Information for patients undergoing Osteotomy Surgery

What is an Osteotomy?

An Osteotomy is a surgical procedure performed around the knee joint to help relieve pain and improve function in patients with early osteoarthritis (wear and tear) once non-operative treatment has failed. It involves cutting either the tibia (shin bone) or the femur (thigh bone) and realigning the leg to help relieve pressure in the painful arthritic part of the knee joint.

Why is an Osteotomy needed?

Osteotomy of the knee is usually indicated in younger, more active patients whose arthritis is at an early stage and in only one part of the knee joint. However, with preoperative digital planning and modern surgical techniques increasing accuracy and safety it has been shown to have good results in older patients wishing to avoid joint replacement. Osteoarthritis can develop when the bones of your knee and leg do not align properly putting added stress onto the joint surface causing wear and tear. Patients are either "knock kneed" or "bow legged". Realigning your knee and leg will shift your weight off the damaged side of the knee helping to relieve pain, improve your function and delay further progression of the arthritis. Where only one side of your knee joint is affected, and you have a deformity of your leg, an osteotomy is preferred to a total knee replacement. A specialist knee consultant will need to review a range of investigations/images and assess your suitability for the procedure.



What are the advantages of an Osteotomy over a knee replacement?

Osteotomy aims at relieving pain and **preserving** your own knee joint delaying the need for a knee joint replacement for some years. It can allow a younger patient to lead a more active lifestyle for many years. Unlike after a knee replacement(where there are limitations in what you are allowed to do). Following full recovery, you will be permitted to return to your full activities, even impact sports, if you are able and wish to. Over 90% of patients feel a significant improvement in their knee following an Osteotomy. In the future if your arthritis has progressed you can still have a knee replacement.

Many years ago before joint replacement, osteotomy was the standard technique for treating osteoarthritis of the knee. However realigning the knee was carried out by "eyeballing" the correction and therefore results were mixed. Some patients' knees were overcorrected resulting in arthritis developing on the normal side of the joint and others were under corrected resulting in persistent pain. Also with older surgical techniques and instruments the risk of nerve and blood vessel damage was higher.

When joint replacement came along and started yielding good results, osteotomy was abandoned except in very young patients with osteoarthritis. With advances in medical practice and availability of enhanced technology, osteotomy procedures are now highly accurate procedures. New computer software allows accurate planning of the procedure to improve surgical precision. With careful preoperative planning and modern surgical techniques the planned correction is now more reliably achieved and osteotomy has had a resurgence over the last 10-15 years. It is widely practiced in other parts of the world but is not widely available in the UK due to lack of surgical experience and old prejudices. Osteotomy has become a procedure that has a **PATIENT INFORMATION DEVELOPED BY THE LISTER KNEE UNIT** number of advantages over joint replacement and can be considered in a significant number of patients with painful knee osteoarthritis.

The results of knee replacement are not as successful as hip replacement. We know from the National Joint Registry that up to 20% of patients who have had a knee replacement without a complication can be unhappy with their outcome. The knee joint is a much more complex structure than the hip and so a knee replacement does not recreate a normal joint. It is well known that younger patients do worse than older patients after total knee replacement surgery often due to higher demand of the knee and higher expectations. Also, once bone has been removed from the knee joint and replaced with metal and plastic you do burn your bridges and any further problems will need more major surgery. Knee replacements do have a limited lifespan and revision surgery can be extremely demanding. Also complications such as infection or fracture within or around a knee replacement can be a devastating complication, particularly in the young patient, often requiring further major surgery. Although there are risks, a total knee replacement still plays a significant role in the treatment of arthritic knees. However, where possible we should aim to reduce pain symptoms with less invasive procedures. An osteotomy allows improvement in symptoms, quality of life and function, with less destructive surgery.



What does the surgery involve?

You will have **long leg alignment x-rays** performed to help your surgeon plan surgery accurately. A Digital Software Program is used to determine which bone needs to be cut and the amount of correction required.



This Patient had early osteoarthritis on the inside of the right knee and was "bow legged". You can see the red line passes through the **inside** rather than the middle of the knee joint

The osteotomy is either an "opening wedge" where the bones are separated or "closing wedge" where a wedge of bone is removed and the cut ends brought together. The cuts are done initially on the computer and the amount of correction required in mms is calculated.







During the operation, accurate surgical cuts are made in either the tibia (shin bone) or femur (thigh bone) to achieve the planned correction of your leg alignment. The corrected bone is held firmly in place with a metal plate and screws.



Types of Osteotomies around the knee

Different types of osteotomy are carried out dependent on the shape of your leg, area of arthritis, and bony features. You may be bow legged (Varus) or knock kneed (Valugs). This may be minor or significant. It is important to know that not all people with significant malalignment will experience pain in their knee. Similarly, you may have only a slight change to your 'normal' alignment but experience excessive symptoms.





Varus



For Varus (bow legged)



<u>Medial Opening Wedge High Tibial</u> <u>Osteotomy (MOW HTO)</u>

The osteotomy is done at this level when there is a deformity of the shin (tibia) bone. This involves an opening of your tibia bone on the inside of the leg. A bone graft is then positioned within the wedge, and held in place with a metal plate and screws. This will change the alignment of your leg, and allow you to weight bear more towards the middle to outer parts of the knee and away from the painful inner side. This will not remove the arthritis but will reduce the load through the arthritic part. Your leg will be straighter.

Lateral Closing Wedge Distal Femoral Osteotomy (LCW DFO)

If the deformity causing your 'bow legged' presentation stems from your thigh bone (femur), you may require this procedure to achieve the correction. This involves an incision of the outside of your femur and a wedge removed. The bone is then cut and brought together, then held with a metal plate and screws. As the femur is a larger bone, involved more in the weight bearing process whilst walking, it is essential you follow protection advice post operatively. You will be advised to be 'partial weight bearing' (PWB). This requires you to use 2 crutches at all times, and only allow 50% of your weight to go through your operated side, for 6 weeks.





Double osteotomy - MOW HTO + LCW DFO

If your deformity is significant, and your weight is significantly moved towards (or extending beyond) the inner part of your knee, it is unlikely that a single level osteotomy will be possible. This deformity will require a larger correction, and to ensure the shape of your knee joint is not significantly affected, the surgeon will complete a double level Osteotomy. A combination of the 2 osteotomies will correct your bow legged shape and still preserve the shape of your knee joint. The surgery will take twice as long as a single bone osteotomy and will result in a longer rehabilitation period. It is essential you remain PWB following the procedure.





For Valgus (knock kneed)

<u>Medial Closing Wedge High Tibial Osteotomy</u> (MCW HTO)

To alter your alignment, and to take the weight from the symptomatic outer part of your knee, you may require a medial closing wedge osteotomy in your tibia. The surgeon will analyse your long leg x-rays and will determine if the deformity stems from the tibia. If this is the case, an incision will be made on the inside of your leg (tibia), and a wedge removed. The bone is reduced, bringing both ends of the bone besides the removed wedge together. This is stabilized and held in place with a plate and screws. Your leg will now be straight.





Medial Closing Wedge Distal Femoral Osteotomy (MCW DFO)

If you are 'knock kneed' and have been found to have a deformity in the thigh bone (femur), you may require a MCW DFO. This involves an incision in the femur bone on the inside aspect, and a wedge removed. This is then closed with a plate and screws. As previously described, this procedure does require more post op caution, and you will likely need to remain PWB for the first 6 weeks to allow sufficient healing before you fully weight bear.





Double Osteotomy - MCW HTO + MCW DFO

Again, if it is not possible to correct your deformity with a single level osteotomy, you may be a candidate for this double osteotomy. Correcting a significant 'knock kneed' anatomy leading to symptoms in the outside part of your knee joint can be achieved with a combined MW HTO + MCW DFO. As previously detailed, this is a larger procedure and recovery time is likely to be elevated. You must follow PWB advice.



What are the risks of surgery? A risk of complications are present with any surgery. Some of the possible complications are listed below:

Infection - Infection can occur with any operation. Special precautions are taken to reduce this risk. The infection risk is low, less than 1 in 100 (1%), and can usually be treated with antibiotics. In some cases it may be necessary to perform further surgery.

Blood Clots - Blood clots are rare particularly if you mobilise early as instructed by the physiotherapists. A blood clot if left untreated can become serious. Patients are given blood thinners for 2 weeks after surgery.

Stiffness - Post operative stiffness of the knee joint is rare. Some patients may struggle to regain the ability to fully straighten the knee. Usually physiotherapy reduces the risk.

Delayed Healing - Sometimes the two bone edges do not heal together as planned – known as delayed union. This may require a further operation. Smoking significantly impairs bone healing as can antiinflammatory tablets, and should be avoided after surgery until the bones have healed.

Failure - It is unusual to see little or no improvement and exceptionally rare to be made worse by your surgery. Failure to relieve some or all of your symptoms can occur although you can continue to see improvement in your symptoms for up to 18 months.

Nerve damage – Major nerve damage is extremely rare but you may feel a loss of sensation to touch surrounding your scars or the front of your knee.

Bleeding - Bleeding is rare, but some bruising may still occur. If a collection of blood results (haematoma), it may need to be drained. Rarely damage can occur to blood vessels behind the knee; this can lead to loss of circulation to the lower leg and foot, which may require further surgery.



Osteotomy Specific Complications

• Hinge Fracture

 Following an osteotomy, there is a risk of a hinge fracture. This can happen at the end point of where the cut has been made into your bone. This can occur during surgery or afterwards. Due to this risk in the early stages, it is vital that you follow all post op precautions including protected weight bearing. A fracture can lead to delayed healing of the bones following an osteotomy. This can also lead to increased pain.



- Plate irritation
 - Due to the procedure removing part of or opening the bone, it is essential that this is stabilized with a strong plate. With the surgery, especially tibia osteotomies, involving part of the leg with minimal soft tissues surrounding it, you may experience irritation from the plate. Patients may have ongoing issues with this irritation following the procedure.
- Plate removal
 - It is advised that the plate is removed approximately 1 year to 18 months after the osteotomy. Not only does this remove your plate irritation symptoms but it also allows full bone healing. An osteotomy does not remove arthritis but transfers the weight from the affected part of the knee. You may require surgery in the future such as a Total Knee Replacement (TKR) should your arthritis symptoms return and worsen. By removing your metalwork, if you need a TKR in the future you would not need to have 2 operations (one to remove the metalwork then TKR 6 months later).
- DVT
 - As with any surgery, there is a risk of a deep vein thrombosis (DVT). This is a clot within the vein. If left untreated, this can be fatal.



However, you will be prescribed prophylaxis treatment with 2 weeks of Clexane. This should significantly reduce your risk of developing a DVT.

How long will I need to stay in Hospital?

Osteotomy surgery will require you to have a period of time in hospital and most people stay in hospital for one or two nights. You will be reviewed by a physiotherapist who will teach you specific exercises, explain the postoperative precautions, teach you how to walk with crutches and climb stairs if required. You can discuss any concerns you have with them. You will be discharged home when you are safe to do so.

What happens after the operation?

You will have a bandage on that can be removed the next day. It is important to keep the wound dry to reduce the risk of infection. Many years ago patients were on crutches for 3 months or in plaster for 1-2 months. Nowadays, you will be encouraged to mobilise immediately and in most cases there will no brace, just crutches. With the most common type of osteotomy (Tibial Osteotomy), patients begin to put some or even full weight through the leg straight away, but usually can fully weight bear by 2-3 weeks. Patients will usually be walking unaided within 6-8 weeks of the surgery. However, patients undergoing femoral osteotomies will be required to remain partial weight bearing (PWB) for at least 6 weeks. When you can return to work depends on your job. If you have a desk based job you can return to work when your pain allows and you can travel back and forth to work safely which can take up to six weeks. If you have a manual job you are likely to need a longer recovery period of up to 3 months. It is important to recognise the significance of the procedure, and to understand the importance of post op recovery and rehabilitation. Although the results are extremely beneficial to patients, it is vital that you do not rush your return to certain activities.



Physiotherapy after Surgery

After surgery, the aim is to restore normal function in your knee. The Physiotherapist will see you on the day after your operation to teach you how to use the Crutches and assess you on stairs if appropriate. It is usual for the quadriceps muscle to weaken very quickly after surgery, to achieve best outcomes from the operation you need to return your leg muscle strength to its normal levels in the first 6 months of rehabilitation. You need to regain normal movement, strength, balance and co-ordination.

Exercises

Exercise is important to achieve this and to prevent complications such as scar tissue formation, stiffness and muscle weakness. You will be taught exercises on the ward and given an exercise sheet. Exercises may be uncomfortable to start with but should not cause excessive pain or swelling. Pain relief is important to allow you to do exercises regularly. A follow up outpatient Physiotherapy appointment will be arranged for you approximately two weeks after your surgery at your local outpatient physiotherapy service provider.

Swelling management

- **Rest:** rest with your knee in a straight position.
- **Ice:** use ice packs regularly to reduce pain and swelling. Wrap an ice pack in a pillow case or towel. Apply it to your knee for 15-20 minutes every hour during the day.
- **Elevation:** elevate your leg above the level of your heart when you are resting. Your leg should be supported.

Disclaimer



Please note that this information is true for most patients. Sometimes you may have different instructions – if this is the case, your surgeon or physiotherapist will explain these to you.