

Patient Information Sheet : Total Knee Replacement

What Is It?

Knee replacement involves resurfacing of the damaged knee joint. The knee joint consists of three bones moving against each other. The kneecap (patella) moves against the underlying thigh bone (femur), but the main knee joint is between the femur and the shin bone (tibia). The knee joint is held together by four major ligaments, two outside the knee (the collateral ligaments) and two inside the knee (the cruciate ligaments). The knee joint is also supported by muscles which pass across the joint. Knee replacement involves shaving away what is left of the bone ends and replacing them with either metal or plastic to give new joint surfaces which are smooth and therefore easy to move without pain, and can restore the alignment of the affected leg.

Why Do We Do It?

Knee replacement is usually required as a result of damage to the joint surfaces as a result of :

1. Wear and tear arthritis (osteo arthritis). This occurs in us all but occurs at different rates depending on our activity level, weight, family history and any associated diseases such as neurological (nerve) problems

2. Inflammatory arthritis. The most common of these is rheumatoid arthritis and this involves damage to the joint surface due to inflamed or swollen joint lining which encroaches upon and erodes the joint surfaces. The resultant damage can cause deformity and pain much earlier than one would normally see in osteo arthritis. Even though the inflammatory condition may "burn out", the damage done to the joint will accelerate the ongoing wear and tear process. Other conditions associated with inflammation of the joint lining are gout, psoriasis, pigmented villonodular synovitis, and pseudo-gout (chondrocalcinosis). All, apart from rheumatoid arthritis, are really quite rare

3. Post traumatic arthritis. This refers to a condition in which a normal joint has been damaged as a result of injury or deformity in the past, such as previous meniscectomy (removal of cartilage at a young age), fractures through the knee joint or complications from previous surgery such as infections. It can also occur as a result of repeated injuries or bleeding into the knee, in particular haemophiliacs have a high incidence of knee deformity in later life.

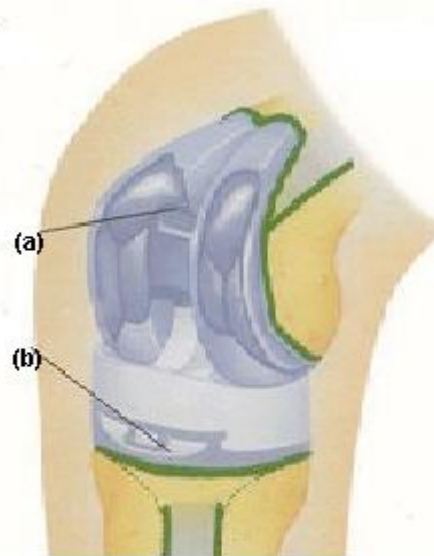
Once the joint surface has been damaged, for whatever reason, the irregular joint surfaces no longer glide or move smoothly across each other and cause pain and discomfort. They can also give symptoms of catching or giving way, much the same as gears in a car when they fail to align properly. Because the knee joint is at a slight angle, sometimes the wear of the knee joint is irregular and the damaged part of the bone surfaces can collapse leading to either knock knees or bow legs, depending which side of the knee is affected. When the arthritis progresses to the extent where pain and deformity are sufficient to disrupt an individual's quality of life significantly then surgery is indicated. It is difficult to be dogmatic, but as a general rule surgeons will take the fact that i. an individual is unable to sleep because of pain from their knees, ii. is unable to walk around without a stick or iii. is having to take regular strong painkillers that this means their discomfort is sufficient to warrant joint replacement surgery.

Types of Knee Replacement

The most commonly performed knee replacement at the present time is Total Knee Replacement. This involves the shaving of the whole of the knee joint surfaces and putting a metal spacer at the end of the thigh bone (a) and a plastic tray on top of the shin bone (b) so that one has a new metal-on-plastic knee. The kneecap is often shaved but unless the kneecap is badly deformed I may elect to leave the kneecap as it is or replace it with a plastic button.

The components (metal and plastic) can either be cemented into place or can be held in place by screws and materials which encourage in-growth of new bone into the implant surfaces. The latter technique is known as "uncemented" joint replacement. The choice will depend on your surgeon's preference and other factors such as your age, disease process, etc. However the results of total joint replacement with or without cement and with or without plastic replacement of the kneecap are generally the same.

Other forms of knee replacement include unicompartment knee replacement, mobile bearing knee replacement and plastic inserts.



Unicompartment Knee Replacement

The knee joint itself consists of three parts – the patello-femoral joint, the outer side of the femoro-tibial joint and the inner side of the femoro-tibial joint. Each of these joint surfaces, although connected, can often be thought of as an individual joint or articulation. Often the disease process can affect one particular part of the joint more than others and there has been increasing use over the last few years of unicompartment knee replacements where the joint surface replacement is confined to the most severely affected areas. This can involve all three joint compartments of the knee but replacement of the lateral joint compartment alone at this moment in time is not particularly successful. The most successful partial knee replacement has been the medial or inner unicompartment knee replacement and this has now had extensive research and follow up suggesting excellent results over the 10-15 year post operative period. In view of this, unicompartment knee replacement of the inner aspect (the medial femoro-tibial joint) has become increasingly common particularly in younger individuals. The operation can often be performed through much smaller incisions and involve one or two days in hospital rather than the normal 5-7 days. Recovery still requires six weeks of protected weight bearing using sticks or crutches but the rehabilitation generally is much quicker than after total joint replacement. One added benefit is that in the younger patient who is expecting to have further joint replacement surgery when the initial joint replacement wears out (between 10-15 years), the patient can be more easily treated by revision of a unicompartment knee replacement to a total joint replacement.

More recently success has been found following replacement of the patello-femoral joint using the Avon or Bristol patello-femoral joint replacement and I have started using this in my own practice. Again, the rehabilitation and recovery period is much the same as in a total knee replacement but is usually much more comfortably achieved.

Mobile bearing knee replacement

In order to reduce wear after joint replacement surgery (most joint replacements will last between 10-20 years but the younger, more active and heavier patients are more likely to wear out the artificial joint surfaces sooner rather than later) surgeons have always looked at different ways of trying to prolong the lifespan of the new artificial joint. For this reason various materials other than metal and plastic, such as metal-on-metal, ceramic on plastic and variations in the type of metal and plastic used, have all been tried with varying degrees

of success over the last 40 years, since the original metal-on-plastic design by Sir John Charnley for hip replacement surgery. At the time of writing, there is no better implant than the original metal-on-plastic which has been proven to be as effective. Therefore the vast majority of surgeons still use the metal-on-plastic bearing joint replacement.

Another technique used to try and prolong the life of the plastic bearing surface has been to allow the plastic to slide on the metal plate at the top of the tibia. By allowing some sliding movement, it has been shown in laboratory testing that the forces across the plastic are less and therefore the plastic should last longer. However, this theoretical improvement has not yet been shown in human patients but research is ongoing and your surgeon may wish to use such an implant with your agreement and knowledge. Personally I feel that these implants are not yet proven to be of benefit in the majority of patients undergoing total knee replacement. However, the theoretical advantage suggests that in younger fitter and more active patients, the mobile bearing knee should be used with the expectation of longer life of the implant. Therefore, in my own practice I use the mobile bearing knee for a highly selected group of patients who are fit and active at the time of surgery.

Plastic Inserts

In order to try and prolong the life of an arthritic knee, before undertaking total joint replacement several substances have been used to try and coat the joint surfaces and reduce the wear rate. Injections of Hyalgan (a substance naturally occurring in joint fluid which lubricates the knee) or by implanting plastic spacers inside the knee joint, surgeons have tried to reduce the pain from these damaged and arthritic joint surfaces. Unfortunately at the present time these implants have had limited success and are not used on a large scale.

Cell Cultures

Given the success of scientists in being able to grow tissue in the laboratory (in vitro) there have been attempts over the last 10 years particularly to take joint lining tissue away from a patient's knee and either re-implant it in the damaged part of the knee joint (autograft) or try and grow this tissue in the laboratory to produce sufficient cells to then be able to re-implant the tissue into the damaged joint surfaces. These techniques are experimental and involve quite major surgery to prepare the damaged bone surfaces in order to be able to accept the new tissue and involve prolonged periods of immobility and immobilisation (non weight bearing for anything up to six months) in order to allow the new tissue to incorporate into the knee joint. Success with these techniques has been variable at best and again these techniques should be thought of as experimental and only undertaken by specialist surgeons in specialist centres as part of a controlled clinical trial. At the moment I do not use these techniques and do not recommend them.

What Are The Risks?

Overall, joint replacement is probably the most effective surgical procedure which has been invented. In terms of quality of life improvement and function, they have made the most significant difference of any operative procedure. This was originally the case with total hip replacement and the success rates obtained for total hip replacement have now been matched by total knee replacement. One can confidently expect around 95% of patients who undergo total knee replacement to return to "normal" levels of activities (commensurate with their age and fitness prior to the operation) and for the joint replacement to last between 10-20 years before eventually wearing out or loosening. It is for this reason that joint replacement is so popular but your surgeon will try to avoid such surgery until absolutely necessary. There are other procedures which can be used such as unicompartent knee replacement and osteotomy (breaking and re-aligning the bone) which can be used in the younger individual.

However, the fact that 95% of total knee replacements are successful, means that 5% are not successful. Major complications can and do occur, and can affect all surgeons and all patients. On average around 1% of patients who undergo total knee replacement develop deep wound infection, 1% develop continued pain and stiffness due to excessive scarring or adhesions, 1% get significant deep venous thrombosis with dislodging of the thrombosis (blood clots in the calves) which then travel in the veins to the heart and lungs and can cause significant chest pain (pulmonary embolus). Around a further 1% can develop problems

with mal-positioning or mal-functioning of the prosthesis (implant) where the new metal-on-plastic knee does not articulate properly and is either too loose or too tight or the kneecap can dislocate, usually to the side. When you add up all these complications together this leads to around 5% of patients not doing as well as they or their surgeon would like. Around 1 in 1000 of patients actually die as a result of joint replacement surgery usually due to overwhelming infection or massive pulmonary embolus where the heart or lungs are blocked sufficiently to cause death. There are also rare complications such as death secondary to major blood loss, anaesthetic complications, nerve damage complications and anaphylaxis (excess reaction to drugs). The majority of these major complications can be addressed with medical techniques such as antibiotics or replacement of the new knee replacement but the success rate of second, i.e. revision surgery, is much less predictable than the first. For this reason it is recommended that your surgeon has extensive experience and expertise in knee surgery and should be undertaking at least 10 and preferably around 50 joint replacements per year.

What happens in hospital?

On Admission

Most patients undergoing knee replacement will be admitted on the day of surgery and will be seen by the anaesthetist to discuss the anaesthesia involved and also by myself. You will be clerked by the nursing staff and you should remember to bring in with you suitable clothing for a five-seven day stay, any medication which you are taking and any notes and xrays which you may have in your possession, particularly with regard to your knee. Occasionally, if the operation is in the afternoon, you will be admitted on the morning of surgery. You will also be seen by the physiotherapists and instructed in the use of exercises and aids such as crutches. Before the operation you will be asked to sign a consent form and the appropriate knee for operation will be marked by myself. The operation will be undertaken usually mid morning and can last for 1-2 hours. You will be in recovery (an area in theatre where monitoring of blood pressure and breathing will take place) until you are stabilised, and then returned to your own ward. Occasionally patients will go to an area of more intensive monitoring called the High Dependency Unit, usually just for one night. This is normally the case for patients who have significant medical problems such as heart or lung conditions which need closer monitoring than usual.

After Surgery

Once back on the ward or in the High Dependency Unit you will be encouraged to move around as much as comfort allows. You should move your feet and ankles, and your operated knee within the limits of the bandaging, etc. You will notice that you have a drain or tube coming out of the knee to take away any excess bleeding from the knee joint. This drain will normally be left in place for 24 hours. You will also notice that there is a small plastic needle in the veins in the back of your hand (an intravenous cannula) which is in case you need drugs or fluid. Apart from moving your operated leg you should also try and move around in bed to avoid pressure sores on your bottom and heels, and also practice deep breathing exercises to encourage good lung function. You will be able to sit up in bed and begin taking fluids and food within three-four hours of the operation.

Normally patients who have had a knee replacement are independently mobile, getting in and out of chairs, getting in and out of bed and walking around the ward within a few days. Prior to leaving hospital you will also be asked to ascend and descend stairs just to ensure that you are capable of doing this comfortably and safely. When you leave hospital you will still be using your crutches but encouraged to put as much weight through your operated leg as possible. You will be given injections of Heparin (a drug used to prevent blood clots) whilst you are in hospital.

On Discharge From Hospital

On discharge from hospital you will be given a note to keep at home which summaries your hospital treatment in case you have any requirement for emergency GP visits over the next two-three days. A separate letter will be sent by the hospital to your GP and also by myself, but this often takes a few days before it arrives. Your wound will normally be covered by a wound dressing and underneath that will be a series of metal clips or staples which will need to be removed 12-14 days after surgery. This will be arranged by the hospital for you to

either come back to the hospital or preferably in liaison with your GP when the district nurse will come and see you at home. Once home you can shower or bathe and get the wound wet, even with the clips in but you should not let the wound soak until the clips have been removed, i.e. from two weeks post surgery onwards.

How Mobile Will I Be After Discharge?

Before you are allowed to leave the hospital you should be independently mobile with your crutches and be safe, even walking up and down stairs. For this reason some patients need to stay somewhat longer than normal. The average hospital stay for a knee replacement patient is around five-seven days, but it can vary between five days up to two weeks. Although you will be encouraged to get outdoors for short periods, for most of the first six weeks you will be indoors and should travel outdoors preferably with a friend or family member.

When Can I Drive?

Normally patients are advised to refrain from driving for at least six weeks, i.e. until the first clinic review with myself. After that time, once you are able to walk without crutches you are safe enough to drive but this would normally involve short journeys for the first couple of weeks, before progressing to normal driving. If the operated leg is your right knee it is often harder to recover sufficiently to allow safe operation of the brake and it could be 9 or 10 weeks before you are safe to drive. As a general rule, once you are able to walk without crutches or sticks without a limp, you are able to drive.

When Can I Return To Work?

Most patients will be off work for around three months. If your work is sedentary or supervisory you can return to work in a part time capacity on light duties from six weeks post surgery, but this would only be if you have a degree of control over your working environment. Normally return to work will be discussed more formally at the six week post op clinic visit.

What Drugs Will I Need Following Discharge?

You will be given the medication which you brought into hospital and if you are on medication for other medical conditions such as diabetes, asthma, blood pressure treatments, etc. these should be continued on leaving hospital. Specifically with regard to the knee operation you may require a few weeks supply of analgesics or anti inflammatories and this will be given by the hospital. Beyond the medication provided by the hospital, simple analgesics such as Paracetamol, Nurofen (a mixture of Panadol and Ibuprofen) or stronger pain killers such as Distalgesic can be used. However, prolonged or excessive use of these medications would suggest a review by your GP or myself is required to ensure that there is no complication.

What Exercise Should I Do?

Prior to discharge from hospital you will have been seen by the physiotherapists and given an exercise programme to follow. This is important first of all to get your knee working properly following the operation and secondly to help recover any muscle loss which has occurred as a result of the prolonged wear and tear process which led to the necessity for a knee replacement. Usually the physiotherapist will arrange for you to be reviewed either by the physiotherapists at the hospital or a more local physiotherapy unit. On average this would be once per week during the first few weeks following discharge from hospital. This will allow the physiotherapists to monitor progress and give further advice and encouragement as required. The amount of physiotherapy will be dependent on individual circumstances.

What Does It Cost Privately?

Most insurance policies cover fully the cost of surgery and I do not charge over recommended medical insurance guidelines. If you are not insured, the Fitzwilliam Hospital has a Fixed Price Package for most procedures including total knee replacement. This price includes all in patient hospital costs, i.e. surgeon's fees, anaesthetist's fees, hospital fees and theatre costs. Should there be any reason to undertake additional treatments such as a prolonged stay, dealing with complications either during the first week when still in hospital or up to the first month following discharge from hospital, this again will be covered by the fixed price

package. An up to date fixed price package can be obtained by contacting the Fitzwilliam Hospital. Total knee replacement surgery usually costs in the order of £10,500.00 at the present time.

What Happens If Things Go Wrong?

Should you be unfortunate enough to develop a complication either as an in patient or following discharge from hospital this will be dealt with either by your own GP or myself. If the problem develops at home you can phone the hospital ward and speak to the nursing staff on duty for advice. They would normally be able to deal with most queries or suggest suitable alternatives such as phoning your GP, attending the local accident and emergency department.