

Anterior Cruciate Ligament (ACL) Reconstruction

The anterior cruciate ligament (ACL) is in the middle of the knee (Fig.1) and controls the movement of the two main bones of the knee, the tibia and femur. It is particularly important for twisting and turning movements that occur in football, netball, basketball and snow skiing.

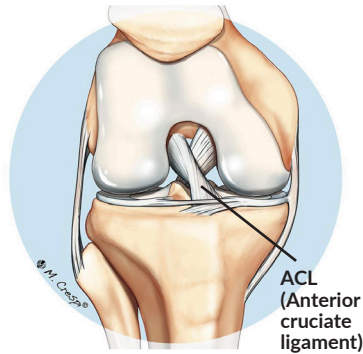


Figure 1.
Anterior Cruciate Ligament

Rupture (tearing) of the ACL can therefore lead to instability. This is felt as giving way with certain activities, usually those that involve a sudden change in direction. When giving way occurs, there is a risk of damage to the menisci (often referred to as cartilages) and this in turn puts the knee at risk of developing premature osteoarthritis. Although it is an aim of reconstructive surgery, it is unclear whether ACL reconstruction actually reduces the risk of developing osteoarthritis.

The main reason for reconstructing the ACL is to stop or to prevent symptomatic instability. In many situations this instability can be predicted soon after the injury occurs and a decision can be made to operate without waiting for the instability to develop. However, in other cases it may be less clear whether instability will develop and people may choose to rehabilitate their knee and try to return to their normal activities without surgery. Whether they can get back to their normal activities without surgery depends on many factors – how much healing of the torn ACL takes place, other injuries to the knee, the intrinsic stability of the knee, rehabilitation, and the individual's ability to modify their activities. In the end, it is a balance between the stability of the knee and what the individual wants to do with their knee.

It is important to remember that ACL reconstruction is almost always an elective procedure. From a medical point of view, there is no rush to make a decision, provided the knee is not giving way.

If ACL reconstruction is to be performed, it is essential to prepare the knee for surgery. The key is to get back full extension (straightening) of the knee. Although it may feel that there is something in the front of the knee that is blocking full extension, this is rarely the case, particularly following the initial injury. When there have been further episodes of giving way, a torn meniscus can get jammed in the knee causing it to be locked and unable to be straightened. A key component is to reduce swelling by regular icing and wearing a compression bandage or sleeve. Having the heel supported on a rolled towel and using the quadriceps muscle at the front of the thigh to lock the knee out straight is the key exercise (Fig. 2). It is often easier to achieve full extension by sitting on the front of a chair with your leg out straight and using your quadriceps muscle to get

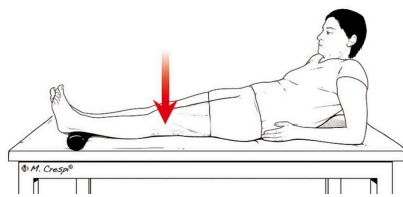


Figure 2. Heel supported on a rolled towel.

the knee locked out. Flexion (bending) is also important and riding an exercise bike will help this, as well as being good for strengthening the quadriceps muscle.

Surgery

The technique for reconstruction involves taking a piece of tendon (usually from the same knee, but sometimes from the other knee) and using this to replace the torn ligament. There are a number of options and your surgeon will advise you in this regard. Although the hamstrings on the inside of the thigh are commonly used, the quadriceps tendon, from just above the patella (kneecap) and the patellar tendon from the front of the knee are also good options. Occasionally allografts are used. These are tendon grafts taken from cadavers (people who have died). Synthetic grafts such as the LARS device are now rarely used.

Whatever graft is used, the principles of surgery are the same. Tunnels are drilled into the femur and tibia at the sites of the attachment of the ACL (Fig. 3). The graft is passed into the tunnels so that the middle part is in the knee where the normal ACL would sit. The graft is then fixed to bone at each end. The fixation provides support early on while the

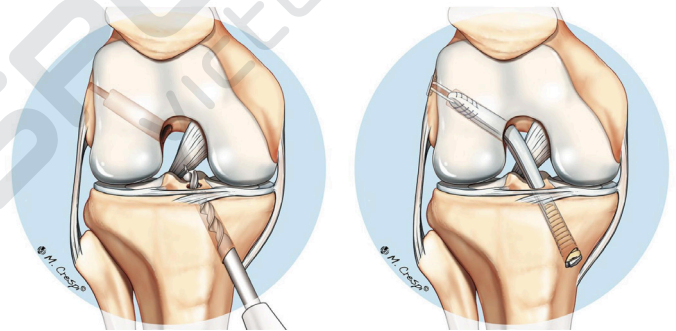


Figure 3. Tunnels drilled into femur and tibia.

tendon is healing to the mouth of the tunnel and adjacent bone.

From your point of view, there are one or two vertical or oblique cuts on the front of the knee together with two small cuts that allow the arthroscope and surgical instruments to be introduced into the knee. If additional surgery is required to repair a meniscus, a further incision may be made towards the back of the knee on either the outer (lateral) or inner (medial) aspects. Areas of numbness around the knee and occasionally down the shin are quite common due to unavoidable damage to very small nerves around the incisions. Although the numbness can be permanent, the area of numbness usually gets smaller with time and does not usually cause any problems.

In recent years some patients who are considered to be at a very high risk of re-injury have undergone additional surgery on the lateral (outside) side of their knee to try to reduce this risk. This procedure is called a lateral extra-articular tenodesis. Your surgeon will advise you if they think it may be appropriate in your situation. This surgery does result in an additional cut and can make the early recovery more painful and difficult, particularly in terms of regaining full extension of the knee.

Surgery is usually performed under a general anaesthetic. At the end

of the operation the area affected by the surgery is infiltrated with local anaesthetic. Sometimes a nerve block is also used. If this is the case you will notice numbness and tingling in your leg when you wake up. This gradually wears off over 6-8 hours or so. After leaving the recovery area, pain control can usually be achieved with tablets alone. Anti-inflammatory medication is often used to help with pain control, so it is important that you tell your anaesthetist if you have ever had a history of stomach ulcers or bleeding, as this medication may not be appropriate in that situation.

You will be awake within 20 minutes of the operation and should be able to eat and drink after approximately 2 to 3 hours. Ice packs are applied to reduce pain and swelling. Depending on your surgeon's preference, you may have a drain tube placed in the knee joint so that unwanted blood does not accumulate and inhibit recovery. These drain tubes are usually removed on the same day or the next morning at the latest.

A physiotherapist will teach you exercises to get the knee out straight and regain function in the quadriceps muscle at the front of the thigh as well as make sure that you are confident walking with the aid of crutches. A brace or splint is not usually required, unless you have had additional surgery to repair a meniscus or one of the other ligaments in the knee.

You will usually go home on the morning after surgery, although the surgery can also be performed as a day procedure. Following surgery you will be provided with information regarding rehabilitation. This outlines the rate of progression. Rehabilitation can be undertaken either independently or under the supervision of a physiotherapist.

It is very important to rest during the first week after surgery in particular. This means spending most of the time on a bed or couch with the leg elevated and regular icing of the knee. The main aim during this phase is to restore full extension of the knee.

The time off work that is required will vary according to your job. If it is mainly deskwork, then patients may be able to work within 2 weeks. If heavy manual work is involved, it may be 2 to 3 months before one can consider return to work. In general, crutches are required for up to 2 weeks, but this will also depend on whether you have had a meniscal repair (which may require longer).

In terms of returning to sport most patients are able to recommence some of their activities by 4 months. By 6 months the majority of patients are able to gradually resume training for their original sports with a view to returning to play from 9 or 10 months onwards. However, improvement continues for another 12 months after that. Timing of return to sport depends on many factors and your surgeon will advise when it is appropriate.

Complications

While most patients are happy with the outcome of their surgery, there are nonetheless some risks that need to be borne in mind.

Infection

Antibiotics are given at the time of surgery to reduce the risk of infection. Despite this, infection of the wound can occur. This is usually easily treated with oral antibiotics. However, sometimes the infection gets into the joint. This is a serious complication and requires admission to hospital, additional surgery and intravenous antibiotics.

Venous thrombosis

A thrombosis is a blood clot that may form in the veins in the legs. This can cause persistent swelling of the foot and ankle and can also be dislodged and be carried to the lungs (pulmonary embolus), resulting in chest pain and breathing difficulties. However, the risk of thrombosis is statistically very low.

Bruising

Bruising around the back of the knee and extending onto the shin is not uncommon, particularly if you have a hamstring graft. It may not appear for four or five days. It can make it difficult to straighten the knee and put weight on the leg, but it settles by itself. There can be some residual staining of the skin, but this also usually resolves although it may take a year or more.

Donor site

If you have a hamstring graft it is very common to experience the sensation of tearing something at the back of the knee during the first 3 months after surgery. This is probably just stretching of the scar tissue being laid down in the tendon harvest site. Although it may be associated with some pain and bruising, it usually settles over a few days and does not affect the long-term outcome.

If you have a patellar tendon graft there can be pain at the lower end of the patella. This can occur as late as 8 to 10 months after surgery but usually settles with time. There is usually difficulty kneeling on the scar for some months, but this also improves over time.

Hardware

Occasionally one of the devices used to hold the graft in place while it heals to bone may be prominent on the front of the shin and cause local discomfort. If problematic, the hardware can be removed later without risk to the graft.

Graft rupture

A proportion of patients will unfortunately suffer a graft rupture. Known risk factors include being under the age of 20 at the time of surgery, returning to a high risk sport, and having a family history of ACL injuries. Many other factors may also contribute to the risk. At present it is not altogether clear how to reduce this risk, but attention to rehabilitation and not returning to sport until your knee is ready do seem to be important.

Other

Persisting problems can occur as a result of poor compliance with rehabilitation, failure of the graft (rare), or significant additional damage to the knee from the original injury such as torn ligaments or menisci, or from developing osteoarthritis.

These notes have been prepared by orthopaedic surgeons at OrthoSport Victoria. They are a general overview and reflect their views, opinions and recommendations. 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.