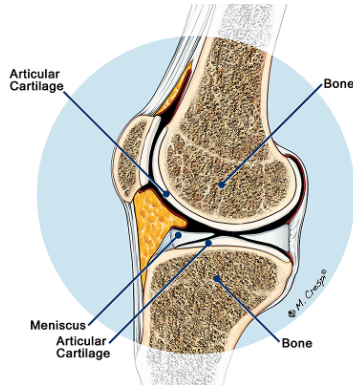


Osteotomy for Osteoarthritis of the Knee

Osteoarthritis is essentially loss of the articular cartilage on the bone surfaces of a joint.

Articular cartilage (also known as hyaline cartilage) is normally a very smooth surface with special biomechanical properties that make it particularly suitable as a bearing surface. However when the surface is disrupted, a process of breakdown commences and eventually the articular cartilage coating is worn off the bones. Unfortunately, articular cartilage has a poor capacity to heal.



For treatment purposes, the knee joint can be considered to consist of three compartments. One compartment is between the patella and the femur (patellofemoral compartment), and the other two are between the tibia and femur. One is on the medial (inner) half of the knee, and the other is on the lateral (outer) half of the knee. If the osteoarthritic process is isolated to either the medial or lateral compartment, one surgical option for treating significant symptoms may be an osteotomy.

The principle of an osteotomy is to realign the lower limb in order to shift the line of weight bearing away from the affected half of the joint towards the good half of the joint. In other words, if the osteoarthritis is isolated to the medial compartment, the aim is to shift the line of weight bearing towards the lateral compartment.

This is shown in the X-ray of a right leg. The yellow line passes from the centre of the hip to the centre of the ankle. Normally it should pass through the middle of the knee joint. In this case there is medial compartment osteoarthritis with loss of articular cartilage and narrowing of the joint space and the line passes through the medial side of the knee.

The main aim of this realignment is to reduce the symptoms from the osteoarthritis and delay the need for joint replacement surgery. Realignment does not restore the articular cartilage and joint space, although it is possible that realignment may slow down the rate of progression of the osteoarthritis. It is important to be aware that realigning the leg will result in an altered appearance of the shape of the leg. If people have medial compartment osteoarthritis, they are usually somewhat bow-legged (as seen in the X-ray) and the osteotomy will make the leg straight or slightly knock-kneed. The opposite applies for lateral compartment osteoarthritis. Prior to surgery the person is usually knock-kneed, but after surgery the leg is straight or slightly bow-legged.

Osteotomies can be performed above or below the knee joint. For medial compartment osteoarthritis, osteotomies are most commonly performed by operating on the upper tibia. If the osteoarthritis is in the lateral compartment, the osteotomy can be performed either in the lower femur or upper tibia.

The osteotomy procedure itself involves cutting the bone virtually completely. There are then two ways of realigning the bone. One is to take out a wedge of bone and the other is to make a cut and open up



a wedge and fill it with either bone or a bone substitute. If bone is used it can either be allograft bone which is taken from a cadaver, or autograft bone which is taken from the patient, usually from the hip region. Some kind of metallic fixation device, usually a plate with screws, is then used to stabilise the osteotomy while it heals.

In general there has been a trend moving away from so-called closing wedge osteotomies, where a wedge of bone is taken out, towards opening wedge osteotomies, where a cut is made and the wedge is opened. There are potential advantages and disadvantages of each technique and a decision regarding the most appropriate method will be based on your individual situation.

The X-ray shows an opening wedge high tibial osteotomy for medial compartment osteoarthritis. It is the same patient as the previous X-ray. The osteotomy gap has been filled with allograft (cadaver) bone.

The surgery is usually undertaken under general anaesthetic. You are admitted on the day of surgery. Most people are in hospital for 1 or 2 nights. After surgery there may be a drain tube in the wound, which



Opening wedge femoral osteotomy for lateral compartment osteoarthritis

is removed the morning following surgery. Depending on the degree of realignment and your surgeon's preference, a brace may or may not be fitted after surgery.

Initially you will commence walking with the aid of crutches. You may be able to partially weight bear immediately or be instructed to remain non-weight bearing for up to 6 weeks following the procedure, again depending on the specifics of surgery and your surgeon's preference. An X-ray will be taken at various stages after surgery and depending on how things are progressing, you should be able to gradually increase your weight bearing somewhere between 3 and 6 weeks after surgery. It may take another month or so to be able to completely discard the crutches.

Complications

Like all surgery, osteotomies are associated with the risk of complications. The specific risks of an osteotomy include delayed healing of the osteotomy, infection, deep venous thrombosis, and incomplete pain relief.

Delayed or non-union

Because a cut is made through the bone, there is effectively a fracture of the bone, which needs to heal. With opening wedge osteotomies in particular, this process can be relatively slow. If the osteotomy fails to heal, further surgery is necessary to stimulate healing.

Ongoing pain

Osteotomy is a useful procedure for people with unicompartmental osteoarthritis who are not suitable for joint replacement, usually because of their relatively young age or their desire to return to impact activities such as running. However, the outcome of surgery is probably less predictable than a joint replacement. Although most patients are happy with the result, pain relief is not always complete. In the longer term the underlying osteoarthritis will progress and one can expect knee pain to return.

In addition, surgery around the front of the knee is often associated with difficulty kneeling. This is more of a problem with tibial osteotomies than with femoral osteotomies. The metallic plate that is used to fix the osteotomy can be prominent, particularly in thin people. The metallic hardware is often removed after about 12 months following surgery. This is often done as a day case procedure. If a knee replacement is subsequently planned and the hardware has not been removed, this is generally done as a separate procedure to the knee replacement.



The X-ray is of the same patient who had the high tibial osteotomy for medial compartment osteoarthritis. The plate and screws have been removed. The bone graft has been well incorporated.

Infection

Infection is a risk of any surgery, not specifically related to osteotomy. Should infection occur, this will usually either be treated with oral antibiotics (tablets) or occasionally with intravenous antibiotics. Sometimes further surgery will be required to clean up the infection. This involves admission to hospital for a number of days during which intravenous antibiotics are also given.

Deep vein thrombosis (DVT)

This is a blood clot in the veins of the leg. Precautions are taken to reduce the risk and this usually involves the administration of a daily injection of a blood-thinning agent such as Clexane, or low-dose aspirin tablets. Additional measures may be taken if it is felt that you are at greater risk than the average person undergoing surgery. If a venous thrombosis does occur this will usually need to be treated with anticoagulant tablets, which would need to be continued for at least three months. A small but nonetheless important risk for venous thrombosis is the potential of the blood clot to break off and lodge in the lungs (pulmonary embolus). This can cause significant breathing problems and very rarely can be fatal.

These notes have been prepared by orthopaedic surgeons at OrthoSport Victoria. They are a general overview and reflect their views, opinions and recommendations. They do not constitute medical advice. The contents are provided for information and education purposes only and not for the purpose of rendering medical advice. Please seek the advice of your surgeon or other health care provider with any questions regarding medical conditions and treatment.