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## Knee replacement

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### Introduction

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Knee replacement surgery is a method to replace a damaged or worn knee joint with an artificial joint. The medical term for this type of surgery is 'arthroplasty'.

Knee replacement surgery (arthroplasty) aims to relieve knee pain and improve movement. There are two types of knee surgery, depending on the condition of the knee:

#### **Total knee replacement**

This may be necessary if the whole of the knee joint is damaged.

#### **Half knee replacement**

This is also known as 'unicompartmental' or 'unicondylar' replacement. This is sometimes carried out if one part of the knee joint needs to be replaced.

#### **Is knee replacement common?**

Knee replacement surgery is now as common as hip replacement surgery, with over 70,000 knee replacements carried out in England and Wales during 2007.

#### **How long does a knee replacement last?**

A replacement knee will not last forever, but your artificial knee will probably last you at least 10-15 years, depending on how active you are and the type of replacement you have.

As new technology continues to be developed, this figure is likely to increase.

### Why it is necessary

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Knee replacement surgery (arthroplasty) is usually necessary when a health condition or injury disrupts the normal working of the knee joint so that:

- your mobility is severely reduced, and
- you experience pain even while resting.

### **How the knee should work**

The knee joint acts as a hinge between the bones of the leg.

It is actually two joints: The major joint is between the thigh bone of the upper leg (femur), and the shin bone of the lower leg (tibia). The smaller joint is between the kneecap (patella) and the femur.

A smooth, tough tissue called articular cartilage usually covers the ends of the bones within the knee joint. This protects the ends of the bones and allows them to slide smoothly over each other, without pain or too much effort.

The synovial membrane that covers the other surfaces of the knee joint produces synovial fluid. This lubricates the joint, reducing friction to further help movement.

### **Replacing a damaged knee**

Pain and difficulty moving the knee joint is commonly caused when the articular cartilage has become damaged or worn away. This means that the ends of the bones start to rub or grind together instead of smoothly sliding over each other.

Replacing the damaged knee joint with an artificial one can help reduce pain and increase mobility.

### **Osteoarthritis**

The most common reason for knee replacement surgery is osteoarthritis.

Osteoarthritis in the knee occurs when the articular cartilage becomes damaged or wastes away through natural wear and tear.

The bones then have little or no protection to prevent them rubbing against each other when the knee moves, causing pain.

The bones may then compensate by growing thicker and producing bony outgrowths to try and repair themselves, but this can actually cause more friction and pain.

### **Other medical conditions that may make a knee replacement necessary include:**

- rheumatoid arthritis,
- haemophilia,

- gout, and
- disorders that cause unusual bone growth (bone dysplasias) and bone death following problems with the knee's blood supply (avascular necrosis).

### **When it should be done**

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If you have already tried all the other non-surgical methods, and your pain is severe, even when resting, your doctor may advise knee replacement surgery (arthroplasty).

As any type of surgery carries a degree of risk, knee replacement surgery is only usually recommended when all other non-surgical methods have been unsuccessful.

#### **Non-surgical methods for knee relief include:**

- losing weight,
- physiotherapy to strengthen the muscles around the knee and reduce the strain on the joint,
- using walking aids such as a cane or crutch, or
- painkillers, anti-inflammatory medicines and steroid injections to reduce inflammation and pain.

#### **Who can have a knee replacement?**

Knee replacement surgery may be considered for adults of any age. Most people who undergo a knee replacement tend to be aged between 60 and 80.

There are a number of reasons that knee replacement is less frequent in younger people. The most common reason for knee replacement is osteoarthritis, which tends to affect people over the age of 50.

Knee replacements are also likely to last longer in older and typically less active people. So trying all the non-surgery alternatives is more likely to be recommended for younger patients.

However, as the technology used in knee replacements has improved, younger or more active people are now having better results from knee replacement surgery.

Regardless of their age, anyone who has knee replacement surgery will still need to be fit and well enough to cope with a major operation, and the recovery and rehabilitation required afterwards.

## **How it is performed**

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During surgery, the damaged parts of your knee joint will be removed and replaced by an artificial knee joint (prosthesis).

The prosthesis is made up of metal and special high grade plastic components.

You may have either a 'total' or a 'half-knee' replacement (arthroplasty). This will depend on how damaged your knee is. Most surgery is of the total knee replacement type.

### **Total knee replacement**

This is usually performed under general anaesthetic. This means you will be asleep through-out the procedure.

Sometimes a sedative is given instead, and an epidural is injected into your spine. This means you will not be asleep, but you will be less aware of what is going on and you will not be able to feel anything below your waist.

1. Your surgeon may place a tourniquet (a tight band) around your thigh. This will reduce the blood flow to your knee, making it easier to see the knee joint.
2. Your surgeon will make a cut down the front of your knee to expose your kneecap (patella). This is then moved to the side so the surgeon can get to your knee joint behind it.
3. The damaged ends of your thigh bone (femur) and shin bone (tibia) are very carefully cut away. The ends are precisely measured and shaped to fit the appropriate sized prosthetic replacement. A dummy joint is then positioned to test that the joint is working properly. The final adjustments are made, the bone ends are cleaned, and the final prosthesis is fitted.
4. The end of your femur is replaced by a curved piece of metal, and the end of your tibia is replaced by a flat metal plate. These are fixed using either special bone 'cement', or are treated to encourage your bone to fuse with the replacement parts. A plastic spacer is placed between the pieces of metal. This acts like cartilage, reducing friction as your joint moves.

5. A drainage tube may be inserted into the wound to collect any excess fluid. The tourniquet is released and the wound is closed with either stitches or clips. A dressing is then applied to the wound, and sometimes a splint to keep your leg immobile.

The surgery usually takes 1-3 hours.

### **Half-knee replacement**

This is also called a 'unicompartmental knee replacement'. This may be suitable if only one part of the knee is damaged.

The procedure is easier to perform than a total knee replacement. It usually means a shorter stay in hospital and a quicker recovery.

However, the replacement may not last as long as that in a total knee replacement. Furthermore, if the condition of your knee gets worse (through further arthritis for example) and a total knee replacement is required in the future, it may be more difficult to perform.

### **Minimally invasive, or mini-incision surgery (MIS)**

This new technique can be used for either total or half-knee replacements, but it is currently more commonly used for half-knee replacements.

The surgeon makes a smaller cut over the front of the knee than in standard knee replacement surgery. Specialised instruments are then used to manoeuvre around much of the tissue, rather than cutting through it. This should result in a quicker recovery.

Compared to the standard technique, MIS is still relatively new, so not as much information on its long-term success has been gathered yet.

The National Institute for Clinical Excellence (NICE) has looked at the MIS technique compared to the standard technique for total knee replacements. They compared how well joints from the two different techniques worked, and the safety of the patients. From the studies examined so far, the MIS technique may give patients better mobility in the short-term, but the longer term effects are not yet known. Not many studies on the safety of the MIS technique have been carried out.

NICE has decided that there are still uncertainties about the benefits and risks of this new technique to patients. More information needs to be collected.

If you are considering MIS for your knee replacement, you should discuss these issues with your doctor. If you do go ahead with it, you may be asked if your details can be used to help gather more information.

## **Complications**

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All surgery carries a slight degree of risk. However, most people do not have any complications. Knee replacement surgery (arthroplasty) is now a routine and commonly performed operation in the UK.

Someone who is fit and with no other medical problems will be at a lower risk than a person with multiple medical conditions.

Evidence indicates that the risks of complications are reduced, and patient satisfaction with the outcome is increased, if the surgeon is familiar with the procedure..

Your anaesthetist and surgeon will be able to answer any questions you may have about your personal risks from anaesthetics and the surgery itself.

## **Anaesthesia**

Anaesthetics are extremely safe, but they do carry a risk of minor side effects such as sickness and confusion (usually temporary), and also a slight risk of serious complications.

The risk of death in a healthy person, who is having routine surgery is very rare. The figure is around 1 death for every 100,000 general anaesthetics given.

However, the risk increases if you are older, or if you also have other health conditions, such as heart or lung disease.

## **Infection**

There is a risk that you may develop an infection after your surgery. This can usually be treated with antibiotics.

In rare cases, a severe infection can require removal and replacement of the artificial joint (revision surgery).

You may also need to take preventative antibiotics before dental work or other surgery in the two years following your knee replacement. This is to prevent an infection developing in your replacement knee. Speak to your doctor or specialist for advice.

## **Bleeding**

If excess bleeding occurs during surgery, you may require a blood transfusion to replace the blood you have lost.

### **Local tissue damage**

The surgery to replace your knee could result in damage to other tissues surrounding your knee.

### **Injury to other organ systems**

Very rarely there may be some injury to the veins and arteries of your leg, or to the nerves in your leg.

### **Allergic reaction**

It is possible that you may have an allergic reaction to the bone cement, if this is used in your procedure.

### **Fractures**

The bones around the artificial joint can become fractured as it is fitted. This may result in you having a plaster cast to help the bones heal, or in some cases it may require further surgery to correct.

### **Scarring**

You will have a scar across the front of your knee where the incision was made. In some cases, you may also have numbness around the scar. This numbness may never go completely.

Scar tissue can also build up inside the knee, restricting movement.

### **Blood clots (thromboses)**

These may also form in the deep leg veins (deep vein thrombosis) as a result of reduced movement in the leg during the first few weeks after surgery. They can be prevented by using special support stockings, starting to walk or exercise soon after surgery, and by using anticoagulant medicines.

## **Recovery**

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### **Hospital stay**

You will probably need to stay in hospital for 6-10 days, depending on what progress you make, and what type of knee replacement you've had.

Patients who've had a half-knee replacement tend to have a shorter hospital stay.

During your hospital stay you will see a physiotherapist who will give you some exercises to help you recover.

At first, you may be using a continuous passive motion (CPM) machine to restore movement in your knee and leg. This support will slowly move your knee while you are in bed. This helps to decrease swelling by keeping your leg raised, and helps improve your circulation.

After a few days you will be using a frame or crutches to move around. These will be replaced with walking sticks after around a week. You will probably be advised to carry on using the walking stick until you have been re-assessed at your hospital follow-up appointment. This appointment is normally around six weeks after your surgery.

The wound left by your surgery (arthroplasty) will be kept covered, and will need to have the dressing changed regularly until it has healed over. Any staples or stitches in your wound will be removed several weeks after your surgery.

### **Recovering movement**

Your physiotherapist will give you an exercise programme in hospital. These exercises are an important part of your recovery, so it is vital that you continue with them once you are at home.

Your rehabilitation will continue to be monitored by a physiotherapist when you attend your appointments at the out patients physiotherapy department

You may be given some specific exercises to carry out, as well as advice on taking short walks and carrying out normal household activities, such as walking up and down stairs. These exercises will help restore your movement and strengthen your new knee.

Most people find it possible to resume normal leisure activities 3-6 weeks after their surgery. However, it may take up to three months for your pain and swelling to settle down.

As soon as you can bend your knee enough to allow you to get in and out of a car, and control the car properly, you can resume driving. This is also usually around four to six weeks after your surgery, but you should check that you are safe to drive with your physiotherapist or doctor.

Most people are also able to return to work at around this time, but it will depend on how physically demanding your job is.

Your knee will continue to improve over the next two years, as long as you keep up your recommended exercises, and follow your doctor's and physiotherapist's advice.

The hospital will usually arrange additional follow-up appointments to check your progress every two years. Follow-up appointments may even continue for the rest of your life.

### **Future prospects**

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You will need to continue with the exercises and follow the rehabilitation advice you are given to get the best from your knee replacement. Surgery alone will not guarantee improved movement and reduced pain.

#### **How long will the replacement knee last?**

Normal wear and tear through everyday use means that your replacement knee will not last forever. However, a recent UK study (the Trent Regional Arthroplasty Study) has found that over 90% of artificial knees (from first-time total knee replacement surgery) were still working 15 years after the surgery.

Therefore it is likely that your replacement knee will last at least 10 -15 years. This may be achieved, and perhaps increased, by making sure you look after your new knee properly and taking care to avoid straining it. Ask your physiotherapist for advice.

There may be some activities, such as running or high impact aerobics, that you will be advised to avoid.

#### **Can I have another knee replacement?**

Revision knee replacement surgery (replacing the replacement knee) is usually more complicated and a longer procedure than the original surgery (called primary knee replacement). Recovery may also be slower.

Success may also vary depending on the reason for the revision. For example, most people tend to be more satisfied (in terms of pain and mobility) after revision surgery to correct loosening of the joint, than they are after revision surgery following infection of the joint.

While there is no set limit to the number of times you can have revision surgery, it is widely accepted that the artificial joint becomes less effective each time it is replaced.

Research has shown that patients become less satisfied with their artificial knee, each time it is replaced. This is another reason why a knee replacement is less likely to be recommended for younger patients.

## References

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THE NATIONAL JOINT REGISTRY (2007) National Joint Registry for England and Wales 4th Annual Report. 10-11, 20, 89-98. Available from://www.njrcentre.org.uk [Accessed 15 February 2008]

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