Birmingham Hip Resurfacing

Hip resurfacing surgery is a great operation in terms of relief of pain, stiffness, and disability caused by hip arthritis. The Birmingham prosthesis has been in clinical use since 1993, and with the current manufacturer since 1997. Before a patient undergoes a hip resurfacing it's important to be sure the benefit exceeds the risk. Non-operative treatment includes paracetamol, anti-inflammatory tablets, activity modification, a walking stick, and perhaps a shoe raise.

What is arthritis?

Arthritis is a destructive process in a joint, leading to stiffness, pain, and disability. It is most commonly referring to osteoarthritis, which has a variety of causes including genetic reasons, childhood hip disorders, and injury. Some arthritic conditions are inflammatory such as rheumatoid arthritis. The hip can also be destroyed by avascular necrosis, a condition where part of the femoral head dies. Surgical treatment by hip replacement has been successful since the 1960's but has carried a number of complications and a slow recovery.

Birmingham Hip Resurfacing

Resurfacing of the hip joint represents the fusion of technologies, allowing a thin metal cap to be placed over the head of the femur, and a thin metal socket inserted in the pelvis. Current technology (used since 1993) allows these to be solidly fixed to bone, show minimal wear, and avoid many of the complications of traditional hip replacement.

Traditionally hip replacements were known as such because the ball of the joint was removed and replaced with a new one. It was fixed to the femur by placing a stem down the inside of the bone. The ball was typically smaller than the "native" femoral head, to fit against a plastic socket inserted into the pelvis. Although improvements have occurred, the majority of the post-operative complications can be attributed to compromises made in those designs.

Advantages of Hip Resurfacing

- Faster recovery
- Better range of movement
- Lower incidence of dislocation
- More accurate leg length
- Lowers risk of blood clot complications

Minimally invasive advantages

- Shorter hospitalisation
- Faster recovery
- Less blood loss or transfusion
- Less scar tenderness and numbness

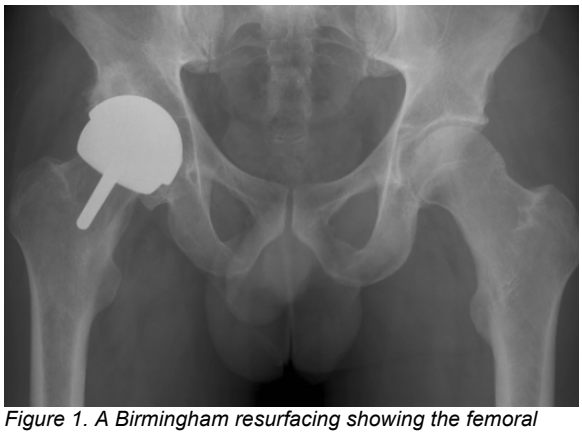

Figure 1. A Birmingham resurfacing showing the femoral neck has been retained, the head resurfaced, and bone preserved.

Down sides of resurfacing

It is not yet known how long they last. The greatest failure mechanism is fracture occurring through the neck of the femur. In Australia this has accounted for 1.5% of cases, and almost all of the failures. For this reason, the Birmingham resurfacing cannot be applied to people with osteoporosis. As a general rule 'resurfacing' is limited to men under 65 years of age, and some women under 55. The failure rate at 10 years is 4% in

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normal sized men, in contrast with 8% for regular hip replacements according to the Australian Joint Registry 2011.

A concern is the metal bearing surface will elevate blood levels of trivalent chromium, cobalt and molybdenum. Evidence to date (metal on metal has been used since the 1950's) demonstrates no problems occur as a result of this.

With significant kidney impairment the blood levels may be further increased, and thus an alternate bearing surfaces would be safer in this rare instance. Young women of childbearing age also need special consideration of alternative bearing surfaces. Metal allergy cases have occurred, requiring further surgery. An alternate ceramic bearing from Eska called Eska-ceram can be considered.

Birmingham Resurfacing is technically challenging surgery, and not all surgeons will do it. The surgeon also needs to understand what underlying problem has caused the arthritis, and treat accordingly.

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Other Hip Replacements

Exeter

The Exeter is the most commonly used hip replacement stem in Australia using bone cement. From the Australian Joint Registry data, 5236 were implanted in 2009. To maximise the longevity of that replacement, the acetabular side should be cemented also, which was only done in about 900 of those. “Hybrid” fixation using an un-cemented cup has an unacceptable revision rate at 20 years for a condition called osteolysis. The revision of cement/cement Exeter at 9 years is 4.9% - but very few of these are performed in young men. In contrast 622 Birmingham’s were performed in 2009. At 7 years 4.2% of Birminghams are revised in men under 65 years of age.

The ASR.

The ASR is similar to the Birmingham, however there were at least three different key design points. The cup on the ASR is relatively thin, and prone to deform, this increases the wear. The articular part of the cup is smaller for the diameter of the cup, increasing edge wear. The clearance of the bearing is 70um in contrast to 120um in the Birmingham. Its failure rate to 2011 in Australia is 14% and in one area of England 49%. It was the subject of a 4 corners report 16th May 2011 and has been off the market since 2010.

C Stem

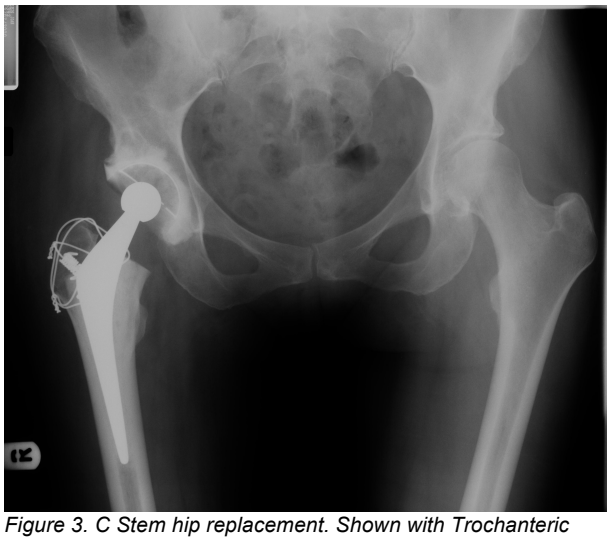

Figure 3. C Stem hip replacement. Shown with Trochanteric osteotomy, wires & cemented cup. ***C Stem.***
This style of hip replacement has been in use since 1993. It is based on the Charnley hip arthroplasty (around since 1958). The C-stem has an expected service life exceeding 20 years (assuming average polyethylene wear). It can be adapted to fix a large number of problems with the hip.

Taperloc

This design is 20 yrs old with some recent improvements. It uses a polyethylene articulation made with a special process called E-Poly, with proven wear characteristics. I use this for people with metal sensitivity, as the stem is made with titanium, and the bearing surface can be ceramic.

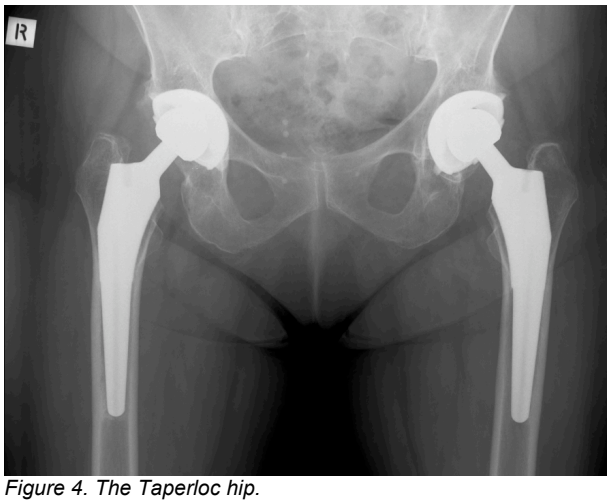

Figure 4. The Taperloc hip.

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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, 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 urinary infections. Bleeding from the wounds required dressing changes, exposing patients potentially to other patients bacteria, even in wards were single beds 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

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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 15 minutes, even an empty house is often acceptable.

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The Process of having a hip replacement

Getting fit for surgery
The greatest predictor of recovery time is how fit you were prior to surgery. Walking or cycling for the weeks before surgery is a good idea. In the week prior to surgery – avoid gardening and other activities where you might get a cut on infection that could cause your surgery to be cancelled.

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

Stopping medications before surgery
Some anticoagulants like Plavix, Iscover, Xarelto, Aspirin &Warfarin are stopped 10 days prior to surgery.
On the day of surgery, take your normal blood pressure tablets. Ensure your surgeon knows what medications you normally take.

What to bring to hospital
You will only be staying a few days, so don't bring too much. Wear to hospital the clothes you will wear home. Night shirts/ boxer shorts have a modest advantage over long pyjamas – to allow access to the dressing and for local anaesthetic top ups. 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 positives & negatives! Do not 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. Prior to surgery, no solid food is permitted for six hours and
Gatorade/Clear Fluids for 2 hours.

Anaesthesia
The best anaesthetic overall is a combined spinal and general anaesthetic. This is used in conjunction with local anaesthetic infiltration. 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 the wound. Occasionally a top-up of the local anaesthetic mix is given in recovery.

Tubes
We aim to have a minimal number of tubes connected to you. The drip is usually disconnected the evening of surgery. Oxygen may be administered in the first 24 hours but is not required all of the time.

Orthopaedic Ward
It is important to start taking painkillers before the anaesthetic starts wearing off. We are keen to have you drinking some Gatorade within two hours of the surgery, and eating some light food on the day of surgery. Avoid fruit juices to reduce nausea. Don't pick rich food off the menu!

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Physiotherapy

Both hospitals in Ballarat have their own physiotherapy service paid for by your insurance. Our intention is to have you out of bed on the day of surgery to minimize the risk of blood clots. The physiotherapist will be there probably the first time you get up, then just the nurses. Our aim is to have 80% of people independent by 16 hours from surgery.

Walking aids may start with a frame, and changed to using two crutches as soon as possible. A few people are good enough to use only a walking stick at discharge from hospital.

Post operative aims for recovery

First time up	3 hours (2.5-24)
Independent	16 hours (8-48)
Discharge home	1 days (1-4)
Inpatient rehab	5%
Outpatient physio	95%

In bed

Unlike traditional hip replacements, you can lay in any position you like. Traditionally, you start off lying on your back for six weeks, but this seems excess. If you wish to “play it safe” for a period of four weeks you may still lie on the side operated on, but avoid lying with the operated side up.

What will the leg be like?

The wound will often be a bit tender and initially have a bulky dressing on it. Ice packs are used frequently to reduce pain and swelling. The swelling usually gets worse for the first week-10 days. The bruise may eventually go to your ankle.

Support person & discharge

The value of having a SINGLE family or other support person to deal with communications is impossible to value.

IF YOUR FAMILY STRONGLY FEEL YOU ARE NOT SAFE TO GO HOME – IT IS ALMOST IMPOSSIBLE FOR US TO SEND YOU THERE! BRING THEM TO THE NEXT APPOINTMENT WITH YOUR SURGEON BEFORE SURGERY.

Do I need to go to inpatient rehabilitation?

The majority of people DO NOT need inpatient rehabilitation. We have found that even people at 80 years old are usually right by 4 days to go directly home – if there will be someone with them. Going to a friend’s house is not ideal as it may need minor modifications – like have a rail in the shower to hold on to, and preferably the shower can be walked directly into, rather than needing to step into a shower/bath.

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Back up plan

A key part to going home is having someone to contact if you have 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

Constipation is a problem best avoided by eating plenty of fruit and walking frequently. Avoid Panadeine Forte, a common painkiller (although all painkillers can lead to constipation). Prune or cloudy pear juice is a classic remedy and probably should be taken for several days after surgery.
If your bowels haven't worked within three days of surgery please seek advice from your local Pharmacy. If they still haven't worked the next day – contact you surgeon.

Driving after Hip 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.

Weekly Progress

First week:

- Walking
- Getting to a single crutch or stick
- Avoid excessive bending at the hip
- Panadol, Mobic, some Tramadol

Second week:

- Sutures are removed about 10 days after surgery at the surgeon's rooms
- Most people using a walking stick
- Take the Mobic

Third week:

- Continue the Mobic unless a problem
- OK to lay on the operated side in bed

Fourth Week:

- Stop the Mobic

Sixth week:

- In a sitting position, start bending your hip so your knee comes up to your chest, roll your knee OUTWARDS to put on a sock
- Now OK to lie in any position.
- OK to drive

Three months

- OK to bend freely with some care

What to ring us about…

- Nausea / vomiting
- Black bowel motions
- Constipation not fixed by three days
- Unwell, or pain
- Bleeding through the dressing

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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 2S45-S53)

Skin wounds

Rose thorns, shin cuts, and open foot injuries are all high risk. Gardening can be 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

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Pain Management after Orthopaedic Surgery

Good pain control allows early mobilization, reduces complications, and you go home sooner.

Local Infiltration Analgesia

During joint replacement operations, local anaesthetic is infiltrated around the wound by the surgeon. This is mixed with Torodol (a NSAID), dexamethasone and adrenaline. The surgeon leaves a wound catheter buried in the bandaging so 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 typically stays on until the review appointment.

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) 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.

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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 my preferred drug to top up. Typically the order is 1-2 tablets, 4 hourly as required. Tramal is not perfect, it can cause nausea or hallucinations, and can't be used with many antidepressants. 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. Venosan stockings (supplied by St John's) are worthwhile to minimise foot and leg swelling.
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 three days as these sweet & acidic drinks can make you nauseous.

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. It can usually be fixed with drugs like Stemetil and Ondansetron. It is much easier to control it early, rather than to attempt to control it once you start vomiting.

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Complications following hip resurfacing

A hip resurfacing is a major surgical procedure. Five percent of the time, something goes wrong with the perfect plan. Our aim is to minimise the risk, and quickly correct things that go wrong. This list of complications cannot be complete, but does deal with more common problems.

Pain
This is major surgery, and it does hurt. A variety of anaesthetic techniques including local infiltration of Naropin and multimodal analgesia are used. By three days, typically there is less pain than before the surgery. Some people get an intermittent groin pain that usually settles with time & exercise.

Urinary catheterisation
Urinary catheters are not used routinely. Since using local anaesthetic and early mobilisation, most patients have been able to use their bladder normally. However, a small number of patients may still require a urinary catheter. It is usually only left in overnight.

Fracture
Neck of femur fracture can occur after resurfacing. If displaced, the treatment is to exchange the head for a modular, stemmed prosthesis. It is particularly an issue in women who are more prone to osteoporosis and have smaller bones.

ALVAL & Metal Allergy
A small proportion of people seem to react to the metal implant. This is probably only 0.1% but not yet known with certainty. The problem could be the small amount of nickel on the metal, or if the cup position creates “edge wear”. Further surgery is required.

Re-operation
X-rays are taken after the operation to check everything is in the right position. If it is not, then a further operation may be required to fix the problem. This can occur despite substantial pre-operative planning.

Stiffness
Hip resurfacing does not guarantee a normal range of movement of the hip. Patients with traditional hip replacements achieved easy application of shoes only in 50% of cases. This is better with resurfacing but still not perfect.

Heterotopic Ossification
New bone can form around the hip joint after surgery. We prescribe anti-inflammatory tablets (Mobic) for three weeks to minimize the risk.

Bowel obstruction
Often the gut ceases to function for a period of 24 hours after surgery. During this time, only fluids are permitted. 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.

Scar pain and numbness
The hip surgery involves cutting a number of layers, and can damage small nerves. The current buttock incision has reduced this risk (no complaints of numbness). The scar invariably is tender for 3 months.

Squeaking
Sometimes “hard bearings”(such as, ‘metal on metal’ or ‘ceramic on ceramic’) squeak. This is thought to be a lesser problem than the plastic components wearing out. It usually is transitory and goes away after a day

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Neurovascular injury

Passing around the hip are nerves and arteries that supply the leg. Rarely these can be injured. Injury can result in chronic pain, permanent loss of function, or viability of the limb, and rarely, vascular injury can cause death! If injured, the surgeon may consider a surgical exploration.

Leg length discrepancy

Sometimes the leg feels longer after surgery. Usually it is the muscles on the side of the hip that feel tight for 6-12 weeks, and need to be stretched. Sometimes it feels short, but it is rarely out by more than 5mm.

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. 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.

Dislocation

The risk of dislocation is about 0.1% in the post-operative period for Birminghams, and about 1% for traditional hip replacements. Most occurrences will be a single dislocation. Recurrent dislocations are very rare. Dislocations occur because the patient puts the hip into a position where it is unstable. The most common position is when sitting, leaning forward, and leaning towards the side of the hip replacement. Less common is with walking and turning abruptly away from the side of the hip replacement. Alcohol abuse and poor patient compliance have been factors in traditional replacements.

Infection

Infections can occur directly after an operation, or even 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. 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. In the first two years following surgery, other invasive procedures (such as dental extraction, urethral catheterisation, colonoscopy) are usually "covered" with antibiotics.

Loosening

For a variety of reasons, the fixation between the hip replacement and the bone may fail. This loosening may cause pain and require re-operation. Infection is a cause of loosening, but others exist.

Wear

One of the theoretical advantages of Birmingham Hip Resurfacing is the metal is unlikely to ever wear out. If the cup develops "edge wear" the metal debris is greater, and further surgery may be necessary.

What happens to the metal debris?

The kidneys function is to remove metal debris from the body. If kidney failure was present at the time of surgery, a problem could occur. It is less likely to be a problem years down the track as

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the metal ion “production” reduces once the prosthesis has “bedded in”. The metal ions don’t seem to cross the placenta, but there is an intention not to do this surgery on young females. There is no evidence to date it causes cancer.

Heart Attack and Death

Heart attacks (myocardial infarction) occur in approximately 1% of people undergoing hip replacement, more so in the older patients. Death after joint replacement or resurfacing under the age of 60 is exceedingly rare.

Other

It is not possible to provide a full list of complications. Extremely rare occurrences eventually happen to somebody. In short, having a hip replacement involves taking on an element of risk. New “copies” of the Birmingham may share the same results. If you have a specific question, please ask your surgeon.

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