Day Case Partial Knee Replacement

Knee arthritis causes pain, stiffness, swelling, catching or jamming leading to disability. Arthritis in a single compartment often maintains a good movement, and the pain might be intermittently severe rather than continuous. The knee may be unreliable. Pain, disability, unreliability are all reasons to consider knee replacement surgery.

The design of the knee

The knee is a complex hinge joint. It has cruciate ligaments in the middle of the knee, dividing it into a medial and a lateral compartment. In addition, the quadriceps tendon has the "kneecap" (patella) within it, which rubs against the front of the femur (patello-femoral joint). When people develop arthritis many parts of the joint could be arthritic, but about 20% of people will have the arthritis limited to one compartment, the ligaments normal, and the knee not stiff.

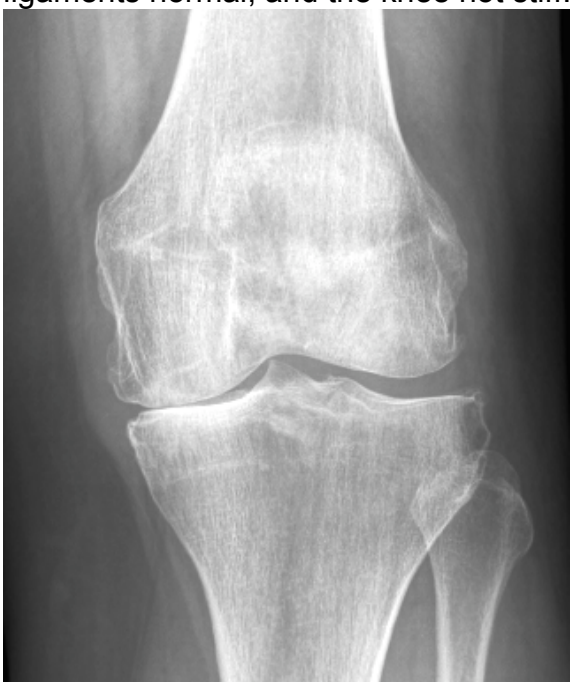

Fig 1. Medial arthritis, worn in just one area.

Partial Knee Replacement

It is possible to replace just the arthritic part of the knee. This keeps the knee feeling more like a normal knee, maintains the good range of movement, and the recovery seems faster. It is still major surgery but possible to be done as day surgery.

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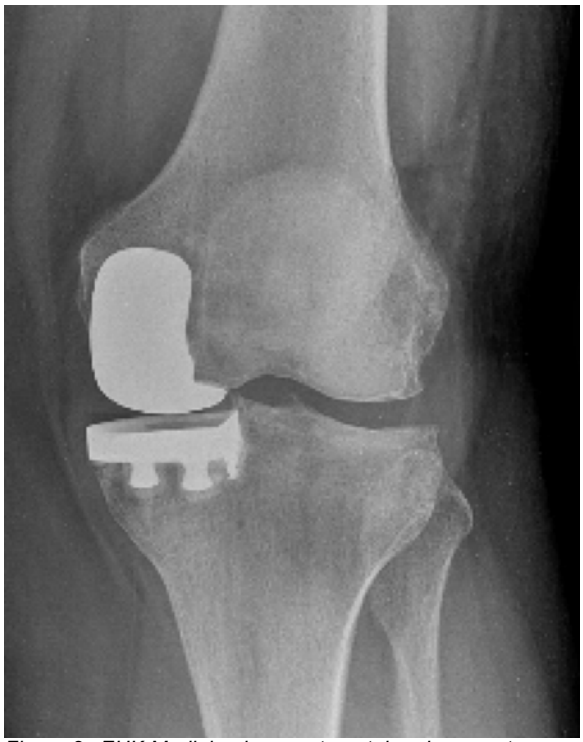

Figure 2. ZUK Medial unicompartmental replacement

Partial knee replacement is not an ideal solution if the patient is very heavy, the required components very small, or the knee cap (patella) is irritable (although patellofemoral replacement also works).

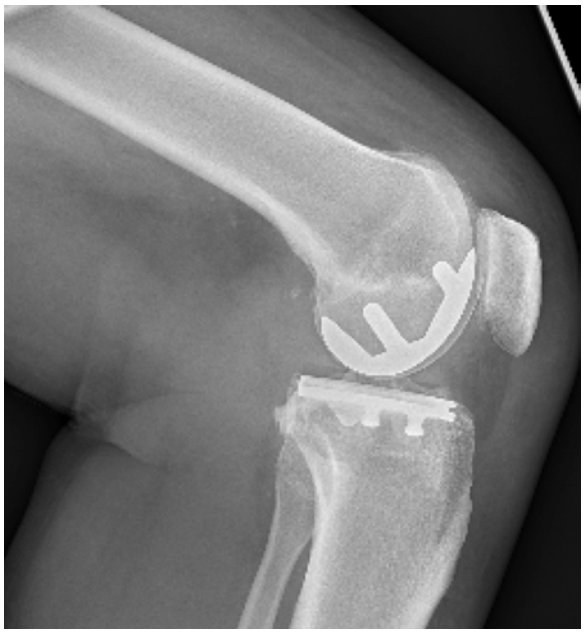

Figure 3. Side on (lateral) x-ray of the ZUK showing the kneecap (patella) to still have its native surface.

Other Compartments

The outer aspect of the knee (lateral compartment) can also develop arthritis,

although only 1 in 10 partial knees are lateral. The results for the lateral side are just as good as medial. The patellofemoral joint is higher risk but also benefits from easier recovery and better range of movement than TKR.

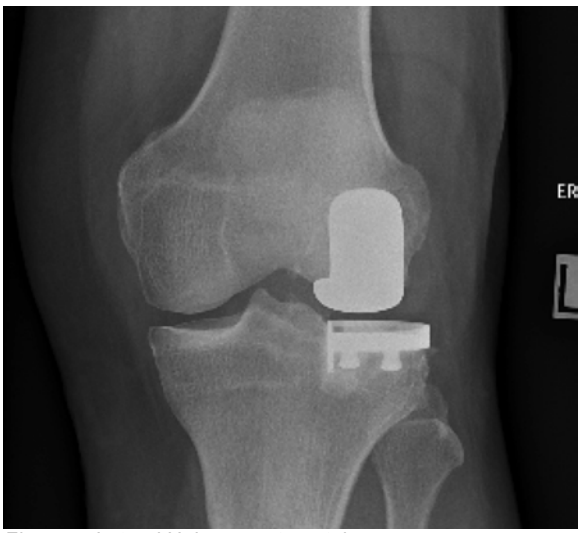

Figure 4. Lateral Uni-compartmental.

Partial knee better than TKR

In a randomised study between UKA & TKR, the Oxford medial compartment replacement was demonstrated to have a better range of movement, faster recovery, and more "excellent" results at five years. JBJS Br, 1998 80(5): 862-5

Long Term Results

The National Joint Replacement Registry here in Australia has tracked all hip & knee replacements since 2000. As of the year 2018, there are just over 50,000 partial knee replacements that the registry is tracking. The ZUK (Zimmer Uni-compartmental Knee) is one of the best performing, with 93.4% of the implants still functioning at 10 years.

The most common reason for failure is progression of disease – ie parts of the knee that were though to be good eventually become arthritic. It is possible to replace a second compartment (see figure 5) but the most common solution is to change to a total knee replacement.

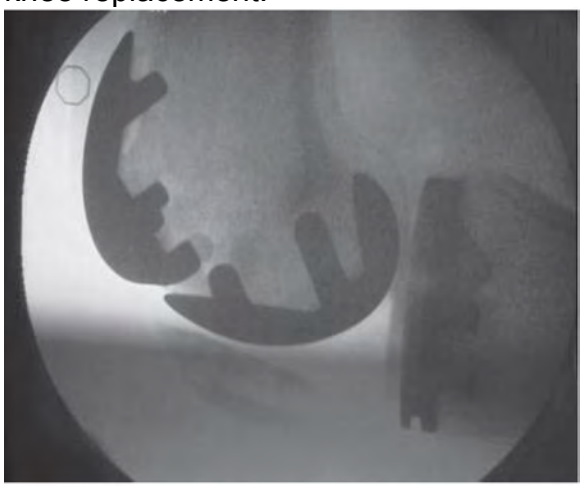

Figure 5. Patellofemoral & medial unicompartmental replacements ("bi-compartmental replacement).

Disadvantages

The failure rate for partial knee replacement seems slightly higher than for total knee replacement. Having said that, the best of the partial replacements have a failure rate of 7% at 10 years, with ALL comers. They are often used in younger, more active patients so this comparison may no be fair.

Total knee replacement after partial knee replacement is not easy. The failure rate for knee replacements revised from partial knee replacement is higher than that of primary knee replacement. Bone loss may need to be "augmented" with additional metal, and maybe a longer stemmed component. Most often standard implants are used.

Minimally invasive techniques

Minimally invasive technique involve using small incisions, protecting the quadriceps tendon and supra-patellar space, local anaesthetic mixtures, and "multimodal" analgesia. With these techniques, some patients choose to have the surgery done as day surgery. The ideal patient is well, not too old, and not have too long a travel distance.

Small incisions aren't necessarily an advantage - a longer incision more towards the outer aspect of the knee causes less numbness, less scarring and has a better likelihood of you kneeling.

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Why is it better to be out of hospital as soon as possible?

History

Partial knee replacement as day surgery has been around since 1993, when John Repecci introduced the technique. With his technique, a long acting local anaesthetic was infiltrated around the knee during the surgery (the patient has a general anaesthetic too, the local anaesthetic is to ensure the patient wakes up comfortable.) Subsequently it has been shown than using a more complex mixture in the injection allows the surgeon to reduce the inflammation, and make recovery easier.

Two complications are prominent in excess hospitalisation: infections and blood clots. Immobility adds to blood clots, chest infections, even pressure sores. Blood thinners are thus used, but excessive blood thinners can lead to wound ooze, setting up a risk of infection entering the joint. These risks are substantially lower in day surgery.

Our way of looking at it

If the surgeon ensures the patient is comfortable and the surgical soreness tolerable, the patient could get up and move. We find patients are almost always independent a few hours after surgery so it is possible to do partial knee 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 are generally acceptable to be done as day surgery. Scores less than 5 may need to go to rehabilitation, although with the partial joint replacement, even this might not be needed.

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" – but 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 both the temporary and permanent house are 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 live next door, or within 15minutes, even an empty house is often acceptable.

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The Process of having a partial knee replacement

Pre-admission Clinic

The patient's are assessed in the surgeon's rooms for their suitability for day surgery, the hospital may also phone to confirm this, and to instruct you what time to arrive at the hospital and when to last eat or drink.

We usually instruct you to have a 1/2 bottle of Powerade 2 hours before surgery - and hour & a half prior to admission to the hospital.

Admission to hospital

You will not need to bring much as you won't be at the hospital long! Bring a magazine to read if you need to fill in time, and a pair of crutches. Dress in baggy clothes eg track suit - the knee will have an extensive bandage on it after surgery.

Anaesthesia

Most patients have either a general or a spinal anaesthetic. The anaesthetist will meet you before you go to the operating theatre to discuss any concerns. You will wake up in the recovery area, adjacent to the operating theatre.

Recovery Ward

An icey-pole is provided in the recovery ward to help wake you up and prepare the body for moving. The nurses will check your blood pressure laying down, then sitting up, then will stand you up to check you're not dizzy. If you are, they have drugs to administer! If not, a short time later you'll walk to step down recovery.

Step down Recovery

The key is to "Eat, Eat, Eat" - drinks and light food will be provided. Your blood pressure will be checked again. The surgeon may top up your knee with additional drugs through a special wound catheter into the knee joint.

What will the knee be like?

The knee will be heavily bandaged after the surgery. This intentionally makes bending the knee difficult, and the thigh muscle feel weak. Despite this, we need you to push the movement of the knee, and work on regaining the muscle strength.

Pain relief

At the time of surgery, extensive local anaesthetic is placed around the knee-joint; this wears off after about 18 hours. Tablets (some regular, some only if you need) is sufficient. Occasionally a patient will be more sore than expected - in these cases we use a Norspan patch applied the front of your shoulder.

How much to do when you go home?

You're recovering from a sport injury. Lay down and put your leg up when you're not doing something, eg on the lounge suite, with an ice pack. We don't need you to be house bound, and definitely don't spend much time sitting. It is OK to walk, indeed we don't want you to rest more than one hour at a time, we expect you to get out of the house a few times a day.

DIAGRAM OF LAYING ON LOUNGE SUITE....

Taking the bandage off.

The bandage usually stays on for two days, it is easiest to remove with a pair of scissors. The dressing underneath is waterproof. **The underlying dressing can be left intact until your next appointment if there is just a little blood staining inside it.** You'll have a spare dressing provided - if the dressing looks like a "blister full of blood" - change it in the shower recess where it's easy to clean up the mess. Shower,

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pat dry, some antiseptic on, then dressing. Tubigrip should be applied.
DIAGRAM OF TUBIGRIP

Stockings

Compression stockings prevent excess swelling occurring below the knee. They are used during daylight hours on both legs for two weeks from surgery.

DIAGRAM OF FOOT ON CHAIR

Driving

When you are able to walk unaided, and are not using strong pain killers, it is possible to drive. Most patients after a partial knee replacement are ready to drive at two weeks.

*Dental and invasive procedures****

For six months after joint replacement surgery you carry an increased risk of infection of the joint replacement with dental procedures and other surgery. Ask your dentist to provide antibiotics prior to cleaning or infective procedures.

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Pain Management after Orthopaedic Surgery

Pain scores & Discomfort

Nurses in recovery will ask you whether you have any pain, and to score it out of ten. If you can get basically comfortable by moving yourself about, the score is probably 2 or less.

It is important that you tell the nurses and doctors if the pain is somewhere different than where the operation site! Most patients look comfortable in recovery. But if you report pain at 5/10 you are likely to get morphine like injections, which might trade the pain for nausea. At 7/10 people are visibly in pain – teeth clenched, pale appearance, sweaty brow. 10/10 pain is rarely seen and described as "screaming pain"

Local Infiltration Analgesia

This is a key technique that we are expert with in Ballarat. Local anaesthetic mixed with anti-inflammatories – Torodol & dexamethasone is infiltrated around the wound by the surgeon. The surgeon may leave a wound catheter buried in the bandaging so that extra drugs can be injected around the joint replacement the later in the day It has a filter on it to avoid any contamination.

Background tablets

Mobic - anti-inflammatory
Panadol - this helps too !
Somac - reduces risk of stomach ulcers
Movicol - avoids constipation

Top up medications

Tramal is the preferred drug. Typically 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. Sometimes we use Tapentadol, both seems more effective and less habit forming than Endone.

Swelling control reduces pain

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 much better than sitting.

Avoiding nausea and vomiting

Our aim is to have you drinking fluid and food as soon as possible after the surgery. We generally try to avoid fruit juices for the first day as these sweet & acidic drinks can make you vomit. Powerade 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. It is easier to control nausea early, rather than allowing vomiting.

Pain Patch.

Most patients don't need one of these, but if more sore than expected, a Norspan patch is a handy way of increasing background pain killers into the system. It is a narcotic, so if the patch is too hot, you may become nauseous or drowsy. If your joint is sore you can warm up the patch by giving it a rub, or put on a jumper.

Other drugs

Occasionally a burning sensation can prevent sleep - we use a small dose of Amitriptyline to solve this.

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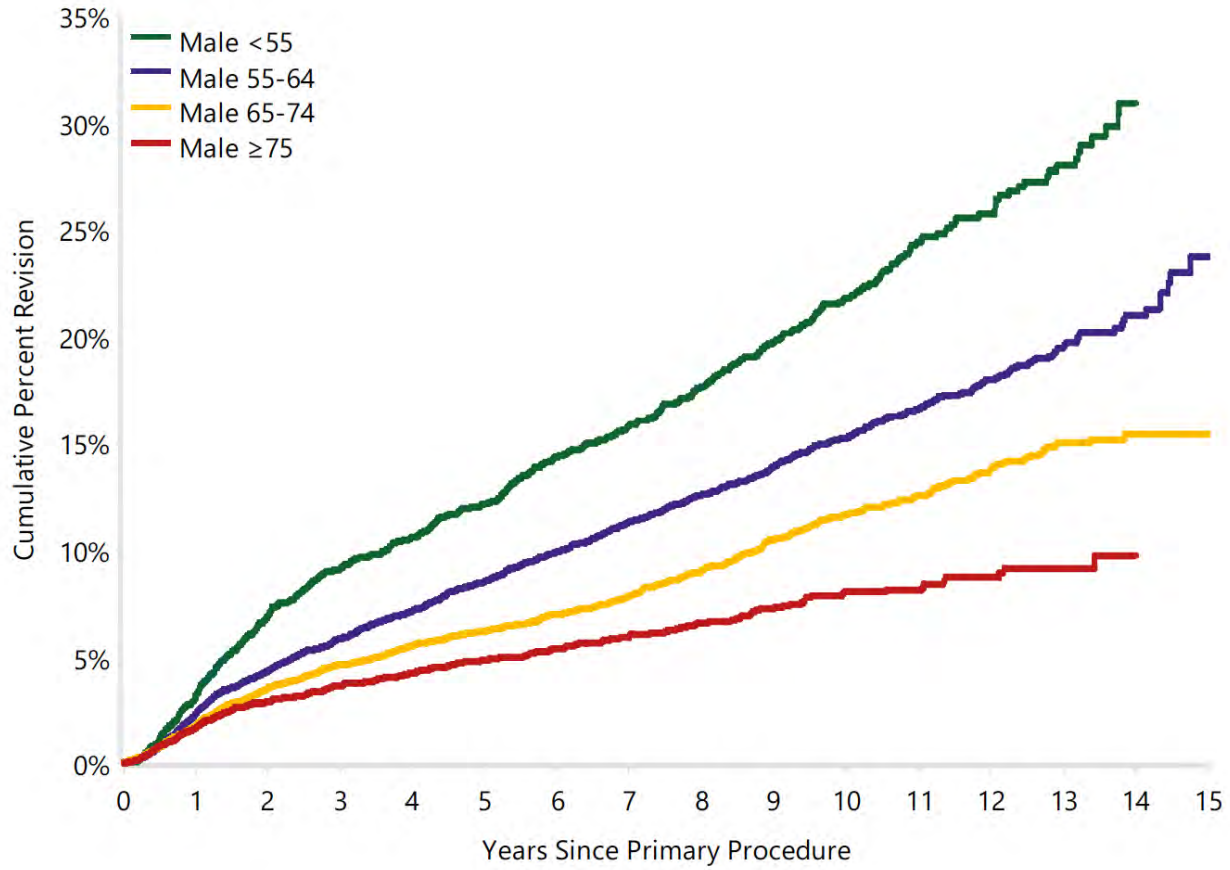
Survivorship of Partial Knee Replacement

Obviously we'd like all partial knee replacements to last forever, have a better range of movement than total knee replacement, and feel more like a normal knee than total knee replacements do. We'd like them to be easier to get over than realignment osteotomy surgery. For the most part - all of those issues come down to patient selection. There are some patients that should have been advised to do non operative management (eg be slim, supple and strong, use tables, increase exercise). For those that ultimately do have partial knee replacement - we have a problem that they have a HIGHER re-operation rate than regular knee replacements. There are many reasons for this, re-operating just because it's not perfect is not a great reason.

The graph below is provided by the Australian Orthopaedic Association National Joint Replacement Registry. This graph has all the partial knee replacements in males since 2000. What it shows is that males in the range of 65-74 years of age (yellow line) have about a 10% chance of needing a reoperation of the partial knee replacement by 10 years. Men over 75 years have only a 7% chance of further surgery by the age of 90.



Different designs have different revision rates. Equal leaders are the ZUK, and the robotic guided Restoris. At 10 years, the reoperation rate for ZUK is 8.6% for patients of all ages, about twice as good as the graph above. Restoris only has one year data in the registry, and has a not statistically different revision rate of 1.2% at one year.

We also know that people having a partial knee replacement changed to a total knee replacement subsequently are not quite as good as someone who didn't need the surgery to the older age. Overall the partial knee results are better than the phrase "knee replacements last 10 years" suggests, but your surgeon needs to pick the patients carefully.

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Complications following partial knee replacement

A partial knee replacement is a major surgical procedure. It replaces an arthritic joint with an artificial one. This list of complications is not 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.

Discovery that Total Knee Required

In the operating theatre, after the knee operation has been commenced, it is possible to find the partial replacement has a poor chance of success. If so, a total knee replacement is done. The same local anaesthetic tricks are used. The majority of patients still go home as planned. If the anterolateral incision was to be used, the scar is slightly longer, but not very different.

In cases where this is a risk, we plan to have a total knee replacement available.

Scar pain, tenderness and numbness

The knee replacement involves cutting a number of layers to do the surgery. It is common for an area on the outer aspect of the scar to be numb. The area may become smaller with time (years) but it is usually permanent. We minimize the numbness by using a scar further towards the outside of the knee.

The patients requesting a shorter, medialised scar have more numbness, and tenderness, and a lower incidence of being able to kneel in the future.

Subsequent arthroscopy

There are a small number of patients who require a further small operation - a camera controlled arthroscopic operation - to remove a bone spur or a broken fragment of bone cement. This usually fixes those problem. If a torn cartilage occurs on the other side of the knee, it can be treated with arthroscopy, but it is often a sign that the rest of the knee is deteriorating.

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. A knee that doesn't bend 90 degrees will be very disappointing to both the surgeon and the patient, and very rare for partial replacements.

Urinary catheterisation

Occasionally, the bladder doesn't function normally after an anaesthetic, especially spinal anaesthesia. A tube may need to be placed in the bladder to rectify this – it is usually left in for one or two nights.

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.

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 phlebetic syndrome" can leave permanent swelling of the leg and can cause ulcers to develop. It is my preference to use regional anaesthesia (as mutually agreed with the anaesthetist) allowing for early mobilisation. Aspirin (Cartia) is given daily and Venosan stockings are worn.

Neurovascular injury

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

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Revision to Total Knee Replacement

The revision rate for surgery is slightly higher for partial than total knee replacements. A little wear behind the kneecap can be tolerated if muscle strength is maintained. If the outer compartment of the knee wears out and is painful, revision to TKR may be required. If the partial knee is done at a young age, it is likely further surgery will be required at some stage.

Dislocation

This rare complication refers to mobile bearings popping out (eg Oxford). If worn, a new bearing is surgically inserted. Revision to a total replacement is also an option.

Infection.

Infections can occur directly after an operation, or not become apparent for some years, or even occur out of the blue many years later. The infection rate is quoted as 0.2 to 2%. It is hard to put a precise figure on it because an infection may not be apparent for some years. Some patients may carry additional risk factors. The majority of infections occur through an infected tooth, or from damage to the skin (eg rose thorn) or a urinary infection.

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. Infection is a cause of loosening but others causes do exist.

Wear

The plastic insert between the femur and tibia can wear at a rate of of 0.04mm per year. Most people will never have a problem from this amount. Rare cases though may wear faster, and require further surgery.

Stroke

A stroke is said to occur in 0.2% of all joint replacement patients, some have permanent weakness, some even die. Our observation has been the rate seems lower than quoted above.

Fracture

A fracture of the tibia can occur at the time of surgery, or after an injury. Late post-operative fractures may require extensive surgery and result in a slower recovery.

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 administrative staff, nurses, and the assistant. The fellow is a fully trained orthopaedic surgeon in his own right, but chooses to work with your surgeon to learn and copy his technique. All critical steps are performed by the surgeon, or under direct supervision by the surgeon.

Osteolysis

Osteolysis implies that bones (osteo...) develop holes (..lysis). What is known is that it is related to wear products, and access of this to the prosthesis - bone junction. This can cause a fracture or loosening around the joint replacement.

Complex Regional Pain Syndrome

This rare diagnosis (previously know 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.

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. If you have a specific question, ask your surgeon, and he will help clarify any queries.

Partial Knee 4.2 17th November 2019

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What is included in the cost of Joint Replacement?

Insurance generally pays for the "spare parts" and most of the hospital expense, but only covers a fraction of the doctors' fees. This is because Medicare hasn't adjusted their schedule to match CPI since 1983, or at all since 2014, Medicare is now worth less than one third of the real value of 1983. So there will be out of pocket expenses for doctors.

Doctors involved in the operation are: the surgeon, anaesthetist, surgical assistant, and if any medical problems occur, or are anticipated, a physician. The surgical assistant is a skilled nurse, doctor, or surgeon or a combination of these working alongside your main surgeon. The surgical assistant's billing will occur through Ballarat OSM. Typically there will be an out of pocket expense, which contributes to paying the salaries of our nurses and our fellow. If a physician is required, please discuss his fees with him. The anaesthetist will arrange his/her own financial consent. Typical out of pocket expense after Medicare & private health insurance rebates (estimates) are $500 for hospital, $400 for anaesthetist, and $400 for surgical assistant.

Included in the **surgeon's fee** is performing the surgery, follow-up in the hospital and consulting rooms for twelve months is usually bulk billed - ie no additional charge to you. The surgeon takes responsibility for the whole process, and to solve whatever problems occur. The surgeon takes personal responsibility for the post-operative pain control –including extensive local anaesthetic infiltration around the wounds. For patients off track, the surgeon intervenes, or supervises interventions. The surgeon takes personal responsibility for achieving a low infection rate. If an infection does occur, aggressive surgical and antibiotic treatment is required.

The AMA calculates annually the change in cost of medical practice, covering practice staff, insurance, rent etc, which roughly follows the CPI. Following the AMA fee suggestion, the surgeon's fee for partial joint replacement & the reinjection technique is $4014 (item number 49517 & 18222). Insurers are only required by law to pay $315 towards the surgeon, Medicare pays $947, thus you're $2750 out of pocket, for the surgeon. Insurers require us to discount by 25-35% to allow "Gapcover" arrangements, even with moderate out of pocket expenses.

ESTIMATED COST	Insured patients	Medicare only insurance	No Medicare
Surgeon	$ 2,750	$ 3,066	$ 4,014
Total	$ 4,300	$ 12,515	$ 14,451

Included in the package of estimated fees are:

- Hospital, surgeon, assistants, anaesthetist, prosthetic implants
- post operative ward rounds, usual blood tests and XRs
- followup phone call(s) after discharge, access to Ballarat OSM nurses for advice
- 2 & 6 week appointment at rooms, and any other visits to the consulting rooms required.
- 12 months follow-up appointment related to the knee
- Long term surveillance of the knee replacement by XR & phone for younger patients

Excluded:

- Physician involvement
- Other orthopaedic or surgical problems

If you are experiencing personal financial hardship, please discuss this well prior to the surgery so an amicable arrangement can be made. Note that most our joint replacements patients are elderly and many have a part pension. The out of pocket expenses will be required to be paid two weeks prior to surgery to avoid cancellation.

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