain worsens when walking down stairs, or hills or sitting with the knee bent for long periods of time.
- A person may also feel pain when climbing stairs or when the knee bears weight as it straightens.
- The disorder is common in:
  - Runners.
  - Skiers.
  - Cyclists.
  - Soccer players.
- A patient's description of symptoms, the physical exam, and a follow-up x-ray usually help the caregiver make a diagnosis.
- Although arthroscopy can confirm the diagnosis. It is not used unless the condition requires extensive treatment.

## WHAT IS TREATMENT FOR CHONDROMALACIA?

- Many caregivers recommend that patients with chondromalacia perform low-impact exercises. The knee must not bend more than 90 degrees. This includes:
  - Swimming.
  - Riding a stationary bicycle.
  - Using a cross-country ski machine.
- Electrical stimulation may also be used to strengthen the muscles.
- If these treatments do not improve the condition, the caregiver may perform arthroscopic. Goals of this surgery include smoothing the surface of the cartilage and "washing out" the cartilage fragments that cause the joint to catch during bending and straightening.
- In more severe cases, surgery may be necessary to:
  - Correct the alignment of the knee cap.
  - Decrease the pressure on the undersurface of the patella.
  - Relieve friction with the cartilage.

- Reposition parts that are out of alignment.

## WHAT CAUSES INJURIES TO THE MENISCUS?

The meniscus is easily injured by the force of rotating the knee while bearing weight. A partial or total tear may occur when a person quickly twists or rotates the upper leg while the foot stays still. For example, when dribbling a basketball around an opponent or turning to hit a tennis ball. If the tear is tiny, the meniscus stays connected to the front and back of the knee. If the tear is large, the meniscus may be left in an abnormally mobile position which produces instability. The seriousness of a tear depends on its location and extent.

## WHAT ARE SYMPTOMS OF INJURIES TO THE MENISCUS?

- Pain, particularly when the knee is straightened.
- If the pain is mild, the patient may continue with normal activity.
- Severe pain may occur if a fragment of the meniscus catches between the femur and the tibia.
- Swelling may occur soon after injury if blood vessels are disrupted. Swelling may occur several hours later if the joint fills with fluid produced by the joint lining (*synovium*) as a result of inflammation. If the synovium is injured, it may become inflamed and produce fluid. This makes the knee swell.
- Sometimes, an injury that occurred in the past but was not treated becomes painful months or years later.
- After any injury, the knee may click, lock, feel weak, or give way without warning.
- Although symptoms of meniscal injury may disappear on their own (particularly with a stable meniscal tear), they frequently persist or return and require treatment.

## HOW IS INJURY TO THE MENISCUS DIAGNOSED?

- The caregiver will listen to the patient's description of the pain and swelling. The caregiver will perform a physical examination and take x-rays of the knee. The examination may include a test in which the caregiver bends the leg, and then rotates the leg outward and inward while extending it. Pain along the joint line or an audible click suggests a meniscal tear.
- An MRI may be done.
- Occasionally, the caregiver may use arthroscopy without obtaining the MRI to diagnose and treat a meniscal tear.

## WHAT IS TREATMENT FOR INJURY TO THE MENISCUS?

- The caregiver may recommend a muscle-strengthening program if:
  - The tear is minor.
  - The pain and symptoms are improving.
- Exercises for meniscal problems are best started with guidance from a caregiver and physical therapist or athletic trainer. The therapist will make sure that the patient does the exercises properly and without risking new or repeat injury. The following exercises after injury to the meniscus are designed to build up the quadriceps and hamstring muscles and increase flexibility and strength.
  - Warming up the joint by riding a stationary bicycle, then straightening and raising the leg (but not straightening it too much).
  - Extending the leg while sitting (a weight may be worn on the ankle for this exercise).
  - Raising the leg while lying on the stomach.
  - Exercising in a pool (walking as fast as possible in chest-deep water, performing small flutter kicks while holding onto the side of the pool, and raising each leg to 90° in chest-deep water while pressing the back against the side of the pool).
- If the tear is more extensive, the caregiver may perform arthroscopic with or without open surgery to see the extent of injury and to repair the tear. The caregiver can sew the meniscus back in place if the patient is relatively young, if the injury is in an area with a good blood supply, and if the ligaments are intact. Most young athletes are able to return to active sports after meniscus repair.
- If the patient is elderly or the tear is in an area with a poor blood supply, the caregiver may trim a small portion of the meniscus to even the surface. In rare cases, the caregiver removes the entire meniscus. Osteoarthritis is more likely to develop in the knee if the entire meniscus is removed.

- Recovery after surgical repair takes several weeks to months. Activity after surgery is slightly more restricted than when the meniscus is partially removed. However, putting weight on the joint actually helps recovery. Regardless of the form of surgery, rehabilitation usually includes:
  - Walking.
  - Bending the legs.
  - Doing exercises that stretch and build up leg muscles.

- The best results of treatment for meniscal injury are obtained in people who:
  - Do not have articular cartilage changes.
  - Have an intact ACL.

**LIGAMENT INJURIES**

*WHAT ARE THE CAUSES OF ANTERIOR AND POSTERIOR CRUCIATE LIGAMENT INJURIES?*

- Injury to the cruciate ligaments is sometimes referred to as a "sprain".
- The ACL is most often stretched or torn (or both) by a sudden twisting or pushing the ACL beyond its normal range. For example, when the feet are planted one way and the knee rotates in the opposite direction.
- The PCL is most often injured by a direct impact, such as in an automobile accident or football tackle.

*WHAT ARE SYMPTOMS?*

- Injury to a cruciate ligament may not cause pain. Symptoms may include:
  - A popping sound
  - Buckling when trying to stand on the leg.
- The caregiver will perform several physical exam tests. These tests are to see whether the parts of the knee stay in proper position when pressure is applied in different directions.
- A thorough examination is essential. An MRI is very accurate in detecting a complete tear. Arthroscopy may be the only reliable means of detecting a partial one.

*TREATMENT*

- For an incomplete tear, the caregiver may recommend that the patient begin an exercise program to strengthen surrounding muscles.
- The caregiver may also prescribe a brace to protect the knee during activity.
- For a completely torn ACL in an active athlete and motivated person, the caregiver is likely to recommend surgery. The surgeon may reconstruct the torn ligament by using:
  - A piece (*graft*) of healthy ligament from the patient (*autograft*)
  - A piece of ligament from a tissue bank (*allograft*). One of the most important elements in a patient's successful recovery after cruciate ligament surgery is a 4- to 6-month exercise program. This program may involve using special exercise equipment at a rehabilitation or sports center. Successful surgery special exercises will allow the patient to return to a normal, active lifestyle.

**MEDIAL AND LATERAL COLLATERAL LIGAMENT INJURIES**

*WHAT IS THE MOST COMMON CAUSE OF MEDIAL AND LATERAL COLLATERAL LIGAMENT INJURIES?*

The MCL is more commonly injured than the LCL. The cause is most often a blow to the outer side of the knee. This injury stretches and tears the ligament on the inner side of the knee. Such blows frequently occur in contact sports like football or hockey.

*SYMPTOMS AND DIAGNOSIS*

- When injury to the MCL occurs, a person may feel a pop and the knee may buckle sideways.
- Pain and swelling are common.
- A thorough exam is needed to determine the kind and extent of the injury.
- To diagnose a collateral ligament injury, the caregiver exerts pressure on the side of the knee to determine the degree of pain and the looseness of the joint.

- An MRI is helpful in diagnosing injuries to these ligaments.

*TREATMENT*

- Most sprains of the collateral ligaments will heal if the patient follows a prescribed exercise program.
- In addition to exercise, the caregiver may recommend ice packs to reduce pain and swelling and a small sleeve-type brace to protect and stabilize the knee.
- A sprain may take 4 to 6 weeks to heal.
- A patient with a severely sprained or torn collateral ligament may also have a torn ACL. This usually requires surgical repair.

**TENDON INJURIES AND DISORDERS**

*WHAT CAUSES TENDINITIS AND RUPTURED TENDONS?*

- Knee tendon injuries range from tendinitis to a torn (*ruptured*) tendon.
- If a person overuses a tendon during certain activities such as dancing, cycling, or running, the tendon stretches like a worn-out rubber band and becomes inflamed.
- Also, trying to break a fall may cause the quadriceps muscles to contract and tear the quadriceps tendon above the patella or the patellar tendon below the patella. This type of injury is most likely to happen in older people.
- Tendinitis of the patellar tendon is sometimes called jumper's knee because in sports that require jumping, such as basketball or volleyball, the muscle contraction and force of hitting the ground after a jump strain the tendon.
- After repeated stress, the tendon may become inflamed or tear.

*SYMPTOMS AND DIAGNOSIS*

- People with tendinitis often have tenderness at the point where the patellar tendon meets the bone. In addition, they may feel pain during running, fast walking, or jumping.
- A complete rupture of the quadriceps or patellar tendon is painful. It also makes it difficult for a person to bend, extend, or lift the leg against gravity.
- If there is not much swelling, the caregiver may be able to feel a defect in the tendon near the tear during a physical examination.
- An x-ray will show that the patella is lower than normal in a quadriceps tendon tear and higher than normal in a patellar tendon tear. The caregiver may use an MRI to confirm a partial or total tear.

*TREATMENT*

- Initially, the caregiver may ask a patient with tendinitis to rest, elevate, and apply ice to the knee and to take medicines to relieve pain and decrease inflammation and swelling.
- If the quadriceps or patellar tendon is completely ruptured, a surgeon will reattach the ends. After surgery, the patient will wear a cast or brace for 3 to 6 weeks and use crutches.
- For a partial tear, the caregiver might apply a cast or an extension knee brace without performing surgery.
- Rehabilitating a partial or complete tear of a tendon requires an exercise program that is similar to but less forceful than that used for ligament injuries. The goals of exercise are to restore the ability to bend and straighten the knee and to strengthen the leg to prevent repeat injury. A rehabilitation program may last 4 to 6 months. A patient can return to many activities before then.

**OSGOOD-SCHLATTER DISEASE**

*WHAT CAUSES OSGOOD-SCHLATTER DISEASE?*

- Osgood-Schlatter disease is caused by repetitive stress or tension on part of the growth area of the upper tibia (the *apophysis*). Symptoms included inflammation of the patellar tendon and surrounding soft tissues at the point where the tendon attaches to the tibia.
- The disease may also be associated with an injury in which the tendon is stretched so much that it tears away from the tibia and takes a fragment of bone with it.
- The disease generally affects active young people. Particularly boys between the ages of 10 and 15, who

play games or sports that include frequent running and jumping and who have open growth plates.

*SYMPTOMS AND DIAGNOSIS*

- People with this disease experience pain just below the knee joint. This pain usually worsens with activity and is relieved by rest.
- The bony bump that is particularly painful when pressed may increase in size at the upper edge of the tibia (below the knee cap).
- Usually motion of the knee is not affected.
- Pain may last a few months and may come back with periods of high activity until the child's growth is completed.
- Osgood-Schlatter disease is most often diagnosed by the symptoms and the physical exam. An x-ray may be normal, or show an injury. An x-ray, more typically, will show that the growth area is fragmented.

*TREATMENT*

- Usually, the disease goes away without aggressive treatment.
- Applying ice to the knee when pain begins helps relieve inflammation. Applying ice is sometimes used along with stretching and strengthening exercises.
- The caregiver may advise the patient to limit participation in vigorous sports. Children who wish to continue less stressful sports activities may need to wear knee pads for protection and apply ice to the knee after activity. If there is a great deal of pain, sports activities may be limited until discomfort becomes tolerable.

**ILIOTIBIAL BAND SYNDROME**

*WHAT CAUSES ILIOTIBIAL BAND SYNDROME?*

This is an overuse condition in which inflammation results when a band of a tendon rubs over the outer bone of the knee. Although iliotibial band syndrome may be caused by direct injury to the knee, it is most often caused by the stress of long-term overuse.

*SYMPTOMS AND DIAGNOSIS*

- A person with this syndrome feels an ache or burning sensation at the outside of the knee during activity. Pain may be localized at the outside of the knee or radiate up the side of the thigh.
- A person may also feel a snap when the knee is bent and then straightened.
- Swelling may be absent and knee motion is normal.
- The diagnosis of this disorder is typically based on the symptoms. Symptoms include pain at the outer side of the knee. Other problems with similar symptoms must also be excluded.

*TREATMENT*

- Usually, the problem disappears if the person reduces activity and performs stretching exercises followed by muscle-strengthening exercises.
- In rare cases when the syndrome does not disappear, surgery may be necessary to split the tendon so it is not stretched too tightly over the bone.

**OTHER KNEE INJURIES**

*WHAT IS **OSTEOCHONDRITIS DISSECANS**?*

- Osteochondritis dissecans results from a loss of the blood supply to an area of bone at the joint surface and usually involves the knee. The affected bone and its covering of cartilage gradually loosen and cause pain.
- This problem usually arises in an active adolescent or young adult. It may be due to a slight blockage of a small artery or to an unrecognized injury or tiny fracture that damages the overlying cartilage.
- Lack of a blood supply can cause bone to break down (*avascular necrosis*).
- The involvement of several joints or the appearance of the condition in several family members may indicate that the disorder is inherited.
- A person with this condition may eventually develop osteoarthritis.

*SYMPTOMS AND DIAGNOSIS*

- If normal healing does not occur, cartilage separates from the diseased bone and a fragment breaks loose into the knee joint. This causes weakness, sharp pain, and locking of the joint.
- An x-ray, MRI, or arthroscopy can determine the condition of the cartilage and can be used to diagnose osteochondritis dissecans.

*TREATMENT*

- If cartilage fragments have not broken loose, a surgeon may fix the cartilage and underlying bone in place with pins or screws. These pins or screws are sunk into the cartilage to stimulate a new blood supply.
- If fragments are loose, the surgeon may scrape down the cavity to reach fresh bone and add a bone graft and fix the fragments in position. Fragments that cannot be mended are removed, and the cavity is drilled or scraped to stimulate new cartilage growth.
- Research is being done to assess the use of cartilage cell implants and other tissue transplants to treat this disorder.

*WHAT IS **PLICA SYNDROME**?*

- Plica syndrome occurs when *plicae* (bands of synovial tissue) are irritated by overuse or injury.
- Synovial plicae are the remains of tissue pouches found in the early stages of fetal development. As the fetus develops, these pouches normally combine to form one large synovial cavity. If this process is incomplete, plicae remain as folds or bands of synovial tissue within the knee.
- Injury, chronic overuse, or inflammatory conditions are associated with this syndrome.

*SYMPTOMS AND DIAGNOSIS*

- People with this syndrome are likely to experience pain and swelling, a clicking sensation, and locking and weakness of the knee.
- Because the symptoms are similar to those of some other knee problems, plica syndrome is often misdiagnosed. Diagnosis usually depends on excluding other conditions that cause similar symptoms.

*TREATMENT*

- The goal of treatment is to reduce inflammation of the synovium and thickening of the plicae.
  - The caregiver usually prescribes medicine to reduce inflammation.
  - The patient is also advised to reduce activity, apply ice and an elastic bandage to the knee, and do strengthening exercises.
  - A cortisone injection into the plica folds helps about half of those treated.
- If treatment fails to relieve symptoms within 3 months, the caregiver may recommend arthroscopic or open surgery to remove the plicae.

## WHAT KINDS OF CAREGIVERS TREAT KNEE PROBLEMS?

- Extensive injuries and diseases of the knees are usually treated by an orthopedic surgeon, a doctor who has been trained in the nonsurgical and surgical treatment of bones, joints, and soft tissues such as ligaments, tendons, and muscles.
- Patients seeking nonsurgical treatment of arthritis of the knee may also consult a rheumatologist. This is a caregiver specializing in the diagnosis and treatment of arthritis and related disorders.

## HOW CAN PEOPLE PREVENT KNEE PROBLEMS?

Some knee problems cannot be foreseen or prevented. However, a person can prevent many knee problems by following these suggestions:

- Before exercising or playing sports, warm up by walking or riding a stationary bicycle, and then do stretches. Stretching the muscles in the front of the thigh (*quadriceps*) and back of the thigh (*hamstrings*) reduces tension on the tendons. Stretching also relieves pressure on the knee during activity.
- Strengthen the leg muscles by doing specific exercises (for example, by walking up stairs or hills, or by riding a stationary bicycle). A supervised workout with weights is another way to strengthen the leg muscles

that support the knee.

- Avoid sudden changes in the intensity of exercise. Increase the force or duration of activity gradually.
- Wear shoes that both fit properly and are in good condition. Good shoes will help maintain balance and leg alignment when walking or running. Knee problems can be caused by flat feet or feet that roll inward. People can often reduce some of these problems by wearing special shoe inserts (*orthotics*).
- Maintain a healthy weight to reduce stress on the knee. Obesity increases the risk of degenerative (wearing) conditions such as osteoarthritis of the knee.

## WHAT TYPES OF EXERCISE ARE MOST SUITABLE FOR SOMEONE WITH KNEE PROBLEMS?

Three types of exercise are best for people with arthritis:

- Range-of-motion exercises help maintain normal joint movement and relieve stiffness. This type of exercise helps maintain or increase flexibility.
- Strengthening exercises help maintain or increase muscle strength. Strong muscles help support and protect joints affected by arthritis.
- Aerobic or endurance exercises improve function of the heart and circulation and help control weight. Weight control can be important to people who have arthritis because extra weight puts pressure on many joints. Some studies show that aerobic exercise can reduce inflammation in some joints.

## WHERE CAN PEOPLE FIND MORE INFORMATION ABOUT KNEE PROBLEMS?

National Institute of Arthritis and Musculoskeletal and Skin
Diseases Information Clearinghouse, National Institutes of Health
1 AMS Circle
Bethesda, MD 20892-3675
Phone: 301-495-4484 or
877-22-NIAMS (226-4267) (free of charge)
TTY: 301-565-2966
Fax: 301-718-6366
www.niams.nih.gov/
The clearinghouse provides information about various forms of arthritis and rheumatic disease and bone, muscle, and skin diseases. It distributes patient and professional education materials and refers people to other sources of information. Additional information and updates can also be found on the NIAMS Web site.

American Academy of Orthopedic Surgeons
P.O. Box 2058
Des Plaines, IL 60017
Phone: 800-824-BONE (2663) (free of charge)
www.aaos.org
The academy provides education and practice management services for orthopedic surgeons and allied health professionals. It also serves as an advocate for improved patient care and informs the public about the science of orthopedics. The orthopedist's scope of practice includes disorders of the body's bones, joints, ligaments, muscles, and tendons. For a single copy of an AAOS brochure, send a self-addressed stamped envelope to the address above or visit the AAOS Web site.

American College of Rheumatology
1800 Century Place, Suite 250
Atlanta, GA 30329
Phone: 404-633-3777
Fax: 404-633-1870
www.rheumatology.org
This national professional organization can provide referrals to rheumatologists and allied health professionals, such as physical therapists. One-page fact sheets are available on various forms of arthritis. Lists of specialists by geographic area and fact sheets are also available on this Web site.

American Physical Therapy Association
1111 N. Fairfax Street
Alexandria, VA 22314
Phone: 800-999-APTA (2782) (free of charge)
www.apta.org
The association publishes a free brochure titled "Taking Care of the Knees".

Arthritis Foundation
1330 West Peachtree Street
Atlanta, GA 30309
Phone: 404-872-7100 or 800-283-7800 (free of charge)
or call your local chapter (listed in the local telephone directory)
www.arthritis.org
The foundation has several free brochures about coping with arthritis, taking nonsteroid and steroid medicines, and exercise. A free brochure on protecting your joints is titled “Using Your Joints Wisely”. The foundation also can provide addresses and phone numbers for local chapters and physician and clinic referrals.

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