# Total Knee Replacement

Each year nearly 300,000 knee replacement surgeries are performed in the United States. Total knee replacement surgery involves removing and replacing the diseased parts of the knee joint with new, artificial parts. The muscles, tendons and ligaments are left in place around the knee to provide stability for the new joint. An artificial joint is usually made of metal (usually cobalt-chrome or titanium) and/or plastic polyethylene. A new joint may be fixed to existing bone either using a special cement or by "press fitting" which allows existing bone to grow into the new surface, locking it into place.

The patient's surgeon will discuss the best options of knee replacement devices and whether it should be cemented or press fit into place, based on several different factors, including the patient's age, weight, activity level and bone quality.

Artificial Knee Joint

Normally, a knee bends smoothly and painlessly because the ends are covered in cartilage, which acts like a cushion, absorbing energy in the joint. If this cartilage wears away, bone surfaces can become damaged, which can result in pain and reduced use of the joint. Damage can result from normal wear and tear on the joint or from injury, infection or some diseases. If the bone beneath the cartilage becomes damaged, as well, this is called osteoarthritis.

Generally, a total knee replacement is indicated if the patient is suffering from severe knee pain during activity and/or severe interference with daily activities and work and if treatments such as pain medication, weight loss or use of a cane have already been tried.

Osteoarthritic Knee Joint

Normal Knee Joint

# Preparing for Total Knee Replacement Surgery

Before surgery, a patient is generally asked to see their primary care physician for a general physical exam. The anesthesiologist will also evaluate the patient the day of surgery to discuss they type of anesthetics that will be used.

One week prior to surgery routine tests will be run to help assess a patient's fitness for the procedure. These tests might include:

- Blood and urine tests
- Chest X-ray
- EKG
- X-rays of both knees

Patients in good health may also be able to donate one or two units of their own blood to receive during or after surgery. In many cases this may not be necessary.

Patients must remember to inform their doctor of the following:

- All current medications
- Any allergies to drugs, iodine or latex
- Previous instances of thrombosis of the legs or elsewhere
- Any recent infections
- Any past illnesses

Before surgery, there are several important things to know:

- Aspirin, medications containing aspirin or certain anti-inflammatories should not be taken one to two weeks before surgery, to minimize bleeding
- Blood thinners, such as Coumadin should be discontinued at least several days prior to surgery, after consulting with the prescribing physician
- Vitamins and iron supplements should continue to be taken before and after surgery, especially if the patient has donated his or her own blood for the procedure
- Overweight patients should try to lose weight to decrease the pressure on the new knee
- Patients should not smoke
- Knee replacement surgery may not take place if infections are present elsewhere in the body, such as the bladder or skin

## The Surgery

Patients are generally admitted on the day of the operation, unless an underlying condition such as diabetes or cardiac or pulmonary disease requires an additional day of pre-operative hospitalization. Patients should bring sleepwear, slippers or shoes and personal hygiene supplies with them to the hospital.

**PATIENTS SHOULD NOT EAT OR DRINK AFTER MIDNIGHT BEFORE SURGERY.**

**Patients who take medication regularly every day should discuss this with their anesthesiologist and/or surgeon. It may be recommended by the physicians that the dose be postponed or taken as usual with a small sip of water.**

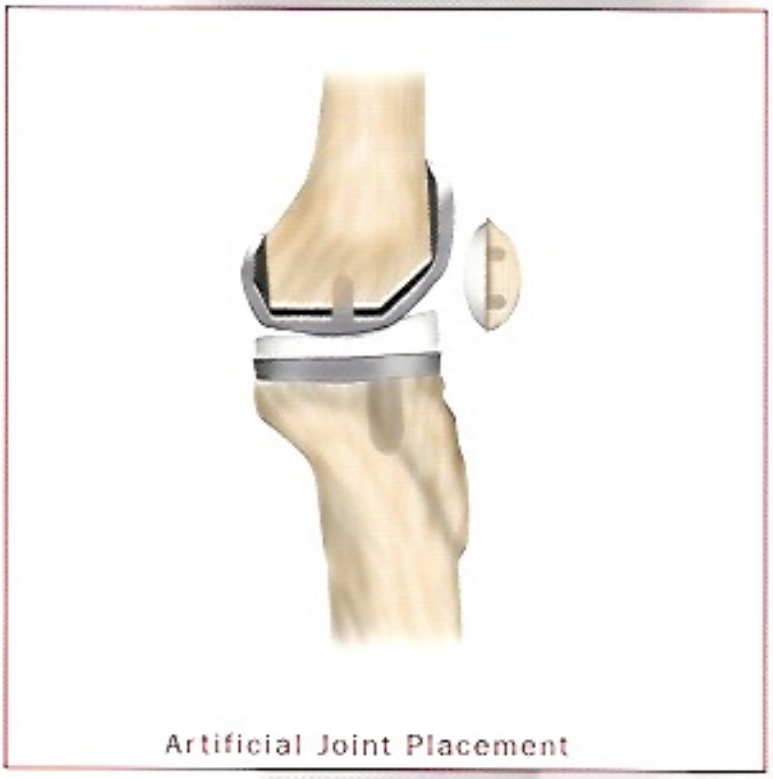
Total knee replacement is performed either under a general anesthetic, with the patient asleep during the procedure, or a spinal anesthetic, in which the patient is conscious but drowsy and unable to feel anything at the surgical site. Also, for postoperative pain management, your surgeon and anesthesiologist may recommend a regional nerve block.

The surgery itself generally includes the following steps:

- A tourniquet is applied around the thigh to keep blood from the surgical site
- An incision is made over the kneecap or along its inner side
- The diseased bone-ends are precisely removed to allow for the replacement knee
- New artificial surfaces are fitted to the bone-ends, either with or without cement
- The wound is closed with sutures or staples
- A drain may be left in the wound for one to two days
- The knee may be wrapped in a splint or strong bandage, depending on the surgeon's preference
- Depending on its complexity, the operation usually takes from one to three hours

At St. Luke's Hospital, there is a Specialty Hospital approach to orthopedics, such that in the operating room there are nurse assistants, scrubs and circulators who do only orthopedic procedures, including all total joint replacements.

Diseased Bone Removal



Artificial Joint Placement

The result of the surgery is that the knee joint has been completely resurfaced by the new, artificial joint. The patient's existing muscles and ligaments surrounding the new joint help maintain its stability. Most surgeons prescribe antibiotics for a brief period before and after the operation.

### Continuous Passive Motion (CPM)

Some surgeons recommend that patients start gentle continuous knee movement immediately or a few days following surgery.

A special Continuous Passive Motion device, called a CPM Machine, is used. The leg rests on the machine, which is set to allow the knee to bend continually a certain amount each day, with the amount increasing each day.

## The Role of Physical and Occupational Therapy

- Patients who undergo knee replacement surgery receive a great deal of help from a physical therapist in order to regain muscle strength and increase their knee motion after surgery.
- Physical therapists work with patients to help them advance from using a walker to crutches to a cane over a period of 10 to 14 days to weeks (longer for non-cemented knees).
- After surgery, patients should work not only with their physical therapist, but also on their own, with the aim of achieving and maintaining as much motion as possible in the knee. Greater range of motion may be achieved over time.

As in the operating room, at St. Luke's, there is a dedicated team of orthopedic nurses and techs, as well as orthopedic physical therapists, whose sole job is taking care of patients on the orthopedic division.

# Post Surgery

## Day of Surgery

- Most of the day will be spent in bed
- The diet will be advanced as tolerated
- Fluids will be delivered via an intravenous line as necessary
- Pain medications will be given either as pills or injections
- Blood transfusions may be necessary to replace blood lost during surgery
- If a patient has difficulty urinating, a bladder catheter may be necessary
- Breathing exercises begin immediately after surgery and additional oxygen may be delivered through a small nasal tube
- An inflatable device delivering intermittent pressure may be placed around the feet to aid in circulation and prevent blood clots

## Post-Operative Days One and Two

- Patients are encouraged to stand and walk with the help of a physical therapist, depending on their medical condition, after the acute pain has cleared
- The physical therapist will begin the exercise programs that will be done both in bed and in the therapy department
- Sitting may be allowed, including using the bathroom
- Daily blood tests help the surgeon determine if a transfusion is necessary
- If a drain has been placed in the knee, it is usually removed by the second day
- Drink more fluids to prevent urinary tract infections, fever and constipation, and eat a well-balanced diet to help aid the healing process

## Post-Operative Days Three and Four

- Most patients will be ready for discharge on post-operative day three or four
- By these days, the patient should be able to get around using a walker
- Physical therapists and other clinical workers will provide instruction about how to get out of bed, use the bathroom and dress and develop a home exercise program in anticiaption of discharge from the hospital

## Walking After Surgery

With the aid of a physical therapist, patients are encouraged to begin walking the day after surgery. The length of time during which crutches or a walker are required varies from patient to patient.

## Goals to Achieve Before Leaving the Hospital

- Walk independently on a flat surface using a support (walker, crutches or cane)
- Climb stairs
- Bend the knee 90 degrees (not always easy to do soon after surgery)
- Straighten leg as far as possible
- Raise straightened leg off the bed
- Move safely and independently from bed to chair

## Returning Home

Patients are usually discharged three to four days after surgery, depending on physical ability and other factors.

A patient must be able to function at a certain level before he or she will be allowed to return home; social workers can help with details during this intermediate period. Some patients may go directly to an in-patient rehabilitation or skilled nursing facility before returning home.

### A patient should contact his or her physician if:

- Pain in the knee increases
- The wound becomes red or warm
- There is an opening in the wound
- There is drainage from the wound
- The knee becomes increasingly swollen
- Either calf becomes painful, swollen or tender
- The patient feels hot or ill
- Sudden coughing or chest pain develops

# Exercise Program for Total Knee Replacement Patients

After total knee replacement surgery, it is important to exercise the legs to increase knee and leg strength. Exercises should be done gently, two to three times per day (10 repetitions each) for at least the first three months after surgery.

## Knee Extension:

- Lie on bed facing up
- Tighten knee by flattening it against the bed
- Bend foot toward you
- Hold for five seconds

## Straight Leg Raising:

- Lift leg straight up off the bed, approximately 12 inches
- Hold for five to 10 seconds, then lower slowly

## Knee Flexion:

- Lie on bed facing up
- Bend knee as far as possible
- Sliding foot on board may make exercise easier to do

## Quadriceps Muscle Strengthening:

- Sit up on bed with knee over a rolled towel
- Brace knee down onto the towel and lift foot off bed
- Hold for five to 10 seconds and lower slowly
- Use ankle weight if able; gradually increasing weight to 10 lbs.

## Hamstring Strengthening:

- Lie on bed face down
- Lift ankle approximately 12 inches off the bed
- Use ankle weight if able
- Hold for five to 10 seconds and lower slowly

## Knee Flexion and Extension:

- Sit on a high stool or chair
- Bend knee as far as possible
- Hold with foot pulled back toward the body
- Straighten the knee

## For the First 12 Weeks after Surgery

Certain movements place undue stress on the new knee and the following safety precautions should be taken:

### Sitting:

- Use a chair that has arms, to help with standing up
- Try not to sit longer than one hour at any time (including driving) without getting up and walking a little while
- Keep the foot elevated when sitting to prevent swelling

### Walking:

Most patients will progress from a walker to a cane to independent walking during this period.

### Lifting:

- Patients should avoid lifting very heavy objects.

### Showering:

- Patients should shower, rather than bathe
- Patients should sit on a stool while showering

### Exercising:

- Patients should have at least some formal guidance and monitoring by a physical therapist following hospital discharge
- Exercise should continue to strengthen muscles around the knee

### Entering a Car as a Passenger:

- Sit first on the edge of the seat and then pull in legs

### Driving:

- It is recommended that patients avoid driving for about four to six weeks
- If good control is achieved earlier and the car has an automatic transmission, patients may return to driving sooner

# Other Issues

## Pain Relief

Various methods of pain control will be used during and after surgery, and in general, these methods are much more successful than in previous years. These include:

- Single shot nerve blocks
- Continuous nerve blocks with a catheter Patient controlled anesthesia (PCA delivers a small dose of narcotic analgesic through an IV line when the patient pushes a button)
- Oral medications

Patients vary in their ability to tolerate pain and their sensitivity to analgesics; these issues are addressed as needed by the clinical staff.

After surgery patients most often notice that the pain of arthritis has disappeared, however many patients are concerned about the pain they will feel from the effects of the surgery itself. While this acute pain will subside quickly, the knee may remain sore and stiff to varying degrees for several weeks.

Steady improvement is expected, with most patients dramatically better after four weeks. A patient's surgeon is the best guide as to what can be expected.

## Returning to Work

When a patient can return to work depends upon the occupation.

- A sedentary or office job may be returned to as soon as three to six weeks after surgery
- A job that requires prolonged walking, standing and lifting may call for three months of recovery time
- Certain types of labor, including construction, some carpentry, high climbing, etc., may not be advised at all after knee surgery
- Climbing ladders is not recommended
- Any questions should be discussed with the patient's physician

## Sports

Generally, after three months a patient may:

- Walk
- Bicycle
- Swim
- Golf
- Bowl

**Vigorous activities such as running, jogging and jumping should be avoided, as they place too much force on the knee.**

### Recommended Activities:

Walking
Cycling
Dancing
Swimming
Golf
Bowling

### Activities to Avoid:

Basketball and baseball
Contact sports
Distance running
Frequent jumping

## Preventing Infection

Surgical procedures such as dental work and gynecologic or bladder surgery may cause bacteria to enter the body. A total knee replacement can be a target for such an infection.

- If any surgical procedure is planned in the future, a patient must always make the physician or dentist aware of the presence of the artificial joint
- Antibiotics will be given before the planned surgery

## Metal Detectors

The metal used in knee replacement surgery will trigger the security machines in airports and other security checkpoints.

## Sexual Activity

Sexual activity may be resumed at any time depending on the patient's comfort level.

## Follow up after Surgery

Patients should visit their orthopedic surgeon two to four weeks for wound inspection, removal of sutures or staples if necessary, X-rays, discussion about work, driving and activities and assessment of walking and range of knee movement

It is extremely important to return for a medical check-up and X-rays of the knee on a regular basis.

## Possible Risks and Complications

Total knee replacement is a major surgical procedure. Most patients do well and are pleased with the result, but potential complications must be addressed. Some may be related to the operation itself and others are more generally associated with any type of operation.

General complications can affect patients with these pre-existing conditions:

- Obesity
- Cardiac disease
- High blood pressure
- Diabetes

Thrombosis is a condition where clots may form in the leg or pelvis and move into the lungs. Clotting in a leg can cause inflammation, pain and swelling and if fragments of the clot do move to the lung, the result can be serious and life-threatening. Patients can help avoid thrombosis in the following ways:

- Wearing elastic stockings to reduce swelling in the legs and improve circulation in the deep veins
- Using compression devices on the legs
- Moving around soon after surgery
- Taking anticoagulants to thin the blood

Other potential complications include :

- Infection (fortunately, uncommon at St. Luke's)
- Post-operative stiffness in the knee
- Various medical problems

Numerous measures are taken by all of our orthopedic surgeons, orthopedic operating room nurses and orthopedic division nurses, techs and therapists to minimize these potential complications.