

# Total Knee Replacement

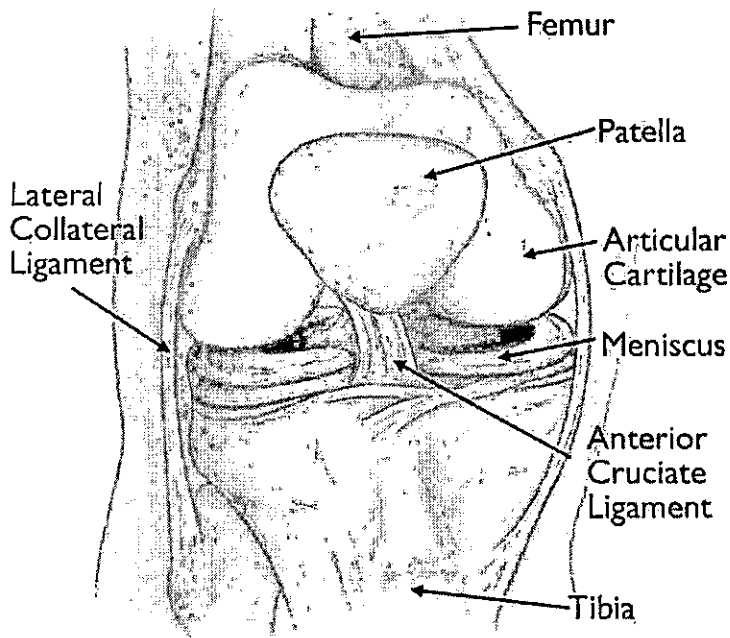
If your knee is severely damaged by arthritis or injury, it may be hard for you to perform simple activities, such as walking or climbing stairs. You may even begin to feel pain while you are sitting or lying down.

If nonsurgical treatments like medications and using walking supports are no longer helpful, you may want to consider total knee replacement surgery. Joint replacement surgery is a safe and effective procedure to relieve pain, correct leg deformity, and help you resume normal activities.

Knee replacement surgery was first performed in 1968. Since then, improvements in surgical materials and techniques have greatly increased its effectiveness. Total knee replacements are one of the most successful procedures in all of medicine. According to the Agency for Healthcare Research and Quality, more than 600,000 knee replacements are performed each year in the United States.

Whether you have just begun exploring treatment options or have already decided to have total knee replacement surgery, this article will help you understand more about this valuable procedure.

## Anatomy



Normal knee anatomy. In a healthy knee, these structures work together to ensure smooth, natural function and movement.

The knee is the largest joint in the body and having healthy knees is required to perform most everyday activities.

The knee is made up of the lower end of the thighbone (femur), the upper end of the shinbone (tibia), and the kneecap (patella). The ends of these three bones where they touch are covered with articular cartilage, a smooth substance that protects the bones and enables them to move easily.

The menisci are located between the femur and tibia. These C-shaped wedges act as "shock absorbers" that cushion the joint.

Large ligaments hold the femur and tibia together and provide stability. The long thigh muscles give the knee strength.

All remaining surfaces of the knee are covered by a thin lining called the synovial membrane. This membrane releases a fluid that lubricates the cartilage, reducing friction to nearly zero in a healthy knee.

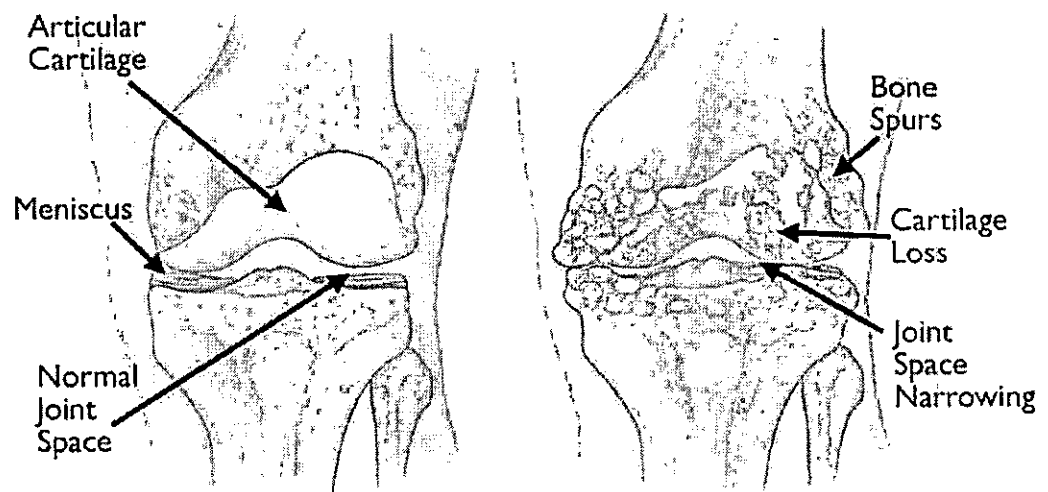
Normally, all of these components work in harmony. But disease or injury can disrupt this harmony, resulting in pain, muscle weakness, and reduced function.

## Cause

The most common cause of chronic knee pain and disability is arthritis. Although there are many types of arthritis, most knee pain is caused by just three types: osteoarthritis, rheumatoid arthritis, and post-traumatic arthritis.

- **Osteoarthritis.** This is an age-related "wear and tear" type of arthritis. It usually occurs in people 50 years of age and older, but may occur in younger people, too. The cartilage that cushions the bones of the knee softens and wears away. The bones then rub against one another, causing knee pain and stiffness.
- **Rheumatoid arthritis.** This is a disease in which the synovial membrane that surrounds the joint becomes inflamed and thickened. This chronic inflammation can damage the cartilage and eventually cause cartilage loss, pain, and stiffness. Rheumatoid arthritis is the most common form of a group of disorders termed "inflammatory arthritis."
- **Post-traumatic arthritis.** This can follow a serious knee injury. Fractures of the bones surrounding the knee or tears of the knee ligaments may damage the articular cartilage over time, causing knee pain and limiting knee function.

Osteoarthritis often results in bone rubbing on bone. Bone spurs are a common feature of this form of arthritis.



## Description

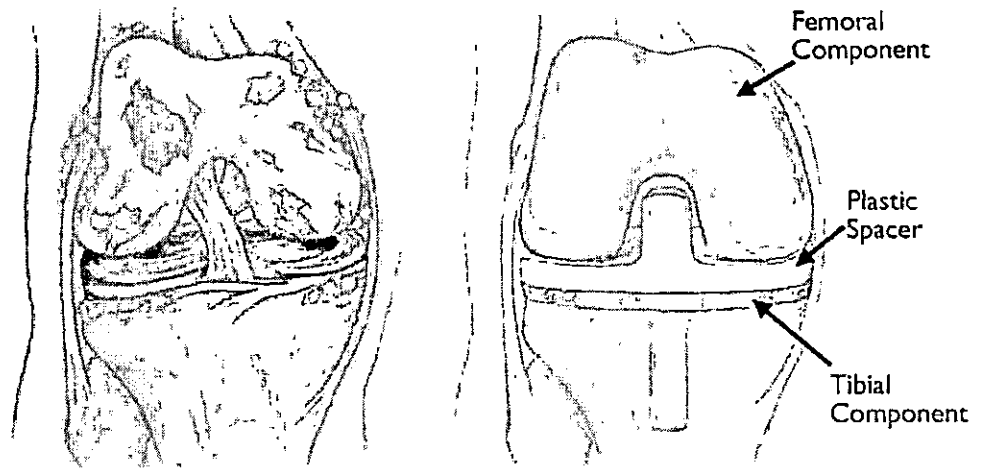
A knee replacement (also called knee arthroplasty) might be more accurately termed a knee "resurfacing" because only the surface of the bones are actually replaced.

There are four basic steps to a knee replacement procedure.

- **Prepare the bone.** The damaged cartilage surfaces at the ends of the femur and tibia are removed along with a small amount of underlying bone.

- **Position the metal implants.** The removed cartilage and bone is replaced with metal components that recreate the surface of the joint. These metal parts may be cemented or "press-fit" into the bone.
- **Resurface the patella.** The undersurface of the patella (kneecap) is cut and resurfaced with a plastic button. Some surgeons do not resurface the patella, depending upon the case.
- **Insert a spacer.** A medical-grade plastic spacer is inserted between the metal components to create a smooth gliding surface.

(Left) Severe osteoarthritis. (Right) The arthritic cartilage and underlying bone has been removed and resurfaced with metal implants on the femur and tibia. A plastic spacer has been placed in between the implants. The patellar component is not shown for clarity.



## Is Total Knee Replacement for You?

The decision to have total knee replacement surgery should be a cooperative one between you, your family, your family physician, and your orthopaedic surgeon. Your physician may refer you to an orthopaedic surgeon for a thorough evaluation to determine if you might benefit from this surgery.

### ***When Surgery Is Recommended***

There are several reasons why your doctor may recommend knee replacement surgery. People who benefit from total knee replacement often have:

- Severe knee pain or stiffness that limits your everyday activities, including walking, climbing stairs, and getting in and out of chairs. You may find it hard to walk more than a few blocks without significant pain and you may need to use a cane or walker
- Moderate or severe knee pain while resting, either day or night
- Chronic knee inflammation and swelling that does not improve with rest or medications
- Knee deformity – a bowing in or out of your knee

- Failure to substantially improve with other treatments such as anti-inflammatory medications, cortisone injections, lubricating injections, physical therapy, or other surgeries

## ***Candidates for Surgery***

There are no absolute age or weight restrictions for total knee replacement surgery.

Recommendations for surgery are based on a patient's pain and disability, not age. Most patients who undergo total knee replacement are age 50 to 80, but orthopaedic surgeons evaluate patients individually. Total knee replacements have been performed successfully at all ages, from the young teenager with juvenile arthritis to the elderly patient with degenerative arthritis.

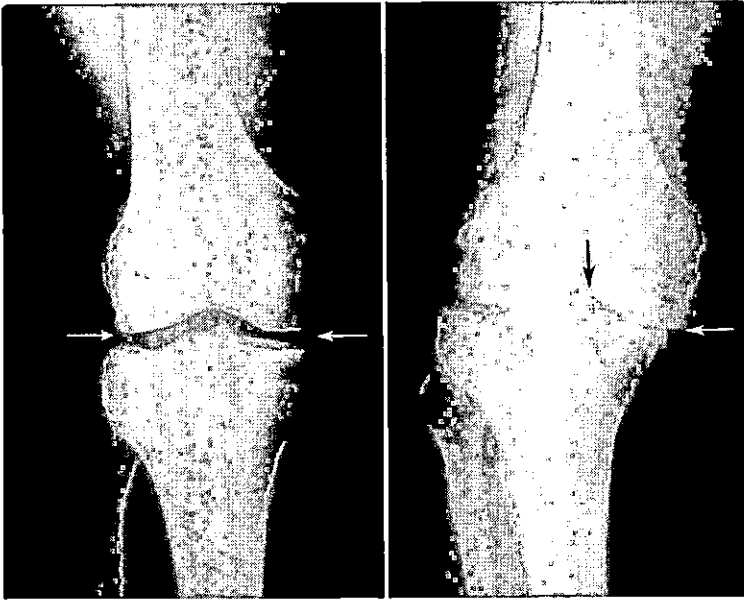


Bowed knee deformity.

## **Orthopaedic Evaluation**

An evaluation with an orthopaedic surgeon consists of several components:

- **A medical history.** Your orthopaedic surgeon will gather information about your general health and ask you about the extent of your knee pain and your ability to function.
- **A physical examination.** This will assess knee motion, stability, strength, and overall leg alignment.
- **X-rays.** These images help to determine the extent of damage and deformity in your knee.
- **Other tests.** Occasionally blood tests, or advanced imaging such as a magnetic resonance imaging (MRI) scan, may be needed to determine the condition of the bone and soft tissues of your knee.



(Left) In this x-ray of a normal knee, the space between the bones indicates healthy cartilage (arrows). (Right) This x-ray of a knee that has become bowed from arthritis shows severe loss of joint space (arrows).

Your orthopaedic surgeon will review the results of your evaluation with you and discuss whether total knee replacement is the best method to relieve your pain and improve your function. Other treatment options – including medications, injections, physical therapy, or other types of surgery – will also be considered and discussed.

In addition, your orthopaedic surgeon will explain the potential risks and complications of total knee replacement, including those related to the surgery itself and those that can occur over time after your surgery.

## **Deciding to Have Knee Replacement Surgery**

### ***Realistic Expectations***

An important factor in deciding whether to have total knee replacement surgery is understanding what the procedure can and cannot do.

More than 90% of people who have total knee replacement surgery experience a dramatic reduction of knee pain and a significant improvement in the ability to perform common activities of daily living. But total knee replacement will not allow you to do more than you could before you developed arthritis.

With normal use and activity, every knee replacement implant begins to wear in its plastic spacer. Excessive activity or weight may speed up this normal wear and may cause the knee replacement to loosen and become painful. Therefore, most surgeons advise against high-impact activities such as running, jogging, jumping, or other high-impact sports for the rest of your life after surgery.

Realistic activities following total knee replacement include unlimited walking, swimming, golf, driving, light hiking, biking, ballroom dancing, and other low-impact sports.

With appropriate activity modification, knee replacements can last for many years.

## ***Possible Complications of Surgery***

The complication rate following total knee replacement is low. Serious complications, such as a knee joint infection, occur in fewer than 2% of patients. Major medical complications such as heart attack or stroke occur even less frequently. Chronic illnesses may increase the potential for complications. Although uncommon, when these complications occur, they can prolong or limit full recovery.

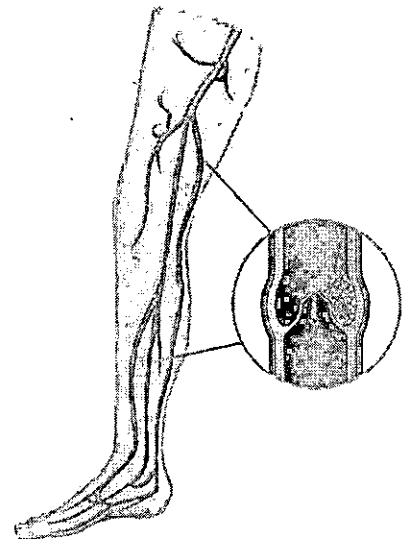
Discuss your concerns thoroughly with your orthopaedic surgeon prior to surgery.

**Infection.** Infection may occur in the wound or deep around the prosthesis. It may happen while in the hospital or after you go home. It may even occur years later. Minor infections in the wound area are generally treated with antibiotics. Major or deep infections may require more surgery and removal of the prosthesis. Any infection in your body can spread to your joint replacement.

**Blood clots.** Blood clots in the leg veins are one of the most common complications of knee replacement surgery. These clots can be life-threatening if they break free and travel to your lungs. Your orthopaedic surgeon will outline a prevention program, which may include periodic elevation of your legs, lower leg exercises to increase circulation, support stockings, and medication to thin your blood.

Blood clots may form in one of the deep veins of the body.

While blood clots can occur in any deep vein, they most commonly form in the veins of the pelvis, calf, or thigh.



**Implant problems.** Although implant designs and materials, as well as surgical techniques, continue to advance, implant surfaces may wear down and the components may loosen. Additionally, although an average of 115° of motion is generally anticipated after surgery, scarring of the knee can occasionally occur, and motion may be more limited, particularly in patients with limited motion before surgery.

**Continued pain.** A small number of patients continue to have pain after a knee replacement. This complication is rare, however, and the vast majority of patients experience excellent pain relief following knee replacement.

**Neurovascular injury.** While rare, injury to the nerves or blood vessels around the knee can occur during surgery.

## **Preparing for Surgery**

### ***Medical Evaluation***

If you decide to have total knee replacement surgery, your orthopaedic surgeon may ask you to schedule a complete physical examination with your family physician several weeks before the operation. This is needed to make sure you are healthy enough to have the surgery and complete the recovery process. Many patients with chronic medical conditions, like heart disease, may also be evaluated by a specialist, such as a cardiologist, before the surgery.

### ***Tests***

Several tests, such as blood and urine samples, and an electrocardiogram, may be needed to help your orthopaedic surgeon plan your surgery.

### ***Medications***

Tell your orthopaedic surgeon about the medications you are taking. He or she will tell you which medications you should stop taking and which you should continue to take before surgery.

### ***Dental Evaluation***

Although the incidence of infection after knee replacement is very low, an infection can occur if bacteria enter your bloodstream. To reduce the risk of infection, major dental procedures (such as tooth extractions and periodontal work) should be completed before your total knee replacement surgery.

### ***Urinary Evaluations***

People with a history of recent or frequent urinary infections should have a urological evaluation before surgery. Older men with prostate disease should consider completing required treatment before undertaking knee replacement surgery.



## ***Social Planning***

Although you will be able to walk on crutches or a walker soon after surgery, you will need help for several weeks with such tasks as cooking, shopping, bathing, and doing laundry.

If you live alone, your orthopaedic surgeon's office, a social worker, or a discharge planner at the hospital can help you make advance arrangements to have someone assist you at home. They also can help you arrange for a short stay in an extended care facility during your recovery, if this option works best for you.

## ***Home Planning***

Several modifications can make your home easier to navigate during your recovery. The following items may help with daily activities:

- Safety bars or a secure handrail in your shower or bath
- Secure handrails along your stairways
- A stable chair for your early recovery with a firm seat cushion (and a height of 18 to 20 inches), a firm back, two arms, and a footstool for intermittent leg elevation
- A toilet seat riser with arms, if you have a low toilet
- A stable shower bench or chair for bathing
- Removing all loose carpets and cords
- A temporary living space on the same floor because walking up or down stairs will be more difficult during your early recovery

## **Your Surgery**

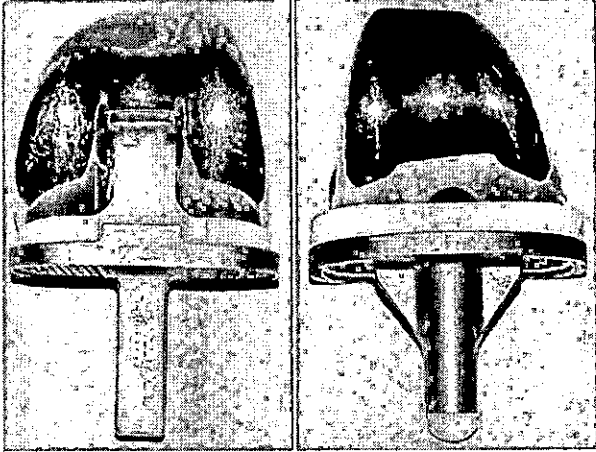
You will most likely be admitted to the hospital on the day of your surgery.

## ***Anesthesia***

After admission, you will be evaluated by a member of the anesthesia team. The most common types of anesthesia are general anesthesia (you are put to sleep) or spinal, epidural, or regional nerve block anesthesia (you are awake but your body is numb from the waist down). The anesthesia team, with your input, will determine which type of anesthesia will be best for you.

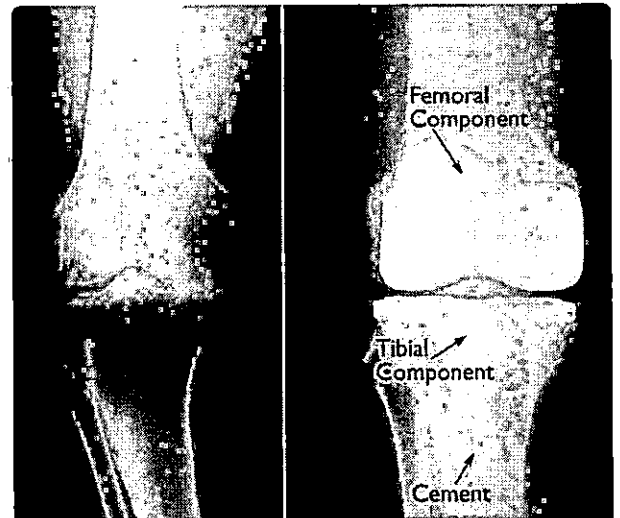
## ***Procedure***

The procedure itself takes approximately 1 to 2 hours. Your orthopaedic surgeon will remove the damaged cartilage and bone, and then position the new metal and plastic implants to restore the alignment and function of your knee.



Different types of knee implants are used to meet each patient's individual needs.

(Left) An x-ray of a severely arthritic knee. (Right) The x-ray appearance of a total knee replacement. Note that the plastic spacer inserted between the components does not show up in an x-ray.



After surgery, you will be moved to the recovery room, where you will remain for several hours while your recovery from anesthesia is monitored. After you wake up, you will be taken to your hospital room.

## **Your Hospital Stay**

You will most likely stay in the hospital for several days.

## ***Pain Management***

After surgery, you will feel some pain. This is a natural part of the healing process. Your doctor and nurses will work to reduce your pain, which can help you recover from surgery faster.

Medications are often prescribed for short-term pain relief after surgery. Many types of medicines are available to help manage pain, including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), and local anesthetics. Your doctor may use a combination of these medications to improve pain relief, as well as minimize the need for opioids.

Be aware that although opioids help relieve pain after surgery, they are a narcotic and can be addictive. Opioid dependency and overdose has become a critical public health issue in the U.S. It is important to use opioids only as directed by your doctor. As soon as your pain begins to improve, stop taking opioids. Talk to your doctor if your pain has not begun to improve within a few days of your surgery.

## ***Blood Clot Prevention***

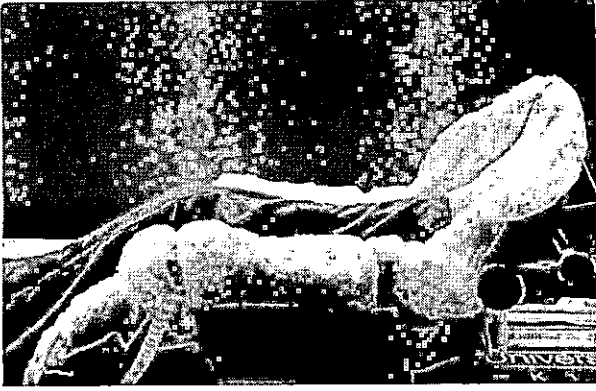
Your orthopaedic surgeon may prescribe one or more measures to prevent blood clots and decrease leg swelling. These may include special support hose, inflatable leg coverings (compression boots), and blood thinners.

Foot and ankle movement also is encouraged immediately following surgery to increase blood flow in your leg muscles to help prevent leg swelling and blood clots.

## ***Physical Therapy***

Most patients begin exercising their knee the day after surgery. In some cases, patients begin moving their knee on the actual day of surgery. A physical therapist will teach you specific exercises to strengthen your leg and restore knee movement to allow walking and other normal daily activities soon after your surgery.

To restore movement in your knee and leg, your surgeon may use a knee support that slowly moves your knee while you are in bed. The device is called a continuous passive motion (CPM) exercise machine. Some surgeons believe that a CPM machine decreases leg swelling by elevating your leg and improves your blood circulation by moving the muscles of your leg.



A continuous passive motion (CPM) machine.

## ***Preventing Pneumonia***

It is common for patients to have shallow breathing in the early postoperative period. This is usually due to the effects of anesthesia, pain medications, and increased time spent in bed. This shallow breathing can lead to a partial collapse of the lungs (termed "atelectasis") which can make patients susceptible to pneumonia. To help prevent this, it is important to take frequent deep breaths. Your nurse may provide a simple breathing apparatus called a spirometer to encourage you to take deep breaths.

## **Your Recovery at Home**

The success of your surgery will depend largely on how well you follow your orthopaedic surgeon's instructions at home during the first few weeks after surgery.

### ***Wound Care***

You will have stitches or staples running along your wound or a suture beneath your skin on the front of your knee. The stitches or staples will be removed several weeks after surgery. A suture beneath your skin will not require removal.

Avoid soaking the wound in water until it has thoroughly sealed and dried. You may continue to bandage the wound to prevent irritation from clothing or support stockings.

### ***Diet***

Some loss of appetite is common for several weeks after surgery. A balanced diet, often with an iron supplement, is important to help your wound heal and to restore muscle strength.

## ***Activity***

Exercise is a critical component of home care, particularly during the first few weeks after surgery. You should be able to resume most normal activities of daily living within 3 to 6 weeks following surgery. Some pain with activity and at night is common for several weeks after surgery.

Your activity program should include:

- A graduated walking program to slowly increase your mobility, initially in your home and later outside
- Resuming other normal household activities, such as sitting, standing, and climbing stairs
- Specific exercises several times a day to restore movement and strengthen your knee. You probably will be able to perform the exercises without help, but you may have a physical therapist help you at home or in a therapy center the first few weeks after surgery.



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You will most likely be able to resume driving when your knee bends enough that you can enter and sit comfortably in your car, and when your muscle control provides adequate reaction time for braking and acceleration. Most people resume driving approximately 4 to 6 weeks after surgery.

## **Avoiding Problems After Surgery**

### ***Blood Clot Prevention***

Follow your orthopaedic surgeon's instructions carefully to reduce the risk of blood clots developing during the first several weeks of your recovery. He or she may recommend that you continue taking the blood thinning medication you started in the hospital. Notify your doctor immediately if you develop any of the following warning signs.

**Warning signs of blood clots.** The warning signs of possible blood clots in your leg include:

- Increasing pain in your calf
- Tenderness or redness above or below your knee
- New or increasing swelling in your calf, ankle, and foot

**Warning signs of pulmonary embolism.** The warning signs that a blood clot has traveled to your lung include:

- Sudden shortness of breath
- Sudden onset of chest pain
- Localized chest pain with coughing

## ***Preventing Infection***

A common cause of infection following total knee replacement surgery is from bacteria that enter the bloodstream during dental procedures, urinary tract infections, or skin infections. These bacteria can lodge around your knee replacement and cause an infection.

After knee replacement, patients with certain risk factors may need to take antibiotics prior to dental work, including dental cleanings, or before any surgical procedure that could allow bacteria to enter the bloodstream. Your orthopaedic surgeon will discuss with you whether taking preventive antibiotics before dental procedures is needed in your situation.

**Warning signs of infection.** Notify your doctor immediately if you develop any of the following signs of a possible knee replacement infection:

- Persistent fever (higher than 100°F orally)
- Shaking chills
- Increasing redness, tenderness, or swelling of the knee wound
- Drainage from the knee wound
- Increasing knee pain with both activity and rest

## ***Avoiding Falls***

A fall during the first few weeks after surgery can damage your new knee and may result in a need for further surgery. Stairs are a particular hazard until your knee is strong and mobile. You should use a cane, crutches, a walker, hand rails, or have someone to help you until you have improved your balance, flexibility, and strength.

Your surgeon and physical therapist will help you decide what assistive aides will be required following surgery and when those aides can safely be discontinued.

## **Outcomes**

## ***How Your New Knee Is Different***

Improvement of knee motion is a goal of total knee replacement, but restoration of full motion is uncommon. The motion of your knee replacement after surgery can be predicted by the range of motion you have in your knee before surgery. Most patients can expect to be able to almost fully straighten the replaced knee and to bend the knee sufficiently to climb stairs and get in and out of a car. Kneeling is sometimes uncomfortable, but it is not harmful.

Most people feel some numbness in the skin around your incision. You also may feel some stiffness, particularly with excessive bending activities.

Most people also feel or hear some clicking of the metal and plastic with knee bending or walking. This is normal. These differences often diminish with time and most patients find them to be tolerable when compared with the pain and limited function they experienced prior to surgery.

Your new knee may activate metal detectors required for security in airports and some buildings. Tell the security agent about your knee replacement if the alarm is activated.

## ***Protecting Your Knee Replacement***

After surgery, make sure you also do the following:

- Participate in regular light exercise programs to maintain proper strength and mobility of your new knee.
- Take special precautions to avoid falls and injuries. If you break a bone in your leg, you may require more surgery.
- Make sure your dentist knows that you have a knee replacement. Talk with your orthopaedic surgeon about whether you need to take antibiotics prior to dental procedures.
- See your orthopaedic surgeon periodically for a routine follow-up examination and x-rays, usually once a year.

## ***Extending the Life of Your Knee Implant***

Currently, more than 90% of modern total knee replacements are still functioning well 15 years after the surgery. Following your orthopaedic surgeon's instructions after surgery and taking care to protect your knee replacement and your general health are important ways you can contribute to the final success of your surgery.

### **Last Reviewed**

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