Knee Arthroscopy

Dr Keith Holt

Knee arthroscopy is a 'key hole' method of operating within the knee, rather than a particular operative procedure. It is performed through 2 or more small incisions, usually under general anaesthesia, and usually as day case surgery. The actual surgery performed is individual, depending on the exact pathology within the joint; hence, it cannot be compared to anyone else's arthroscopy. How sore it is, how long it takes to improve, how good the knee will be in the future and so on, are all dependent on each individuals unique pathology and surgery for that. Having said that, most people can go home the same day, do not require crutches, will limp a bit for 7 - 10 days, and will have reasonable function by 6 weeks. How good the result will be however, depends on how much arthritis (wear) there is in the joint, and what parts of the knee it affects.

The procedure

The vision within the knee is achieved with an arthroscope. This is a narrow, tube like telescope (~3.5mm) that is passed into the knee through another small tube (usually 4.5mm diameter). It contains lenses to view into the joint, and light fibres around the lenses, to deliver light into the joint. On the receiving end is a high definition camera which is viewed on a screen, thereby enlarging and magnifying the picture. Between the telescope and the tube that it is passed through, there is a space through which fluid can be passed into the knee, usually under gravitational pressure, but sometimes with the aid of a pressure controlled pump.

The anaesthetic

General anaesthesia is, without doubt, the preferred method for this type of surgery. It gives good relaxation of the leg, and allows the joint to be opened far enough to get instruments in between the joint surfaces without damage. In order to open the joint up adequately, the knee often needs to be pushed on quite hard. Any resistance to that process can hinder, or even completely prevent, completion of surgery. This means that the anaesthetic needs to be good, with no awareness by the patient.

Whilst a general anaesthetic is preferred, the procedure can also be done under regional anaesthesia, such as a spinal anaesthetic or epidural. These however have some limitations.

Spinal anaesthesia, whereby local anaesthetic is placed around the spinal cord, is reliable and works well. The problem with spinal anaesthesia however, is that it can lead to a leak of spinal cord fluid, out through the needle puncture wound: thus leading to headaches for a day or so, and requiring bed rest in that period. Hence, it can sometimes require an overnight stay in hospital, instead of being done as day surgery. It can also be difficult to achieve if there is any arthritis of the spine, or if there has been any spinal surgery. In these situations, there may not be space enough to get a needle through to the spinal cord, hence making the anaesthetic impossible.

Epidural anaesthesia can also be used but it is less reliable than the other methods. This is because the local anaesthetic is placed outside the spinal cord sheath (epi - dura = outside the dural sheath). It then has to spread evenly right around the spinal cord to anaesthetise all the nerve roots going to the legs. Frequently, one leg is more anaesthetised than the other, and this may not be easy to fix: hence, whilst this sort of anaesthetic has a role for other operative procedures and child birth, it is not ideal for arthroscopy where perfect anaesthesia is required.

Like the spinal anaesthetic, but more so, this requires good access to the spinal cord. Hence, arthritis and prior surgery to the spine limit its use.

Local anaesthesia has been tried by many, and is advocated by some American surgeons for 'office procedures'. Unfortunately, infiltration of the anaesthetic into the joint does not provide complete anaesthesia within the knee and, it does not anaesthetise the upper leg where the tourniquet goes. Hence, this limits the usefulness of the technique because, it does not allow the joint opening required to facilitate the surgery and, just as importantly, it can be very uncomfortable for the patient. It is therefore not recommended.

Hospital admission

Knee arthroscopy is usually done as day-case surgery and all health funds now fund the hospitals just for that. It is usually performed on a morning list for which the admission time is 6.30am. The anaeasthetist comes to conduct a pre-operative check at about 7.00am, after admission. Surgery then takes place on a list beginning at 8.00am, with knee arthroscopy being done early on in order, hopefully to allow discharge by lunchtime, or shortly thereafter.

Surgery usually takes about 20 minutes of anaesthesia time, but longer if the problem is a bit more involved. Recovery in the day surgery unit follows, usually requiring a 3 - 4 hour
post operative stay. After that, if someone is with you, you may go home. You cannot drive that day and you should not attempt to go to work or make important decisions that day. The anaesthetic will affect your memory for about 24 hours.

Information on day surgery admission can be found on our website: keithholt@posmc.com.au

and the hospital web site:

The surgery

What is done inside the knee is what determines recovery, expectations and long term results.

Menisectomy is perhaps the commonest of the procedures performed. Tears of the menisci are usually degenerative in nature, though traumatic injury can occur, particularly in the young. They do not heal, giving pain on one side of the knee or the other. They are often more symptomatic with twisting type manoeuvres and squatting, and can be relatively asymptomatic between episodes. With time, the degenerative tears gradually get bigger, albeit that the symptoms may not necessarily worsen. The one urgent problem is where part of the meniscus gets flipped into the middle of the knee (see lower picture of a bucket handle tear) and locks it up (stops it getting straight). The usual treatment for all these problems is resection of the torn part of the meniscus, Because tears are usually all about the same size, the amount of meniscus lost is usually about 50%, and it is usually at the back of the medial meniscus and the front of the lateral meniscus. If all the torn bits are not removed, then symptoms may persist: hence, conservative resection, whilst perhaps good for the knee in the longer term, may not achieve the desired results of pain relief and good function.

Results of menisectomy. The usual result of menisectomy, in an otherwise normal knee with no arthritis, is near full recovery by 6 weeks. When the meniscus is removed (or torn with reduced function) it increases the pressure on the articular surface of the bone on that side however and, when totally removed, this pressure is doubled. This increased pressure can then lead to a gradual breakdown of the hyaline cartilage lining which, in essence, is osteo-arthritis. If leg alignment is normal, this usually takes 10 - 20 years but, it is activity and alignment dependent. (See the information sheet on ‘knee arthritis’ on the web site listed below.)

If there is underlying arthritis already, then menisectomy may actually increase the wear rate somewhat. If most of the pain is coming from the meniscus, and not the arthritis however, then there can be a marked improvement in symptoms, albeit in the short to medium term only. In the long term, the arthritis will progress and, if symptoms are bad enough, then knee replacement may be required.

In general, if there is arthritis present, but there is a symptomatic meniscal tear also present, some 70% of people will show improvement (improvement not necessarily meaning full resolution of symptoms) with resection of the tear. On the other hand, 10 - 20% may find that the procedure aggravates the arthritis, making it more symptomatic, even if it removes a symptomatic tear. This is an unpredictable outcome so, if the arthritis is quite marked, and the symptoms not too bad, it is sometimes better to live...
with it as it is and wait until knee replacement is warranted, rather than to try and gain a bit of improvement in what is a badly worn out joint. There comes a stage when a knee is perhaps not good enough to think that a clean up will help, yet not bad enough to think that it needs replacing. Unfortunately, in this circumstance, there is no real half-way house procedure that will help.

**Leg alignment deformities** have a big role to play in both recovery, and the long term results of meniscectomy. If the knee is varus (bow-legged), then the medial (inside) side of the knee may already be taking most of the weight, and hence, may already be under excessive stress. This, of course, may be why the meniscus failed in the first place but, either way, loss of meniscal substance will raise those pressures in the medial side of the knee even further, and this can prematurely lead to the development of arthritis on that side, sometimes quite quickly. Similarly, if arthritis is already developing, or is established, on that side of the knee, it will progress more rapidly following meniscectomy than in a normally aligned knee.

If the lateral side of the knee is normal, then the arthritis on the medial side can be treated by an osteotomy, correcting the alignment (actually making the knee slightly valgus - knock knee), thus reducing the stress on the medial side of the knee. This will lead not only to symptom relief, but also to significant improvement in the longevity of the joint, 85% gaining 10 - 15 more years of useful symptom free, or nearly symptom free, function from the knee.

The corollary of this of course, is that, if a knee with a medial meniscal tear is valgus (knock knee deformity), then, as if an osteotomy had already been performed, the medial side is under less stress than normal. This means that the deformity is protective against the arthritis inducing effects of meniscectomy.

**Lateral versus medial meniscectomy.** Whilst the medial meniscus is the most often torn, the consequences of lateral (outside) meniscectomy are perhaps worse from an arthritis perspective. Indeed, the commonest cause of retirement from elite sport in the world today, is arthritis that develops as a consequence of a lateral meniscal tear followed by lateral meniscectomy, even if it is just partial meniscectomy. This is because the lateral side of the knee is smaller and shaped such that it is more sensitive to increased pressure than the medial side (see the information sheet on knee arthritis).

**Meniscal cysts** are a result of degenerative tears of the menisci. These tears are essentially horizontal cleavage tears in the menisci and, once they have reached the rim, at the edge of the joint, they can act like flap mouthed valves. Thus, when activity is undertaken, joint fluid is pushed through the tear to the outside of the joint, eventually forming a cyst full of joint fluid. With rest, the fluid will often drain back into the knee, and the symptoms may abate. However, the symptoms will return as soon as activity is recommenced. The cysts do not heal, and the treatment for them is to resect enough of the torn parts of the meniscus to remove the valve like effect that the tear produces. Once this is done, the joint fluid will then drain back into the knee, and the cyst will disappear.

These tears do get bigger with time so, although resection may lead to arthritis, the resection will be smaller if this is done earlier rather than later. Hence, whilst it may be better for the knee to leave the tear there for a while, it will ultimately lead to a bigger resection with more consequences.
Meniscal repair as an isolated procedure is uncommonly performed. As most of the tears are degenerative in nature, they will not heal even if repaired. In order to achieve a good result with repair, the meniscus needs to be torn near the rim where the blood supply is, it needs to be otherwise intact and healthy, and the knee needs to be stable. If all these conditions apply, then the meniscus may be successfully repaired.

The best results with repair are when the meniscus is damaged at the time of ACL tearing, and is repaired when the ACL is reconstructed. In this setting, one can expect that 85% of those cartilages that are suitable for repair, will successfully heal. In the longer term however (10 - 15 years down the line), breakdown of the repaired meniscus requiring resection is common. Nevertheless, by then it has served its purpose, protecting the joint from arthritis for that period of time, thus rendering the repair as worthwhile.

The commonest problem leading to an isolated meniscal repair, is a dislocation of the lateral meniscus, either when it is torn off the rim or, more usually, when it has a congenitally deficient attachment to the capsule in the first place. This often first presents in the early teenage years and, when it locks the knee up, it does this with the knee near 90° of flexion. The meniscus however, may be otherwise normal, and thus is eminently repairable. If this is done, then a normal knee results and, because the meniscal substance is not damaged, the repair does not deteriorate with time.

Repairs need time to heal and need protecting. This means crutches for up to 6 weeks and 3 months to use it normally. With this in mind, in working people, and those with low demands, borderline tears are usually resected and not repaired.

Osteo-arthritis of the knee is common. It is simply wear and tear of the hyaline cartilage bearing surface of the joint. It has no capacity to heal, and will only deteriorate with time. The rapidity of progression is determined by weight, by the alignment of the leg, and by use (or abuse). This hyaline cartilage surface, like the road, just develops pot holes in it, which increase in size with the passage of time. These pot holes increase in size when the edges break off. The loose bits so generated can cause swelling, pain, a feeling of instability and some grating for a while but, with further time, they smooth themselves out again. If this does not happen, then they can be smoothed out, and this sometimes helps. Unfortunately however, they cannot be filled in, which means that cleaning them up does not change either the amount of wear in the knee, or the future of the knee.

The risk associated with cleaning up areas of arthritis is that it will make the symptoms worse, despite making the joint look better. Hence, cleaning up an arthritic joint, where there is no symptomatic meniscal tear, is thought not to be worthwhile. Given that the alternative is knee replacement however, some people will opt to try this first, knowing that the chances of helping it may be small and of short duration.

On the other hand, if the knee is not bad enough to consider replacement, it may be best left alone, for fear of stirring it up so much that replacement becomes inevitable.

Arthritic joints can be stirred up with surgery (or any other injury) and sometimes, when aggravated, they cannot be settled down again without proceeding to replacement. Sometimes this aggravation is temporary, so it is often 3 or more months before an arthroscopic clean up can be said to have failed. In that period of time however, rest is needed, analgesics and anti-inflammatory medications may be needed, and cortisone injections may be needed. This is a very different recovery from resection of a torn meniscus in an otherwise normal knee, something that takes only about 6 weeks.

If it is unlikely that an arthroscopy will help, it is sometimes better to proceed directly to replacement, noting that, by 3 months, most people are better than they were pre-operatively. This is in contradistinction to an arthroscopy and clean up which, although more minor to do, may have left the knee no better, or worse, by then.

Stress fractures of the bone are not uncommon. Indeed, in the elderly who have soft bone (osteoporosis), this is an alternative to the diagnosis of a meniscal tear. Only an MRI can determine this so, if suspected, that is the investigation of choice. The good thing about stress fractures is that they heal. This usually takes about 8 weeks and, when they heal,
they do so suddenly. Hence, if they are still symptomatic at 6 weeks, then it is just a matter of more time.

In the arthritic knee, the soft hyaline cartilage bearing surface absorbs a lot of the stress of impact loading (walking and running). When deficient, these stresses are transferred directly to the hard bone, which in turn does not deal with them as well. The stresses are not well absorbed, and hence, stress fractures are more common in the setting of arthritis. Similarly, after a meniscus has been resected (or partially resected), excessive walking can lead to a stress reaction, or stress fracture, because of the increased pressure on the underlying bone. Thus, for 6 weeks or so after meniscal resection, it is better not to do excessive impact loading, giving the bone time to build up and strengthen. This means no long walks, and definitely no running, in that time frame: and especially if the bone is soft.

**Lateral release** is surgery to release a tight, symptomatic knee cap. This is only performed where the kneecap is tight, but otherwise tracks normally. It can lead to bleeding afterwards, and it usually leads to swelling for 5 - 6 weeks. It may then take some time to eventually settle.

It is very helpful when the knee is sore when sitting for prolonged periods (movie goers knee), and in the arthritic knee when most of the pain is patello-femoral. More information on this can be found on our information sheet on 'patello-femoral pain'.

**Synovectomy** of the knee is an operation for chronically inflamed knees, usually with inflammatory joint disorders such as rheumatoid arthritis, where injections and medications have not completely settled the joint down. It involves shaving out as much abnormal lining tissue as possible, hoping that this will lead to a reduction in fluid production in the knee, and therefore to a decrease in the swelling. It is usually not a permanent fix for these problems, but sometimes gives some years of significant and worthwhile improvement.

**After surgery**

When you go home, rest is very important. It decreases bleeding into the knee and long term swelling. Most can take their knee through a range of motion and can get around without crutches, but excessive walking should not be undertaken. These points are worth considering:

1) You may leave the hospital when you are fully awake provided that you have someone to drive you home and to look after you for the night (metropolitan and surrounding areas only, not the country).

2) Keep the bandage on the knee for 4 - 5 days. If it falls off, reapply it firmly but not tightly (this helps the swelling). After 2 - 3 days you may get the knee wet with the bandage off, but you should gently dry it and reapply the bandage afterwards. Waterproof dressings may be used, and these can be provided by the hospital. These allow the knee to be wet for short periods of time right from the outset. If these become wet or sodden however, they must be changed.

Note that using a very tight bandage or elastic stocking is to be avoided as this can act like a tourniquet, reducing blood flow and increasing the risk of getting a clot (DVT).

3) The only exercises required are straight leg raising exercises (with the knee straight). These should be done lying on your back with the opposite leg bent up so that the foot reaches the level of the operated knee. The leg should then be raised, held for 2 - 3 seconds, then lowered. This should be repeated 10 times, making one set of 10. One to two such sets should be performed (resting between each), three times per day. That is a 10 to 20 lifts, 3 times a day. These raises are only required until such time as you are walking reasonably well, which is usually at the 2 - 3 day mark, but may be on day 1 in some cases.

4) In general no physiotherapy is required in the first 5 - 6 weeks. If it becomes necessary, it will be ordered for you when you visit the office.

5) Generally you will be given a post operative appointment time when your surgery is booked. Country patients can frequently see their GP for this first visit, and can then be in contact with the office by phone, or in person, at the 6 week mark.

**Optimising recovery**

The aim is to get the swelling down as quickly as possible, and to avoid making the knee too sore. Swelling and pain can be helped by:

1) Resting (not exercising) the leg as much as possible post-operatively.

2) Not walking excessive distances for a few weeks, and keeping impact loading to a minimum. This is especially important in the elderly who have softer bone and may be more at risk of developing a stress fracture due to changed mechanics in the knee.

3) Icing the knee for 20 minutes, 3 times a day, or after exercise and therapy. Gel packs, iced peas, or a plastic bag of ice wrapped in moist towels, all work effectively.

4) Judicious use of an anti-inflammatory tablet. This is much more powerful than ice.

**Complications and problems**

Complications with straightforward arthroscopy are uncommon. The following however, are relevant:

**D.V.T.'s** (deep venous thromboses) occur but are uncommon (less than 5%). These represent clots in the deep veins of the leg, usually the calf. They may occur at the time of surgery, or sometime over the next few weeks. Most commonly however, it is in the first 10 days. If noticeable, it is usually as an ache in the calf at the back of the leg, but may also be seen as abnormal swelling below the knee. If this is occurring, then a doppler (ultrasound) scan can be used to detect it, and appropriate treatment organised.

For people at risk of this problem, prophylactic anti-coagulation will be organised.

**P.E.(Pulmonary Embolism)** is perhaps the most serious complication of all surgery and anaesthesia, and indeed, can be fatal. The problem of having clots in a vein (DVT) is always that they may spread to the lungs. This, fortunately, is a rare event, occurring perhaps just once in every few hundred cases. It generally presents as chest pain, which is worse with deep breathing. It may also lead to intermittent shortness of breath, and a general feeling of unwellness.
Unfortunately, whilst we can reduce the incidence of DVT’s by the use of low-dose peri-operative anticoagulation, the same cannot be said for pulmonary embolism. Standard peri-operative anticoagulation does not seem to change the incidence of pulmonary embolism, almost as if it is a separate disease entity: and therefore not directly related to a DVT. For those at high risk of PE therefore, more substantial anticoagulation is required which may involve full, and prolonged, anticoagulation with warfarin or similar agents.

**Infection** in a straightforward arthroscopy is very unusual and the incidence is perhaps one in a thousand. It is treated by arthroscopic washout(s) and intravenous antibiotics. It can take a couple of months to fully settle and, if severe, can lead to damage to the hyaline cartilage lining, hence, leading to arthritis or progression of arthritis. As the incidence is so low however, prophylactic antibiotics are only given where there is a moderate risk of infection, such as when arthroscopy of a prosthetic joint is undertaken.

**Protracted pain** is usually due to underlying arthritis. It can be treated by injections, rest, anti-inflammatory medication and so on but, if persistent, requires joint replacement.

**Stress fractures** require rest, and possibly crutches, for 6 - 8 weeks. If there is underlying osteoporosis, then appropriate testing for bone density should be undertaken, and treatment for this organised. This is usually done by your GP.

**Bleeding** is something that happens with every operation however, occasionally, it is excessive. When an arthroscopy is performed, there is usually a tourniquet on the leg. This means that any bleeding is not seen prior to the bandages being applied. Sometimes therefore, part of the knee that has been operated on, can bleed more than expected, and this won’t be known until afterwards. When this happens however, aspiration of the blood, prior to discharge from the day surgery unit, is usually all that is needed. Rarely is a second aspiration required, and only extremely rarely is a further arthroscopy ever required.

The most at risk procedures are lateral meniscectomy, lateral release, and soft tissue procedures such as drainage of ACL, or fat pad, cysts. With lateral meniscectomy, the risk is that the vessel near the rim of this meniscus will be encountered. Often, lateral meniscal tears are large and go right to the rim, so this is a small risk. If seen, the vessel can be dealt with directly but, more often, it is small and not directly visualised. As described above however, aspiration is generally all that is required.

With lateral release, the problem is sufficiently common, and problematic, that the tourniquet is always released whilst the arthroscopy is still in the knee. Any bleeding can then be dealt with at the time, before the bandages are applied. This is relatively easy because the diathermy which is used for the release is already open, and the fluid that is used in the knee (glycine) is such that it allows the use of a diathermy (it is non conductive). In other arthroscopic procedures, the preferred fluid is saline. This is conductive, and hence, is not suitable for diathermy use.

If bleeding is excessive, prolonged, or recurrent, then testing for coagulation disorders may be warranted. If there is any history of this, then these tests should be undertaken pre-operatively.

**Bruising** is not uncommon, and is usually mild, settling within a couple of weeks. If it is more substantial than that, it may track down to the ankle and cause problems there. If bruising is excessive, then testing for coagulation disorders may be warranted.

**Numbness** around the medial portal in particular, is not uncommon. Usually it involves just a small area, and usually it recovers. If a large area is involved, it may mean that the infra-patellar branch of the saphenous nerve is situated slightly higher than normal and that it has been damaged at the time of portal placement. In order to decrease the risk of this, the medial portal is deliberately made horizontal. Even so, albeit rarely, this numbness can ensue. If it does, there is no treatment other than to await the passage of time (months) to see whether it will recover. Mostly it does.

**Painful lumps at the site of the portals** do occur. They are due to swelling and bleeding in the portal, which leads to some scarring there. Usually this is worst at about the 2 month mark, when scarring is at its worst. Over time however, these settle down and the lumps soften up and disappear. It may be 9 - 12 months for this to fully occur but, only rarely, is further surgery required.

**Questions and Concerns**

Phone: +61 8 92124200
Fax: +61 8 94815724
Email: keith.holt@perthortho.com.au
On line: use the link below

**Further information** can also be obtained, on this and other related topics such as:

- Knee arthritis
- Patello-femoral pain
- Osteotomy
- Knee replacement
- ACL reconstruction
- Hospital admission
- Drug information for hospital admission
- Information for those with Lap Bands
- Information for those with sleep apnoea

at: www.keithholt.com.au