

# Total Knee Replacement Surgery

## Knee arthritis

Osteoarthritis is caused by old injuries, bow-legs, knock-knees and being overweight. Rheumatoid and other forms of arthritis can also damage the knee. Symptoms of arthritis include pain, stiffness, swelling, catching or locking, and lead to disability. Disabilities refer to the things you can't do. For example – being unable walk a certain distance, difficulty getting out of a chair, or climbing stairs. From a personal level it might be that you can't work, play bowls, or golf.

Non-operative treatments may include; paracetamol, anti-inflammatory tablets, activity modification, exercise, weight loss, shoe wedges and a walking pole.

Before undergoing a knee replacement it's important to have a severe enough problem that the benefit of surgery exceed the risk involved.

Knee replacement surgery is not pain-free!



Figure 1. This front on x-ray has been done with the patient standing. The reduced joint space on the right side of the picture is indicative of moderate arthritis.

## Knee replacement basics

Knee replacements are made of polished metal and plastic, these are held in place with bone cement. They use your existing ligaments to "hold it together". The human body is happy enough with the implant – but often "impact loading" such as running may cause swelling. The implant can click, this is not a problem, and in time is easily ignored.

Patients expecting their new knee to be like a normal knee will be disappointed. Knee replacements don't get as much movement as a normal knee in a thin young adult. Knee replacements may still have some tenderness, and may not be comfortable to kneel on. Investigation sometimes finds a problem- however, this could be that the patient's expectations were too high.

## A Knee Replacement



Figure 2. Vanguard knee replacement (with better alignment)  
Note-the plastic can't be seen, and the kneecap can't be seen on this view.

Vanguard is made by Biomet and is based on evolution of technologies. The plastic component (ArCom) is manufactured by compression moulding, then gamma irradiating in an inert gas, minimizing future wear of the component.

## What is Navigation?

The results of knee replacement are related to how well the knee is aligned. A normal leg has a straight line from the hip to ankle passing through the middle of the knee. Arthritic knees invariably have some deformity (eg “bow-leg”) and this must be corrected at the time of surgery. We have been using alignment guides introduced in the 80’s with a rod placed inside the femur. It carries the downside of pushing some marrow into the bloodstream, but doesn’t give perfect alignment.

### OrthAlign

Our current preferred technique is with OrthAlign KneeAlign2 system. It uses smartphone accelerometer technology to locate the centre of rotation of the hip and ankle.



*The OrthoAlign system in use. A single use disposable device is demonstrated here aligning the tibia to ensure the cut is perpendicular to the long axis of the bone.*

Advantages include: no additional pre-operative imaging required, and apparent ease of avoiding overcorrecting deformity such as “bow leg” into a “knock knee” position.

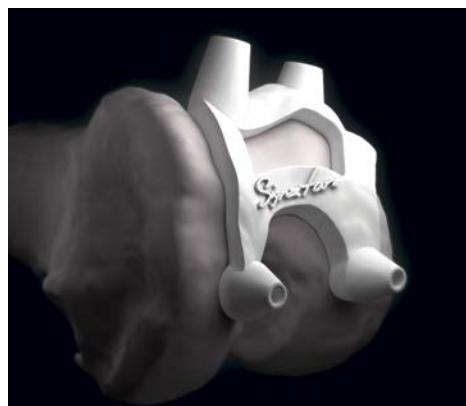
### Computer guided navigation

Computer navigation has been available since 2008, using additional aiming guides inserted into the leg during the surgery, and a computer to confirm alignment. It has reasonable support in the literature, but pin sites can be a trouble, and longer surgery might increase infection rates.

### Signature System

Patient specific instrumentation is based on CT or MRI images of the knee, hip and ankle being used to create three-dimensional moulds using 3D printing technology. This technique was extensively used from October 2009 and early 2014, and achieved results better than traditional instrumented alignment, the accuracy was not great enough to rely on, and adjustments were required.

None the less the technology has been useful and there may be circumstance where it will still be used.



*Signature Patient Specific Instrumentation (PSI) Based on MRI scans, the machining guide holes can be drilled.*

## **Irrespective of the system used:**

- Better alignment means your knee replacement should last longer.
- Better rotational alignment makes the ligaments happier achieving a better range of movement.
- Less operating theatre time reduces post-operative pain and reduces infection risk.
- Avoiding the rod inside the femur puts less of a stress on the body, improves recovery, and reduces post-operative confusion and blood clots.
- Reducing the stress on the body surgery means patients with underlying medical conditions are relatively safer to have surgery.

## Why is it better to have only one night in Hospital?

### Firstly – reflect on the old days

When hip replacement was popularised around 1962, knee replacement over a decade later, the operations were painful, and the general consensus was that rest would be good for the patients. The old surgical approaches to the hip joint weren't great, and results might have been better by slowing down the patients. Patients were admitted to hospital often days prior to the surgery for tests and meeting other doctors involved in the care.

Two complications were particularly prominent: infections and blood clots. Antibiotics were added to the treatment, blood thinners also administered. Through the 1990's wound were more prone to bleed and more dressing changes required. Drain tubes were a routine part of surgery. To control pain morphine pumps were used, more recently "patient controlled analgesic systems". These required a drip to be running and oxygen administered. Urinary catheters were required in 80% of our patients in 2003, so it became routine to insert at the start of the operation. Patients were effectively tied to the bed.

Immobility adds to blood clots, chest infections, even pressure sores. Urinary catheters add to the risk of urinary infections. Bleeding from the wounds required dressing changes, exposing patients potentially to other patients bacteria, even in wards where single rooms are available.

### A new way of looking at it

If the surgery was not very painful, the patients could get up and move. We find the first time patients gets up they get dizzy, whether it is day three after

surgery, or two hours. The next time they are usually fine. If they can get up and walk, they are less likely to get blood clots – in fact in the absence of a history or family history of blood clots, we virtually never see them. If the patient is comfortable, and only needs tablets for pain, there is no need for a morphine machine. No morphine machine means the patient need not be "tied to the bed", and probably won't have nausea or vomiting. We find patients are almost always independent by after lunch the day after surgery. There are surgeons in the USA doing joint replacements as day surgery!

If the patient is moving well, pain well controlled, not nauseated, and safe, why not go home? By getting out of hospital, the risk of being exposed to other patients' bacteria is dramatically reduced, and our lower infection rate reflects this. We do have a scoring system RAPT score to check it is plausible to go home. Scores of more than 9 will probably go home the day after surgery. RAPT scores less than 5 probably need to go to rehabilitation.

Perversely, the funding systems discourage the hospitals from short stay. The hospital is paid less for short stays, and the patients and their family need to work harder. But it is in the interest of better results to go home. Some people feel that they are being "thrown out of hospital" – no one goes home if they don't pass the checklist. By going home – less infections, and less clots.

Going to the patients own home is usually best. At someone else's house, there is a lesser tendency for the patient to get up and do things. Getting up and doing things is what we need! It is hard to check the temporary and permanent house are both safe.

Where people live alone, we'd like a friend or relative to stay the first night or two at home with the patient. Where family lives next door, or within 15minutes, even an empty house is often acceptable.

# The Process of having and recovering from a knee replacement

## Getting your knee fit for surgery

The greatest predictor of the final movement is the amount you had before the knee replacement! Quadriceps strength can easily be improved and helps the recovery. Our preferred timeframe is eight weeks between confirming your surgery, and having the surgery. During this time, you and a physiotherapist should work to improve muscle strength. The exercise bike is a useful tool to achieve this – both before surgery, and after. Some people can't bend their knee ninety degrees, which makes it hard to use a bike. BUT - the most common reason a bike isn't used is the physiotherapist doesn't know the surgeon.

## Other health issues before surgery

Dental infections / planned dental clearance should be addressed well prior to surgery.

Unless you have already seen a physician, we may not have been fully informed of your history of angina, strokes, peptic ulcer symptoms, and recent infections. If you are aware of any health issues that may impact on the surgery – let us know!

## Looking after the leg before surgery

This is important! Sometimes patients turn up with cuts and infections on the leg we are planning to operate on – and get sent home. In the few weeks before surgery, gardening or other activities where you MIGHT injure your shin should be avoided. Or at the very least take appropriate precautions (eg sturdy trousers) to avoid injury.

## Physician Assessment

Physicians are doctors specializing in adult internal medicine. Most patients having a knee replacement will not need a physician unless they have other serious health issues.

## Getting your house ready for going home

- Remove unnecessary mats & rugs
- More space around furniture to allow easier mobilising with crutches
- Raised toilet seat & hand rests
- Handrails in shower
- Sitting options include carver chairs
- The pre-admission clinic will also go over these requirements.

## Pre-admission Clinic

At St John of God Hospital, most patients attend the pre-admission clinic to ensure all the required tests have been done (including a urine test) and that you are familiar with the hospital, and its layout. Sometimes this is arranged by telephone alone

## What to bring to hospital

You will only be staying briefly, so don't bring too much. Wear to hospital the clothes you will wear home. Nightgowns and shortie pyjamas allow for easier access for dressings / bandages / having the wound attended to & topped up with local anaesthetic agents. A second set of night attire allows for any drama like needing to wash the first set. Bring some magazines, but don't bother with laptops. A mobile phone has both negatives & positives. Aim not to bring any jewellery.

## **Admission to hospital**

Typically patients are admitted on the day of surgery to the hospital through the Surgical Admission Unit. Same day admission has successfully reduced the risk of post-operative infections. You will be advised when to “fast” from prior to admission, it is important to have an empty stomach for safe anaesthesia. No solid food is permitted for six hours, Gatorade 2 hours.

## **Anaesthesia**

The best anaesthetic overall is a combined spinal and general anaesthetic. This is used in conjunction with local anaesthetic infiltration to ensure minimal pain. The anaesthetist will meet you before you go to the operating theatre to discuss any concerns. If you are a high-risk patient, it may be appropriate to meet the anaesthetist some weeks prior to surgery.

## **Recovery room**

Typically you will wake up in the recovery room, adjacent to the operating theatre. The nurses there closely monitor you. Ice packs will be applied to your knee. Occasionally a top-up of the local anaesthetic mix is given in recovery.

## **Tubes**

We aim to have the minimum number of tubes connected to you. The drip is usually left in until the day after surgery. Oxygen may administered in the first 24 hours, but is not required all of the time. We only put in a urinary catheter if it seems likely you will have trouble voiding.

## **Orthopaedic Ward**

You are moved to the ward on your bed. When you are alert, start getting some Gatorade drink into your stomach. The nurses will check on your leg and get your knee more ice packs. A light diet

only for the day after surgery is recommended.

## **Physiotherapy**

Typically our intention is to have you out of bed on the day of surgery to minimize the risk of chest infection and blood clots. The physiotherapist will be there probably the first time you get up, then just the nurses. 95% of people are independent by 24 hours from surgery. Walking aids may start with a frame, and changed to using two crutches as soon as possible. Some people use only a walking stick at discharge from hospital.

## **Post-operative aims for recovery**

|                   |          |        |
|-------------------|----------|--------|
| First time up     | 2 hours  | (2-24) |
| Independent       | 16 hours | (8-48) |
| Discharge home    | 1 day    | (1-4)  |
| Inpatient rehab   | < 5%     |        |
| Outpatient physio | 20%      |        |

## **Getting on with recovery**

There are three things to getting good knee function after a knee replacement. It needs to go straight, it needs to bend and you need to walk. Whether you are home or in hospital, these three things YOU need to do. You need to take enough painkillers to achieve all three of these.

## **Walking**

Our intention is to start you walking on the day of surgery. At the very least, standing or sitting briefly on the edge of the bed allows your body to adjust to being vertical again. We find that people walk MORE if at home than in hospital.

## **Getting the knee straight**

Usually a pillow is placed behind your ankle when in bed. This is so the knee rests fully straight. DO NOT put a pillow behind your knee, as this has the opposite effect. There are very limited circumstances a pillow may be used behind your knee.

## **Getting the knee to bend**

This is not as important in the first two days, and indeed may cause the knee to swell excessively. It is OK to bend the knee to get out of the bed or chair. After the first two days, we are keen for you to make the knee bend. This happens fairly easily but some patients need to do additional exercises after the first three days to get the knee going.

|                     |          |
|---------------------|----------|
| Bending 90 (degree) | 5 days   |
| Bending 110         | 12 days  |
| Bending 120         | 6 weeks  |
| Bending 135         | 6 months |

## **Do I need to go to inpatient rehabilitation?**

The majority of people DO NOT need inpatient rehabilitation. We have found that even people over 80 years old are fit to go directly home by day 4 – if there will be someone with them. We use a system called RAPT score to assess you'll be OK.

Going to a friend's house is not always ideal. It may not have a rail in the shower to hang on to. Preferably the shower can be walked directly into, rather than needing to step into a shower/bath.

## **Going Home**

### **Tablets & things to take home**

You will take home some tablets – some as background painkillers, and some to top up with if you have significant pain. Scissors will be provided for you if you need to remove the bandage. Also, a

spare dressing and tubigrip (to pull up over the knee) is supplied.

Older patients may need a raised toilet seat, handrail in shower and better sitting options such as carver chairs. Younger, stronger patients often don't need any special aids.

## **Living Alone?**

Everyone is best to have someone stay with them for the first night. You will need to stock up the freezer before going to hospital, and someone to check on you daily (bread/milk/newspaper etc). Obviously if the corner shop is an easy walk away, you can do this quite soon after the surgery. A Safety Link necklace could theoretically be used for a couple of weeks after the surgery.

## **Back up plan**

A key part to going home is having someone to contact with concerns. In hours you can call the rooms on **5332 2969**.

Out of hours you can call the St John's Orthopaedic Ward on **5320 2140**, or the Ballarat Base Hospital ward on **5320 4640**.

Most problems only require advice, but perhaps one person per year needs to go to the emergency department.

## **Bowels**

We routinely advise taking Movicol twice a day to avoid constipation, which may become extreme. Eat plenty of fruit and walk frequently. Avoid Panadeine Forte, a common painkiller, although all painkillers can do it. Prune or cloudy pear juice is a classic remedy and probably should be taken on day two (ie Saturday after a Thursday operation). If your bowels havn't worked within three days of surgery please seek advice from your local Pharmacy. If they still haven't

worked the next day – contact your surgeon.

## Pain

Different people have different amounts of pain. If the knee is painful at night, take Tramadol before bed. If this isn't enough, phone your surgeon. Typically, Amitriptyline or Lyrica is prescribed if you still have pain after two weeks.

## The bandage

At the time of surgery a firm multi-layered bandage is used. This should stay on for at least 24 hours. If you have a long distance to drive home the bandage may stay on until you get home. The bandaging often has some blood soaked into it, sticking the layers together. The easiest way to remove the bandaging is to cut it off with a pair of scissors. We recommend doing this in the shower recess on a plastic chair. If the dressing is leaking blood out the edge, remove it, shower, and pat the wound dry. Put the new dressing on. It should not need changing again. Some scissors have a blunt tip – this is the side that should be against the skin! The underlying plastic dressing usually stays on (it can be changed) and a tubigrip pulled on to give some compression.

## What will the leg be like?

The knee will be swollen and bruised underneath the bandaging. When the bandaging comes off there will be indentations from the bandaging, sometimes even red patches and a few blisters.

The edges of the wound are usually a bit pink for about a centimetre – this is normal healing and not infection. The knee will be warm, even hot – as part of the healing reaction. Ice packs (or frozen peas) are very helpful in the first week.

Bending the knee is difficult at the start. The thigh muscle feels weak and you may require crutches to avoid falling until you have your strength. The swelling can get worse over the first week- this is normal.

The knee typically will have some areas of numbness at the front – this gradually gets better. The swelling & heat in the knee typically stays for 3 months, it may take 12 months for the swelling to go.

## What to do in the first week:

Take the Panadol four times a day, Mobic 7.5mg twice a day, & Aspirin (Cartia 100mg) once daily. Leave the Norspan patch on until the staples are removed.

You should walk every hour when awake. When not walking, you should put your leg up – the lounge suite is best.

You should do bending exercises. Sometimes the other leg can be used to help make your operated knee bend.

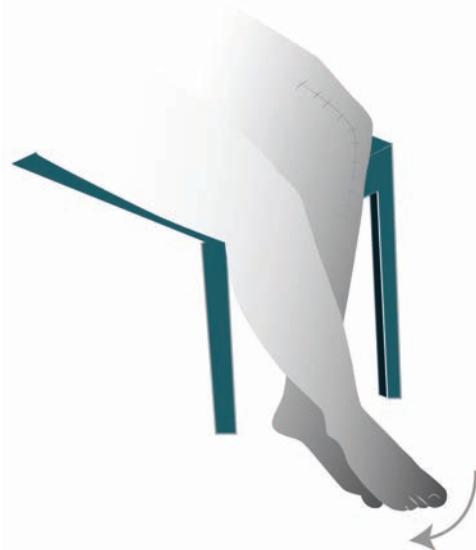


Figure 5. Passive flexion exercises (diagram) using good leg to bend the operated side

## **Second week:**

You should walk every hour. You probably will only need a walking stick. When not walking, you should put your leg up. The swelling is usually at its worst about a week after the surgery.

Once the swelling is at its worst –bending every day will see it getting better every day. Aim for 100 degrees for the day the staples are due out, back off for a couple of days, then aim for 110 degrees at the end of the second week.

The metal staples holding the skin together are removed at about ten days from the surgery. This is typically at the consulting rooms at 707 Mair Street, but sometimes we arrange a district nurse to visit you, or the rehab department will attend to it.

## **Third week**

Exercise bike – get strength & more flexion back. Might need to start off with the bike seat high for 5 minutes, then slightly lower the seat for 10 minutes. Aim for 2-3 times per day.

## **More aggressive bending exercise**

Historically only 50% of people achieve kneeling in Western societies after knee replacement. Whether or not you want to kneel, we would like you to commence an exercise at three weeks from surgery. Putting the operated knee and the front of the shin to the ankle on a well padded chair or bed, and trying to “sit on your haunches”. This is also a VERY good way of pushing the flexion range.

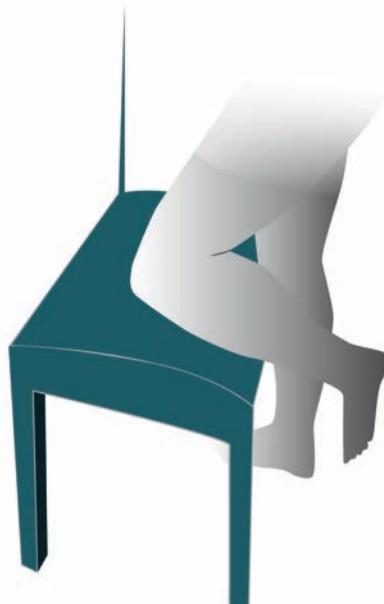


Figure 6 Passive flexion exercises (diagram) kneeling on the edge of a padded chair

## **Resuming Life!**

Knee replacement surgery aims to improve your pain and disability. Now you've had it done, you should get on with life.

Walking up and down the street should be undertaken as soon as possible, probably the day you go home from hospital. Then you know you can do it, and know that you will be able to do a bit more the next day. Some people feel they should stay inside their house – this makes no sense. We would rather that you walked every hour to help to reduce the swelling of the calf. Obviously the first time, someone should be with you. A mobile phone with you is best.

In short, it is possible to resume “life” as soon as you go home. If you want to tinker in the shed, fine. If you want to cook, fine. If you want to go and visit a friend, fine. If you need to take a tablet to achieve these things, fine. It is better to be active, although prolonged standing still should be avoided.

## Sleeping

Do not put a pillow under your knee in bed, the knee will become harder to get out straight as a result. Usually the Tramal helps you get some sleep if pain is the issue.

An occasional patient can't use Tramal. Endone isn't great as it wears off during the night. About 5% of people have pain or disturbed sleep enough to use Endep 10-20mg at night, or Lyrica 75mg twice a day.

## Driving after Knee Replacement

There is a recommendation from the Arthroplasty Society of Australian that patients cannot drive for six weeks after surgery. Discuss return to driving with your surgeon.

*When you start driving you should:*

- Have mobile phone turned off
- Have radio/music turned off
- Start with short distances
- Avoid peak hour traffic
- Avoid tailgating – your reaction times will be off by 0.8sec & this could translate to 50m more stopping distance.

## Starting kneeling

Kneeling requires strength, range of movement, and a lack of tenderness, and also bravado. The kneeling exercise on a chair (see above @ three weeks) helps with the range of movement, tenderness and confidence. To kneel on the floor – for the first few times (at six weeks for instance) it is wise to do it on a carpeted floor or on a cushion, and to have a bench to push up on. An "EasyKneeler" is useful in the garden.

## When will my knee be normal?

Knee replacement is a major operation. It is basically right at SIX MONTHS from surgery. It will continue to improve until 3 years, but even by three months it should be better than pre-operatively.

A small number of people are never satisfied with their knee replacement. These fall into the categories of wrongly selected for surgery, wrong expectations of the patient, complications, and a group where no reason is ever found.

## What to ring us about...

- Nausea / vomiting
- Constipation not fixed by three days
- Black bowel motions
- Increasing redness or discharge from the knee

# Pain Management after Orthopaedic Surgery

## Avoiding Sources of Infection

### Dental Procedures

Some dental work is particularly risky for getting infection into a joint replacement. Dental infections can get into a joint. The most common recommendation is to take 2-3g of amoxicillin one hour prior to procedures where there is a risk.  
(Aust. Dent J 2005;50 Suppl 2:S45-S53)

### Skin wounds

Rose thorns, shin cuts, and open foot injuries are all high risk. Gardening is somewhat hazardous. The risk never completely goes away. Gardening gloves are essential and long sleeves add safety for pruning. Mowing should be done in trousers and protective shoes.

### Local Infiltration Analgesia

During joint replacement operations, local anaesthetic is infiltrated around the wound by the surgeon. This is mixed with anti-inflammatories – Toradol & dexamethasone and adrenaline. The surgeon leaves a wound catheter buried in the bandaging so that extra drugs can be injected around the joint replacement the following morning. It has a filter on it to avoid any contamination.

### Pain Patch

Norspan, a narcotic patch, is applied to the skin and gradually releases analgesia. This has allowed us to avoid having a drip – we aim to ensure it is easy to get up and about after surgery. If the patch is too hot, you may become nauseous or drowsy – typically in the shower. Try to keep the patch out of hot water. If your joint is sore you can warm up the patch by giving it a rub, or put on a

jumper. The Norspan patch is typically changed 6-7 days after surgery.

### Background tablets

Mobic is used twice a day for three weeks. For those that have a history of stomach ulcer, we ask you take an extra anti-ulcer tablet (eg Nexium/Somac) the night before and morning of surgery. Panadol may be used for the first few weeks

### Pain score

Nurses in recovery and the ward will ask you whether you have any pain, and to score it out of ten. It is important that you tell them if the pain is somewhere different than where the operation was. Most patients have a score of zero in recovery. Occasionally a top-up of the local anaesthetic mix is given in recovery.

### Top up medications

Tramal is our preferred drug to top up. Typically the order is 1-2 tablets, 4 hourly as required. Tramal is not always perfect, it can cause nausea or hallucinations, and can't be used with high doses of some anti-depressants. Usually we have had an opportunity of trying them in hospital before you go home.

### Swelling control reduces pain

Everyone who has sporting injuries knows Rest, Ice, Compression, and Elevation.

**Rest** means not bending it too much in first two days. It is still permissible to walk and exercise your feet up and down.

**Ice packs** are first applied in recovery, or as soon as possible after the surgery. Be a little careful with areas that have local anaesthetic that you may not be able to feel how cold it is. Do NOT apply ice directly to the skin, and apply it only 20 minutes at a time.

**Compression** is initially a bulky bandage extending to the foot. This stays on for a

minimum of one day. It is then replaced with Tubigrip, and a Venosan stocking.

**Elevation.** In the first two weeks, put your leg up when you can. Lying on the couch is better than sitting and swelling the knee.

### Avoiding nausea and vomiting

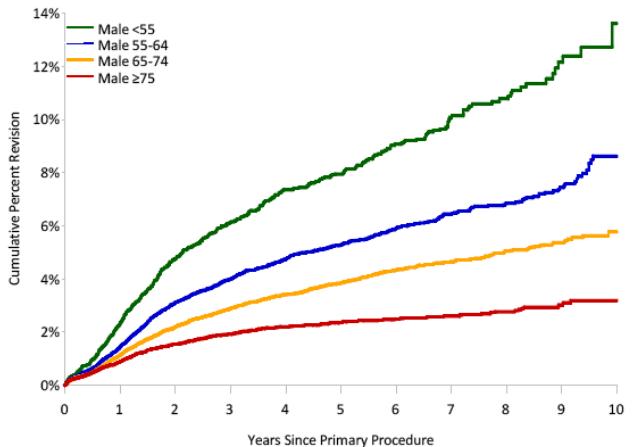
Our aim is to have you drinking fluid as soon as possible after the surgery, and start eating food by six hours. We generally try to avoid fruit juices for the first day as these sweet & acidic drinks can make you vomit. Gatorade is a sugar & salt drink – this can be used up to two hours before surgery, and when you are alert after surgery. If you feel sick tell the nursing staff. Anti-emetics can be administered. It is easier to control nausea early, rather than allowing to progress to vomiting.

### Chronic pain

If pain prevents sleeping it needs treatment to avoid becoming chronic. Amitriptyline 10mg at night, increasing to 20mg may suffice. It is strictly an anti-depressant, but in this instance it is prescribed in a comparatively small pain management dose.

# Revision Surgery Rates after Total Knee Replacement

The biggest factor in revision surgery is age. Men under 55 have a 14% revision rate at 10 years. The most common age group is 65-74, which does better with 6% revisions at 10 years.



## Females do better

Only marginally, but apart from the youngest age group, are up to 2% better at 10 years.

## Patella Resurfacing Does Better

We routinely resurface the patella. This reduces the re-operation rate by 1%. Even surgeons who routinely resurface the patella in people under the age of 60 years, a case-by-case approach is taken, as it is likely that patient will have a further procedure in the future.

## Minimally constrained does better

The surgeons at Ballarat Orthopaedics all use minimally constrained implants as the usual design. Some other surgeons remove the posterior cruciate ligament – the Australian Joint Registry data indicate that minimally constrained designs perform better. The posterior cruciate is typically removed with revision or re-do

operations, a bridge we hope to never need to cross!

## Joint Registry data

Around the world many orthopaedic associations have registries of all the joint replacements. The conclusions of each registry are not the same, the best performing implant not all the same. Typical knee replacements in normal aged patients fail at a rate of 0.7% per year.

# Complications Following Knee Replacement

A knee replacement is a major surgical procedure with serious complications. This list cannot be complete, but does deal with more common problems. Accepting and minimizing these risks is a responsibility of both the patient and the surgeon. If the patient doesn't accept that a joint replacement occasionally goes wrong, then they should not submit themselves to surgery.

## Skin loss & wound healing issues

We have had about 1 in a hundred people that have had a small area of skin loss over the front of the knee. None so far have required skin grafting, but dressings have been necessary and it is hard to get the full range of movement of the knee.

## Scar pain and numbness

The knee replacement involves cutting a number of layers to do the surgery. It is common for an area on the outer (lateral) area of the skin scar to be numb. The area may become smaller with time (years) but it is usually permanent. For total knee replacements, where a long incision is required anyway, we put the scar further towards the outside of the knee. Using local anaesthetic should also reduce the risk.

## Scar tenderness

The scar is expected to be tender for three months. The scar is not perfectly flat and takes some months to smooth out. The obvious scar is not the only one, deep layers are usually cut on the inner aspect of the kneecap and this will be tender for some months. Rubbing cream into the scar and the skin at the front of the knee helps.

## Stiffness

Knee replacement does not guarantee a normal range of movement of the knee. This is typically most obvious when trying to put on a shoe or sock, climbing stairs, or getting into a car. Less than 90 degrees of bend will be very disappointing to both the surgeon and the patient. Pre-operative training, pain management, and patients working hard minimises the risk

## Urinary catheterisation

Sometimes the bladder doesn't function normally after an anaesthetic. A tube is placed in the bladder to rectify this – it is usually left in for 1-2 nights. Rarely, there is a problem that a Urologist is required to fix with surgery.

## Thrombosis & pulmonary embolism

Clots can occur within the veins of the leg and pelvis before, during or after surgery. They are associated with a risk of dislodging and moving up to the lung. It can be fatal. Even if they remain in the leg, a "post phlebotomy syndrome" can leave permanent swelling of the leg and can cause ulcers to develop. Our standard approach is to use compression stockings, aspirin, and early mobilization.

If you, or a family member, have had a blood clot before, you **MUST** tell your surgeon to ensure additional steps are taken if required.

## Infection

Infections can occur directly after an operation, or even occur out of the blue many years later. The infection rate is quoted as 0.2 to 2%. Some patients may carry additional risk factors – tell us you have been exposed to MRSA or a previous staph infection. Diabetes, obesity, malnutrition and cigarette smoking all contribute to infections. To

minimize the risk of infection, we prepare the operation site with antiseptics, use antiseptic impregnated drapes, and use intravenous antibiotics at the time of and after surgery. At St Johns we have laminar flow operating theatres, and we use "space suits" at both hospitals.

Following knee replacement you must tell doctors & dentists before any procedure.

### **Bleeding from the stomach**

We have seen this in patients who probably had an undiagnosed stomach ulcer prior to their knee replacement. Where a risk is perceived, Losec is given. There is clear evidence that Mobic used in combination with Losec has virtually no risk even with a history of stomach ulceration.

### **Neurovascular injury**

Passing around the knee are nerves and arteries supplying the lower leg. Injury to these can result in permanent loss of function or viability of the limb.

### **Bowel obstruction**

Pain relieving drugs such as morphine can slow the gut action. On occasions the gut gets worse, becomes distended and may require surgical treatment! This is usually a "pseudo-obstruction" and occurs in 0.5% of cases. Since using our local anaesthetic cocktails, we haven't seen this problem.

### **Fracture**

A fracture of the tibial shaft can occur at the time of surgery, or after an injury. Fractures of the femur can occur just above the knee replacement. Either way, both may require surgery and a prolonged recovery period.

### **Complex Regional Pain Syndrome**

This rare diagnosis (previously known as Reflex Sympathetic Dystrophy) contributes to poor outcomes with pain and stiffness. If you have ever had this condition diagnosed in you, tell your surgeon so additional steps can be undertaken to minimize the risk. Our techniques of local infiltration analgesia and postoperative pain management minimise the risk of it occurring with this operation.

### **Dislocation**

Knee replacements rely on your ligaments. In extremely rare cases, if ligaments fail around the knee, the femur and tibia may dissociate. Obviously we have solutions to the problems, but it is unlikely the knee will be returned to normal.

### **Loosening**

For a variety of reasons, the fixation between the knee replacement and the bone may fail. This loosening may cause pain and require re-operation. An average re-operation is unlikely to be as good as an average first time operation.

### **Wear**

The plastic insert between the femur and tibia can wear. Typically the wear rate is in the vicinity of 0.04mm per year, so most people will never have a problem from this. Rare cases though may wear faster and require further surgery.

## **Extensor Complications**

The patella (kneecap) like other bone is alive, with a blood supply. Rarely, this dies, and can cause it to break into pieces. This might need surgery, that surgery may not be particularly successful. The tendon above or below the patella could rupture. The patella component could loosen. Surgery is recommended for each of these problems.

## **Dexamethasone**

We administer this to help with pain & nausea after surgery. Uncommon risks include mania and avascular necrosis of their hip.

## **Renal failure**

To minimise pain after the surgery we use anti-inflammatory medications. Patients that have had renal failure previously are at particular risk. Please inform us if you have previously had dialysis.

## **Stroke**

A stroke occurs in 0.2% of patients, causing possibly permanent weakness, and one in four die as a result. This risk is reduced as we administer aspirin as part of our blood clot reduction strategy.

## **Surgical team**

There might be 150 steps to getting an operation just right. The surgeon is responsible for every step. Some steps are delegated to nurses, administrative staff, surgical assistant and the orthopaedic fellow. Your surgeon's reputation is based not only on his own skill, but that of the whole team!

## **Other**

It is not possible to provide a full list of complications. Extremely rare occurrences eventually happen to somebody. In short, having a knee replacement involves taking on an element of risk. Ask your surgeon to clarify any specific questions you may have.