

# **TOTAL KNEE REPLACEMENT: A GUIDE FOR PATIENTS**

Produced by the British Association for Surgery of the Knee  
and the British Orthopaedic Association

## **KNEE ARTHRITIS**

If your knee is affected by severe arthritis or injury it may be difficult to perform simple activities such as walking, climbing stairs or sitting comfortably for prolonged periods. You may even feel the pain lying down. In Britain 1 in 5 patients over the age of 65 has some form of arthritis and in 1 in 20 patients the knee is the most severely affected joint.

Osteoarthritis can develop for the following reasons

- age -degenerative;
- rheumatoid arthritis or other inflammatory joint disease
- trauma which can damage the joint surfaces;
- after some birth defects and growth disorders.

## **HOW THE NORMAL KNEE WORKS**

The knee is the largest joint in the body and each knee carried half the body weight. It is the articulation between the lower part of the thigh bone (femur) and the upper part of the shin bone (tibia). These are covered by a smooth layer of cartilage called articular cartilage. There is rotation and hinge activity between these two bones. In addition the kneecap or patella is covered by articular cartilage on its under surface and slides in the groove on the front of the femur. There are two large ligaments joining the two bones together, reinforced by strong muscles and tendons at the back and the front of the joint (see appendix).

Injury can damage the joint surfaces and the destruction of the cartilage covering the ends of the bone is what we term arthritis. These surfaces become rough and uneven and the joint cannot move smoothly.

## **NON-SURGICAL TREATMENT**

The initial treatment includes drugs to reduce pain and inflammation, changing activity levels, using walking supports and physiotherapy, and injections. Occasionally keyhole surgery is advised to clean out any damaged areas. However, if these are not successful in curing the symptoms, a total knee replacement may be considered. This operation resurfaces the knee joint removing diseased bone and cartilage from the lower end of the thigh bone, the upper end of the shin bone and the back of the kneecap (patella). These surfaces are replaced with metal and plastic implants which allow natural knee motion and function and at the same time relieve pain and correct any deformity, enabling you to resume a greater range of normal activities.

## **KNEE REPLACEMENT**

Knee replacement was developed following the success of hip replacement and much of the pioneering work was done in Britain. The early knee replacements in the 1960s and 70s were fairly basic and the results were mixed. Improvements in surgical materials and techniques have greatly increased the effectiveness so that knee replacement surgery today has a high rate of success in relieving pain and restoring mobility. 95 out of every 100 procedures can be confidently predicted to be successful and, even at 10 to 15 years after the operation, will still be giving good service; some knee replacements have lasted 25 years.

If the replacement becomes loose, breaks or gets infected another operation is necessary; this is called a revision knee replacement. The replacement will last longer in lighter people and in older people who put less demand on the materials.

## **IS TOTAL KNEE REPLACEMENT RIGHT FOR YOU?**

Your General Practitioner and Orthopaedic Surgeon may advise knee replacement surgery in the following cases:

- Severe chronic pain in the knee that limits everyday activities such as walking, going up and down stairs, getting out of a chair, as well as pain at rest, especially at night. The knee may be stiff and swollen and xray confirms arthritis.
- Failure to obtain relief from non-steroidal anti-inflammatory drugs and injections or physiotherapy. Most patients who undergo knee replacement are aged between 60 and 80 but patients younger or older than this may be advised that this is the best treatment for them.

## **THE DECISION TO HAVE TREATMENT**

This should only be made after discussion with the Orthopaedic Surgeon whose team is going to carry out the operation. The Surgeon will discuss benefits and risks of treatment, and will emphasise that surgery cannot be guaranteed to meet all expectations and that there are risks associated with surgery. There must be a realistic expectation by the patient about what the operation can achieve and, whilst over 90% of patients have dramatic reduction in pain, the operation will not allow a high level of athletic activities and in particular some high impact sports will be excluded from normal activities.

## **THE ORTHOPAEDIC ASSESSMENT**

This consists of several components:

- A medical history, when the Surgeon gathers information about your general health.
- Physical examination with assessment of knee movement, stability and strength, followed by an x-ray.
- Occasionally blood tests and magnetic resonance imaging (MRI) may be required to clarify the diagnosis.

The Orthopaedic Surgeon will assess the results of these and, after discussion, may advise other treatments, leaving total knee replacement as the last resort of a treatment plan.

Knee arthroplasty is not usually recommended for patients who are severely overweight, have severe arterial disease in the legs, an infection in the knee, in the lower leg or in the skin, any nerve disorder affecting the knee and severe neurological problems, such as Parkinson's Disease.

## **MEDICAL HISTORY**

You must disclose all health problems and any medication, in particular the following need to be highlighted:

- allergic reaction to antibiotics, anaesthetics or other drugs;
- prolonged bleeding or excessive bruising;
- previous problems with blood clots in the legs or lungs;
- recent or long-term illnesses;
- gout
- diabetes
- psychological or psychiatric illnesses;
- poor healing and scar formation.

Drugs such as anti-inflammatory medication, Aspirin, anticoagulants, the contraceptive pill and Insulin may be stopped or modified prior to surgery and the surgical team need to know these details.

## **SMOKING**

Smoking increases surgical and anaesthetic risk and impairs healing. Patients are advised to stop smoking at least two weeks before surgery.

## **PRE-OPERATIVE EVALUATION**

Many units will carry out pre-operative evaluation with nurses or physiotherapists involved, and often the Surgeon and Anaesthetist will see you on that occasion. Also at this stage social and home discharge planning is undertaken in order to ensure that your home is ready for you to return with your new joint. These can include safety bars, handrails, a stable chair, toilet seat riser, shower bench and advice in adjusting all loose carpets and cables in the home.

## **THE ANAESTHETIC**

Knee replacement can be performed under a general or spinal anaesthesia, which numbs the lower limbs but you remain awake. Modern anaesthesia is safe but you should discuss this with the anaesthetist. Occasionally there are side effects and a full list of your existing medications and allergies must be given to the Anaesthetist.

## **THE OPERATION**

In Britain most patients are admitted the day prior to surgery, although there is an increasing trend for patients to be admitted on the day of surgery. The operation usually takes place with a tourniquet around the thigh to reduce the amount of bleeding and enable the components to be fitted accurately into position. The incision can be anything from 10 to 20cm in length depending on the type of approach and the size of the leg. All the blood vessels, muscles and nerves are protected during surgery and special tools are used to remove the surface of the bone. These include power saws, driven by battery or compressed air, special chisels and various drills to enable the components to be firmly seated. The components may be implanted by shaping the bone to form a tight fit with the prosthesis, which is coated with a special material which allows bone to grow on to the surface and provide fixation (uncemented prosthesis); alternatively bone cement may be used to hold the prosthesis in place (cemented). The wound is closed with internal stitches to keep all the ligaments and muscles securely together, and clips, sutures or special tape on the skin.

## **RECOVERY**

Following the total knee replacement you will be transferred from the operating theatre into the Recovery area where there may be several other patients. You will be here for up to 2 hours while most of the anaesthetic wears off. If you have had a spinal anaesthetic you may not be able to feel your legs when you wake up.

You will be given oxygen and pain killing medication, usually through an intravenous line or drip.

Very occasionally a special catheter may be introduced into the bladder to drain off the urine if you are unable to feel or pass urine yourself or if you have no feeling due to the spinal anaesthetic.

The knee will have a large bandage, possibly with a splint or a special device containing ice to reduce swelling.

The pain and discomfort might be quite severe in the first few days but the nurses and Anaesthetic team will usually be able to administer sufficient pain killers to reduce the pain to acceptable levels.

## **EXERCISE**

An exercise programme is an important part of recovery. This starts with gentle exercises in bed; a special machine may be used. Patients are normally advised to get out of bed with the help of physiotherapy on the second day.

The time spent in hospital used to be 2 weeks but now is more likely to be a week unless there are special problems; further physiotherapy may be advised at home. In the early stages you will need crutches or a walking frame but muscle strength may take some weeks to recover.

The stitches or clips are removed after 10 to 14 days. You will be reviewed, either in the Nurse/Physiotherapy clinic or by the Surgeon, and x-rays will be taken in the post-operative period to ensure that everything is progressing well.

## **REHABILITATION**

Most patients can begin physical therapy immediately after surgery. A frame, crutches or a stick may be needed for up to 6 weeks and older patients may have to continue the use of a walking aid for longer periods.

During the first few weeks stretching and strengthening the muscles remain goals of treatment. As strength and motion improves you may be instructed on other activities such as distance walking, cycling and swimming. These should restore your feeling of well-being. You may take up to between six and twelve weeks off from work depending on the job and it is useful to discuss this before surgery.

Following total knee replacement patients are encouraged to resume an active lifestyle but are strongly advised against activities that produce high impact such as running and jumping. Sports such as golf, cycling, swimming and walking are encouraged. Other acceptable activities include bowling, croquet, doubles tennis, table tennis and dancing – ballroom and line dancing.

## **COMPLICATIONS OF KNEE REPLACEMENT SURGERY**

There are risks following knee replacement surgery despite high standards of practice. Complications can occur that may have permanent effects which is why the operation is only undertaken when all other methods of treatment have failed. Surgeons do not usually outline every single complication but they do point out to you the most serious ones. Serious complications occur in no more than one or two in every 100 patients, but less serious complications can occur more frequently and generally get better.

### **a/ General risks of surgery**

Possible complications include:

- Pain around the incision;
- Nausea – often from the anaesthetic;
- Heavy bleeding from the surgical site. A blood transfusion may be required. Sometimes patients are asked to donate their blood in advance and there are sometimes systems which collect the blood that has leaked into the drains and this is then re-transfused;
- Keloid or thickened, raised scars – these can be very unpleasant, itchy and unsightly in the early stages but usually will settle down and are not a serious threat to the wound healing;

- Separation of the wound edges – sometimes the stitches or clips come adrift and this can cause opening of the wound;
- Allergies to anaesthetic agents, antiseptic solutions, suture materials or dressings;
- Very rarely there may be any complication of anaesthesia and surgery such as blood loss, heart attack, heart failure, stroke, kidney failure, and other serious problems.

## **b/ Specific Risks of Knee Replacement**

### **i/ Infection**

Infection around the prosthesis occurs in about one patient in every 100, and is very serious. It can occur immediately or many months after the operation. Infection can spread from any part of the body. To help prevent this antibiotics are given before and after surgery. You may need to take antibiotics during other subsequent surgery. Sometimes a small operation to clean out the knee may be required.

Occasionally the infection may be resistant to treatment and a second operation may be needed to remove the components of the knee replacement. Once all the infection has been effectively treated a third operation is performed to insert new components.

You may develop other infections including chest and urine.

### **ii/ Thrombosis and Pulmonary Embolism**

Blood clots can form in the deep veins of either leg. This can be life-threatening if they break away from the vein wall and travel in the bloodstream to block the arteries to the lung. Prevention in the form of injections, tablets or special leg pumps is used.

### **iii/ Loosening/Breakage**

The prosthesis may become loose where the metal or cement meets the bone. This can cause pain and eventually another operation may be needed. This is the most common long-term problem.

The prosthesis may loosen if osteoporosis (loss of bone density) occurs. Rarely, the artificial joint may break and another operation would be needed.

### **iv/ Scarring, Stiffness and Swelling**

Heavy scarring after surgery may restrict bending of the knee. To release the scars and improve movement the Surgeon may need to manipulate the knee. If the joint was extremely stiff before surgery, there is likely to be quite a lot of stiffness afterwards.

Swelling is common after surgery and may take several months to settle. Occasionally it may be necessary to drain fluid off with a needle.

### **v/ Nerve and Artery Injury**

A major nerve may be damaged, leading to poor or no leg movements. Most nerve injuries recover well, often completely. Uncommonly, nerve damage may be permanent, leading to permanent numbness and/or weakness of the foot. One of the major arteries near the knee may be injured and require further surgery.

vi/ Skin

A numb area of skin, usually on the outer side of the wound, is quite normal and most of this will recover with time.

vii/ Amputation

Rarely, complications due to a severely impaired blood supply, arterial damage or overwhelming infection may lead to amputation of the leg above the knee. The risk is greater for patients who are elderly or in poor general health. The overall risk is 1 patient in 6,000.

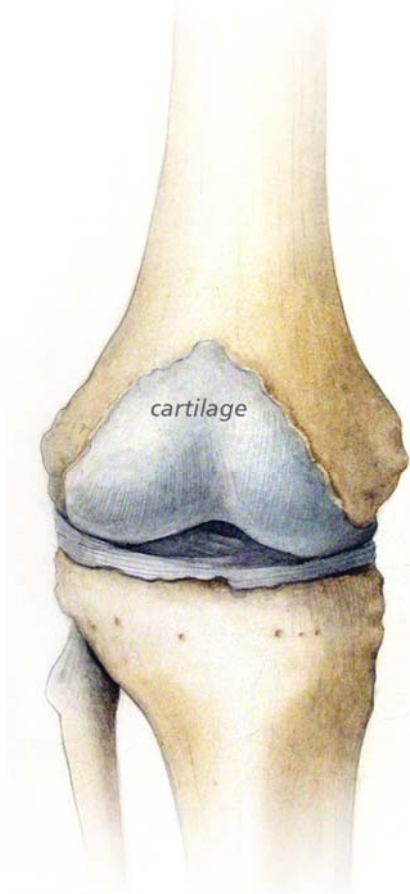
## **RE-OPERATION**

The prosthesis may become loose requiring further surgery; this can be done in one operation. If the looseness is due to infection, this will usually require two operations with a period of 6 weeks to 6 months between them to allow the infection to settle.

## **FINALLY**

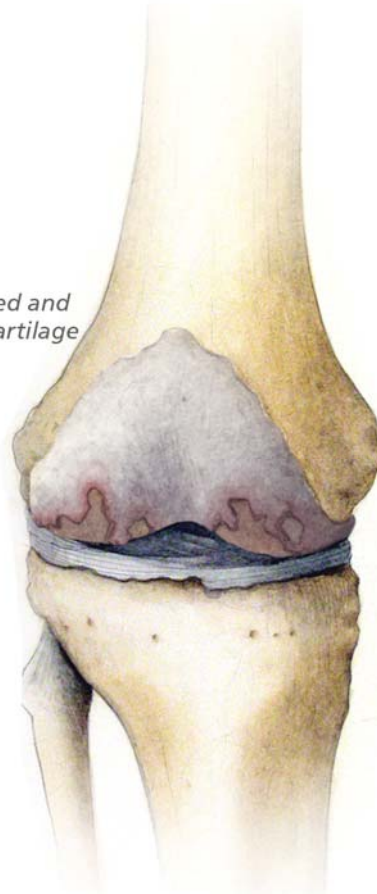
### **Report to the Doctor or Medical Staff any of the following:**

- Temperatures higher than 38.5° Centigrade/102° Fahrenheit, fever, sweating, shivering or chills;
- Severe pain or tenderness;
- Heavy bleeding from the incision;
- Redness around the incision that is spreading;
- Worsening pain or stiffness of the knee;
- Loss of mobility after a fall with increased pain;
- Any concerns regarding the surgery
- Swelling and pain in the calf or ankle of either leg.

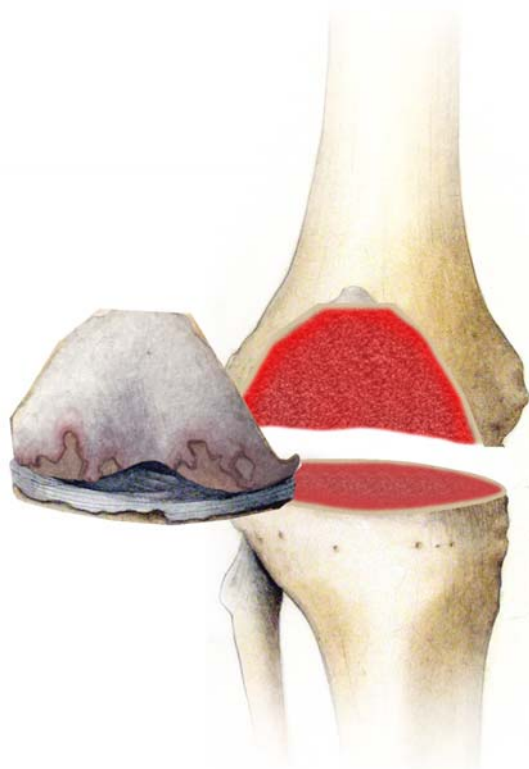


normal knee joint

*diseased and worn cartilage*

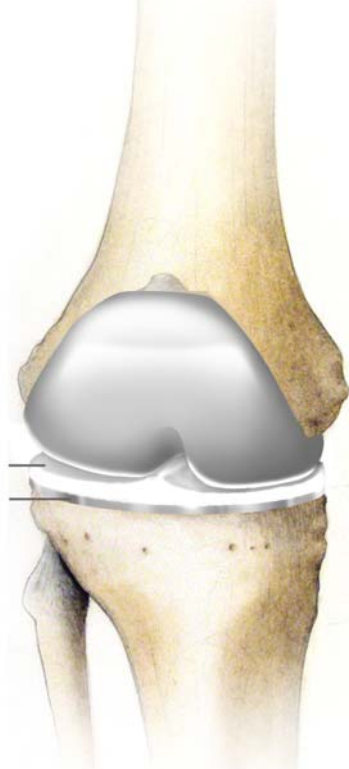


damaged knee joint



damaged cartilage and underlying bone are removed

Plastic layer  
Metal layer



replaced with prosthesis