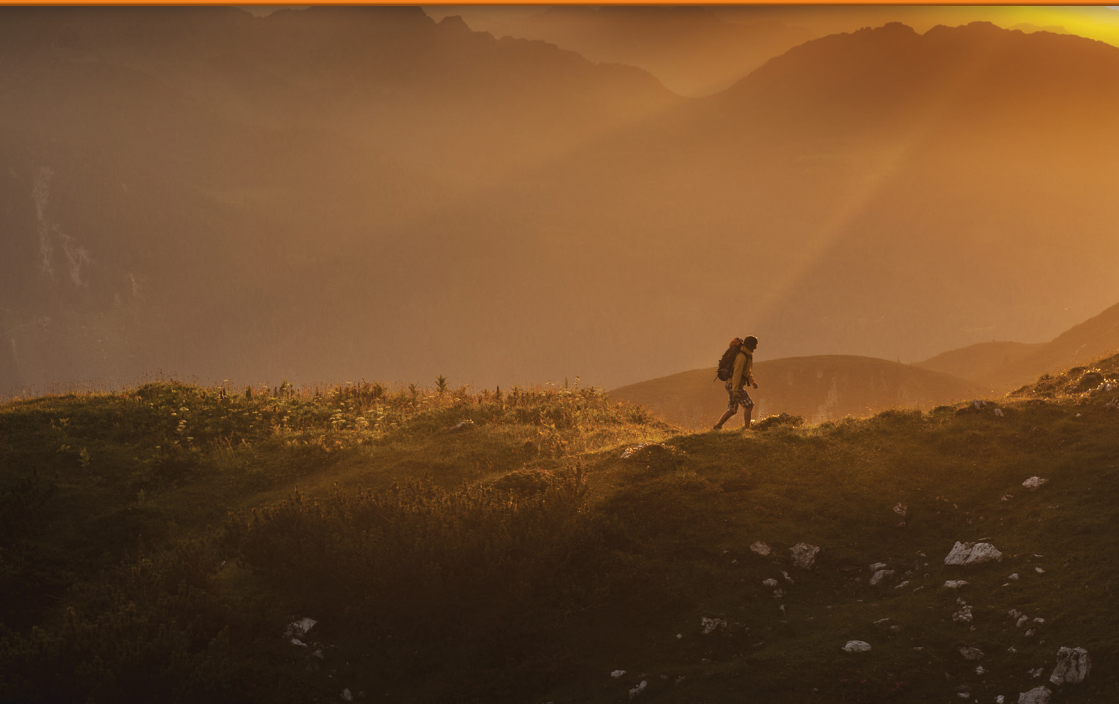
Smith+Nephew

A Patient's Guide Total Knee Replacement



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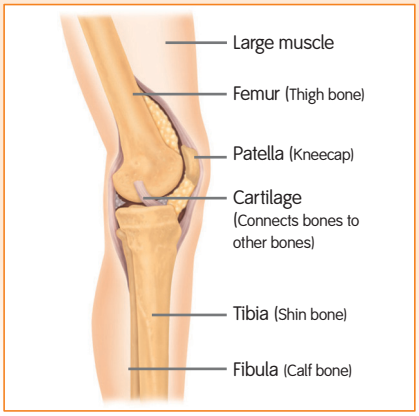
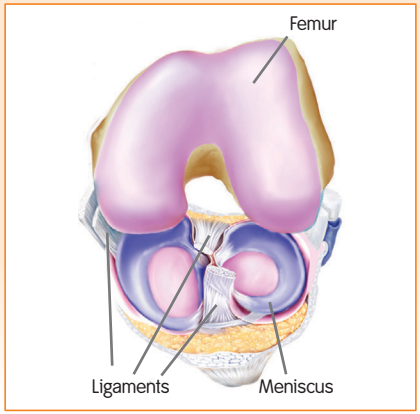
DISCLAIMER: Always speak to your doctor about the options that would be available to you, as well as the benefits and risks associated with each option. The information in this brochure is for general educational purposes only, and should not be construed as medical advice, or as statements relating to suitability of any implant for you, or for other persons.

The information in this booklet has been assembled to help you better understand the anatomy and function of the knee and the degenerative changes associated with arthritis, to prepare you for total knee replacement surgery, and to provide guidelines for post-operative care. The long-term goal of total knee replacement surgery is to provide relief of pain and help one get back to the activities of daily living.

Anatomy and function of the knee

The three bones that comprise the knee joint are the femur (thigh bone), the tibia (shin bone), and the patella (kneecap). The knee may be described as a modified hinge joint, similar to the hinge on a door. However, the knee not only bends back and forth like a hinge, it has a complex rotational component that occurs with flexion and extension of the knee. The knee is a major weight-bearing joint that is held together by muscles, ligaments, and other important soft tissue. Cartilage is the material inside the joint that provides shock absorption to the knee during weight-bearing activities such as walking or stair climbing.





The arthritic knee

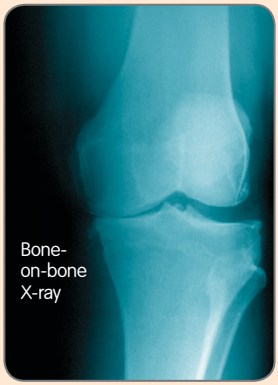
Arthritis in the knee joint occurs as a result of degeneration of the cartilage (the smooth, white tissue that covers the ends of bones where they come together to form joints) in your knee. Osteoarthritis is commonly referred to as “wear and tear” arthritis or degenerative (i.e. where the disease causes the structure and function of that body part to deteriorate over time) arthritis, and is the most common cause for total knee replacement surgery. The cartilage in the knee breaks down over time and the result is a severely damaged joint surface with bone rubbing on bone. This process may occur as a result of osteoarthritis, previous trauma to the joint, ligament instability, or abnormal stresses to the joint.

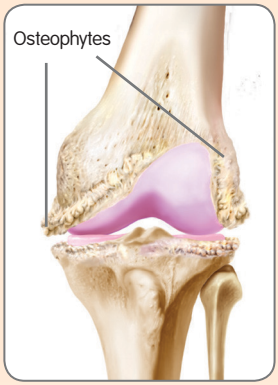
Rheumatoid arthritis is an inflammatory process that results in erosion of the articular cartilage and subsequent damage to the knee joint surface.

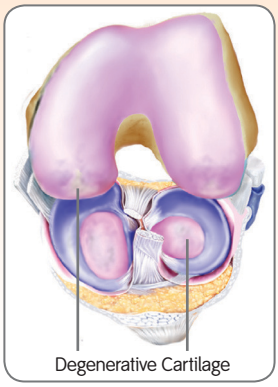
Non-surgical treatment of the arthritic knee

Listed below are several non-operative, conservative options to consider for treatment of the arthritic knee:

1. **Lifestyle modification:** Losing weight, avoiding aggravating activities, modifying exercise to low impact activities only
2. **Exercises:** Specifically prescribed exercises to improve strength and flexibility without exacerbating your pain
3. **Anti-inflammatory medications:** Designed to decrease swelling in the joint, and provide temporary pain relief
4. Powerful anti-inflammatory agents injected directly into the joint (specific medicines injected into the knee)
5. **Joint fluid therapy:** A series of injections directly into your knee, designed to improve lubrication in the joint







6. Dietary supplements
7. **Bracing:** Used to provide external stability to the knee joint
8. **Arthroscopic surgery:** The use of a tube-like device to examine, diagnose and treat a joint. Minimally invasive procedure to remove debris or repair torn cartilage

Reasons for knee replacement surgery

Total knee replacement surgery is considered when all other conservative measures have failed to provide successful intervention, and may be performed for the following reasons:

1. To relieve pain
2. To improve joint stability
3. To improve alignment and correct bone deformity
4. To maximise quality of life
5. To optimise activities of daily living

Total knee replacement surgery is a common procedure performed on more than 600,000 people worldwide each year. With advancements in surgical technique and implant design, patients have experienced improvement in knee pain, function, and quality of life. Furthermore, allowing patients the potential for years of active, healthier, pain-free living.

Preparation for knee replacement surgery

Once you and your orthopaedic surgeon have decided to proceed with surgery, there are several activities that must occur prior to surgery, including the following:

1. **Initial Surgical Consultation:** Pre-operative X-rays, complete past medical history, complete past surgical history, complete list of all medications and allergies (prescription, over-the-counter, supplements)
2. **Complete Physical Examination:** Your doctor will determine if you are in the best possible condition to undergo surgery
3. **Physiotherapy:** Instruction in an exercise programme to begin prior to surgery and an overview of the rehabilitation process after surgery will better prepare you for post-operative care

4. **Preparation for the Hospital:** You may want to bring the following items:
   - Clothing: Underwear, socks, t-shirts, exercise shorts for rehabilitation, pyjamas
   - Footwear: Walking or tennis shoes for rehabilitation exercise; slippers for hospital room
   - Walking Aids: Walker, cane, wheelchair, or crutches if used prior to surgery
   - Medical Scheme and/or gap cover information
5. **Evening before Surgery:**
   - Do not eat or drink after midnight or as instructed by the anaesthetist or surgeon
   - Prepare your belongings and review total knee booklet

Pre-operative procedures

This section will give you a brief overview of the activities that will occur on the day of surgery:

1. You will be admitted to the hospital, typically the morning of your surgery
2. A final assessment of vital signs (blood pressure, heart rate, temperature, breathing) will be taken
3. A clean hospital gown will be provided
4. An intravenous drip will be started to give you fluids and medication during and after the procedure
5. An elastic stocking may be provided to decrease the likelihood of blood clots
6. You will be asked to empty your bladder
7. All jewellery, dentures (false teeth), contact lenses, and nail polish must be removed
8. The surgical leg will be scrubbed and shaved in preparation for surgery
9. If possible beforehand, the anaesthetist will discuss the type of anaesthesia that will be used
10. You will be taken into the operating room

Total knee replacement

Implant components

In the knee replacement procedure, each prosthesis is made up of four parts. The tibial component has two elements and replaces the top of the shin bone or tibia. This prosthesis is made up of a metal tray attached directly to the bone and a high-density plastic spacer that provides the bearing surface.

The femoral component replaces the bottom of the thigh bone or femur. This component also replaces the groove where the patella or kneecap rides.

The patellar component replaces the surface of the knee cap, which rubs against the femur. The patella protects the joint, and the resurfaced patellar button will slide smoothly on the front of the joint. In some cases, surgeons do not resurface the patella.

Bearing surfaces

One of the keys to a successful implant is its ability to withstand the rigours of daily activity, and central to that is the quality of the artificial surfaces that slide against each other, or articulate, in the new joint.

In knee implants, bearing surface options have been somewhat limited over the last few decades. The standard substance used for the femoral component is cobalt chrome, a metal alloy typified by its toughness and biocompatibility. However, even this high-quality industry standard has its shortcomings. Over time, this metal surface can become roughened by bone and bone cement particles become trapped between the femoral component and the plastic tibial insert.

This roughened surface, when rubbing against the plastic component (estimated up to two million times per year), can quickly wear out your implant. When that happens, you will have to undergo surgery to replace the plastic piece, the femoral component, and possibly even the tibial component.

An alternative material to enter orthopaedics in recent years is OXINIUM® oxidised zirconium. This material combines the strengths of ceramic and metal, such as wear-reduction and strength.

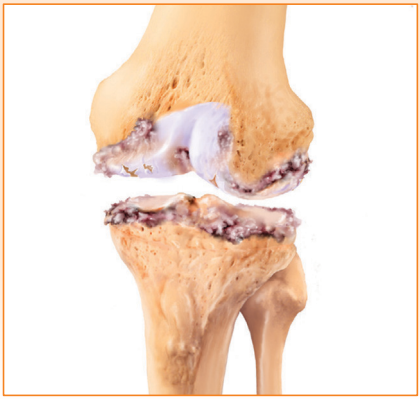
Zirconium is a biocompatible metal, similar to titanium. When the zirconium alloy undergoes a unique heating process, the surface of the metal transforms into a ceramic. Even though the new ceramic surface is abrasion resistant, it retains the toughness and flexibility of the underlying metal.

Because it can achieve the reduction in implant wear without sacrificing strength as actual ceramic components do, oxidised zirconium implants have the potential to last significantly longer, thus possibly reducing the need for future corrective surgeries. When articulating on standard plastic tibial components, OXINIUM® knee implants reduce wear.

The procedure

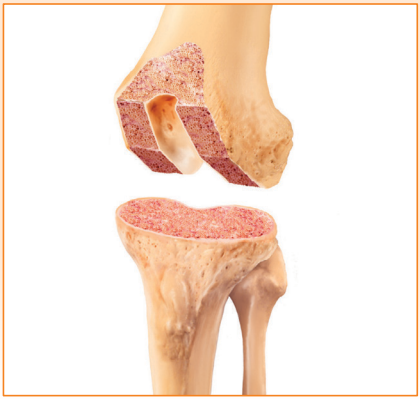
Knee replacement surgery typically takes between one and two hours to complete but is case dependent. This section will provide you with a brief, easy-to-understand description of the surgical procedure:

1. An incision is made extending from the thigh, past the inside edge of the kneecap, and down to the shinbone
2. The end of the femur is shaped in preparation for sizing the femoral trial component
3. The top of the tibia is shaped for proper sizing of the tibial trial (prosthesis instrumentation) component
4. The trial units are put in place and the appropriate implant size is selected
5. The knee is assessed for alignment, stability, and range of motion
6. The underside of the kneecap is prepared and the patella trial is selected
7. The trial units are removed and the final femoral, tibial, and patella components are implanted
8. The incision is closed, a drain is put in, and the post-operative bandaging is applied

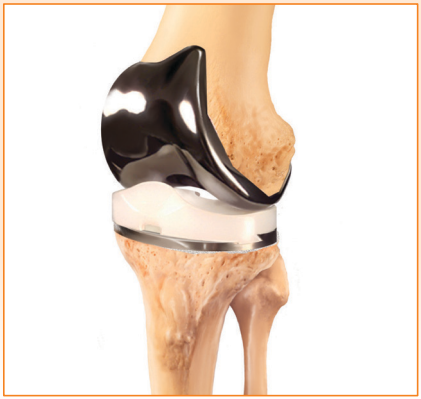


A knee joint with advanced osteoarthritis.

The most appropriate implants are chosen.

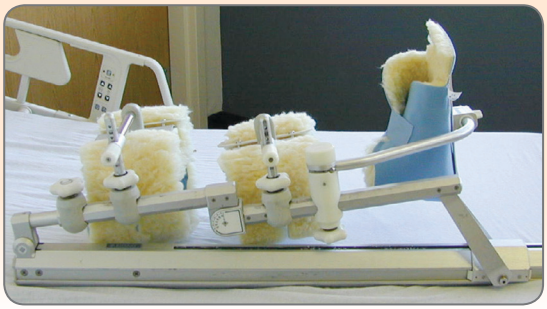


The ends of the femur and tibia are shaped for the implant components.



The implants are securely fixed into place.

See previous page for complete description of the steps depicted on this page.



Continuous Passive Motion (CPM) Unit

Post-operative care

After your surgery is completed, you will be transported to the recovery room for close observation of your vital signs, circulation, and sensation in your legs and feet. As soon as you awaken and your condition is stabilised, you will be transferred to your hospital room or ward. Below is an example of what you may see when you wake up:

1. You will find a large dressing applied to your incision in order to maintain cleanliness and absorb any fluid.
2. There may be a drain placed near your incision in order to record the amount of fluid being drained from the wound.
3. You may be wearing an elastic stocking, and/or a compression stocking sleeve designed to minimise the risks of blood clots.
4. Your surgeon may prescribe a PCA (patient-controlled analgesia) that is connected to your IV. The unit is set to deliver a small, controlled flow of pain medication and is enacted when you firmly press the button on your machine. The healthcare staff will instruct you on how to use it.
5. You may have a catheter inserted into your bladder as the side effects of anaesthesia often make it difficult to urinate.
6. A Continuous Passive Motion (CPM) unit may be placed on your leg to slowly and gently bend and straighten your knee. This device is important for quickly regaining your knee range of motion.
7. When your leg is not in the CPM, you may be wearing a knee immobiliser to protect your knees when you stand up.

Preventing complications

As with all major surgical procedures, knee replacement complications can occur. Below is a list of potential knee replacement complications and steps you can take to minimise the likelihood of it occurring, or to minimise the severity of the occurrence.

1. **Thrombophlebitis:** Also known as deep vein thrombosis (DVT), this problem occurs when the large veins of the leg form blood clots and, in some instances, become lodged in the capillaries (i.e. the smallest blood vessels in the body) of the lung and cause a pulmonary embolism (a blockage of the main artery of the lung or one of its branches). The following steps may be taken to minimise the risk of blood clots:
    - Blood-thinning medication (anticoagulants)
    - Elastic stockings (TED stocking)
    - Foot and ankle exercises to increase blood flow and enhance venous return in the lower leg

IMPORTANT: If you develop swelling, redness, pain, and/or tenderness in the calf muscle, report these symptoms to your orthopaedic surgeon immediately.

2. **Infection:** Although great precaution is taken before, during, and after surgery, infections sometimes do occur in patients following knee replacement surgery. Steps you can take to minimise this risk include the following:
    - Monitor your incision closely and immediately report any redness, swelling, tenderness, increased drainage, foul odour, persistent fever above 38°C orally, or increasing pain
    - Take your antibiotics as directed and complete the recommended dosage duration
    - Strictly follow the incision care guidelines your surgeon recommends

3. **Pneumonia:** Because your lungs tend to become "lazy" as a result of the anaesthesia, secretions may pool at the base of your lungs, which may lead to lung congestion or pneumonia. The following steps may be taken to minimise this risk:
    - **Deep breathing exercises:** A simple analogy to illustrate proper deep breathing is to, "smell the roses and blow out the candles". In other words, inhale through your nose, and exhale through your mouth at a slow and controlled rate.

4. **Knee Stiffness:** In some cases, the mobility of your knee following surgery may be significantly restricted and you may develop a contracture in the joint that will cause stiffness during walking or other activities of daily living. The following steps must be taken to maximise your range of motion following surgery:
    - Strict adherence to the Continuous Passive Motion (CPM) protocol as prescribed by your surgeon
    - Early physiotherapy (day 1 or 2) to begin range of motion exercises and walking programme
    - Oedema (excess water/fluid) control to reduce swelling (ice, compression stocking, and elevation)
    - Adequate pain control so you can tolerate the rehabilitation regime

Rehabilitation following knee replacement surgery

In order for you to meet the goals of knee replacement surgery, you must take ownership of the rehabilitation (rehab) process and work diligently on your own, as well as with your physiotherapist, to achieve optimal clinical and functional results. The rehabilitation process following total knee replacement surgery can be quite painful at times. However, if you commit to following your programme and overcome the challenges in rehab, you will succeed in meeting the goals you set when deciding on surgery. Please talk to your surgeon to obtain more information of his/her specific requirements and instructions. What is described below is a general guideline of what might be required.

The following outline will summarise the process you will adhere to during rehabilitation:

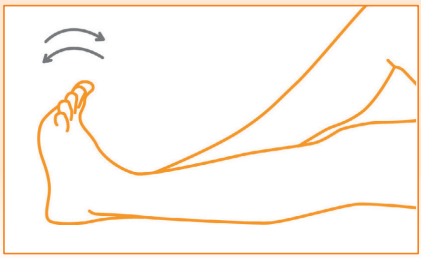
1. **In the Hospital:**
    - CPM beginning day one or two
    - Walking with a walker or crutches (weight-bearing status determined by your surgeon)
    - Range of motion exercises
    - Oedema control (ice, compression, elevation)
    - Instruction in home exercise programme

- Discharge goals are as follows
    1. Independent in getting in and out of bed
    2. Independent in walking with walker or crutches
    3. Independent in walking up and down 3 steps
    4. Independent in your home exercise programme
    5. Ability to bend your knee 90-degrees
    6. Ability to fully straighten your knee

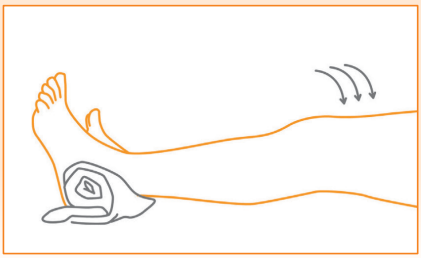
2. **At Home:**
    - Begin walking with a cane as tolerated
    - Continue CPM (if necessary) and range-of-motion exercises
    - Keep incision clean and dry; watch closely for signs of infection
    - Continue home exercise programme
3. **Outpatient Physical Therapy:**
    - Advanced strengthening programme, adding weights as tolerated
    - Stationary cycling
    - Walking programme
    - Aquatic therapy programme
4. **Long-term Rehabilitation Goals:**
    - Range of motion from 100-120 degrees of knee flexion
    - Mild or no pain with walking or other low-impact physical activities
    - Independent with all activities of daily living

In-home exercises

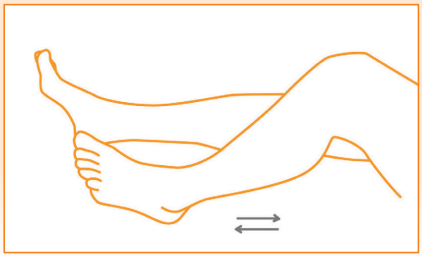
(Consult your therapist regarding the number of repetitions)



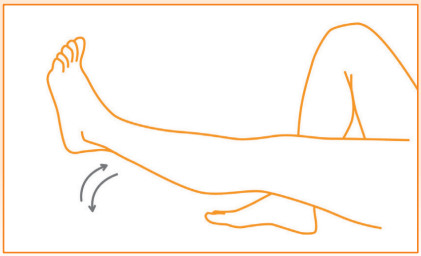
Ankle Pumps
Flex ankle up and down.



Quadriceps Sets
Tighten thigh muscles and hold contraction for five seconds.

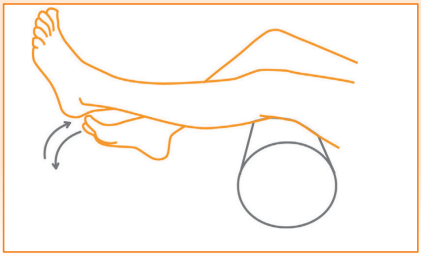


Heel Slides
Flex your hip and knee.
Return knee to the straight position.



Leg Lifts
Raise leg 15cm above the mat, keeping knee straight.

This is a brief outline only. Always speak to your surgeon and physiotherapist about the rehabilitation regime that is best for you. Also speak to them if you are uncertain or experience any pain or difficulty or if you are concerned about your progress.



Knee Extension
Place a pillow under your knee. Lift your foot off the mat.

For more information ask your orthopaedic surgeon, or visit:
www.walkwithoutpain.co.za

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