

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION **PATIENT INFORMATION SHEET**

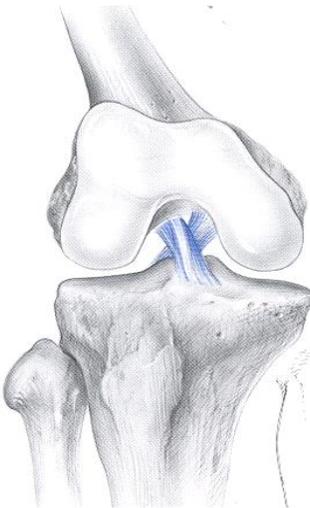
Introduction

You have injured your knee and it has been recommended that you undergo an operation to reconstruct your anterior cruciate ligament (ACL). This leaflet aims to give you information on the ACL structure and function, what the operation entails and the post operative rehabilitation. If you have any further questions after reading this information please discuss them with me.

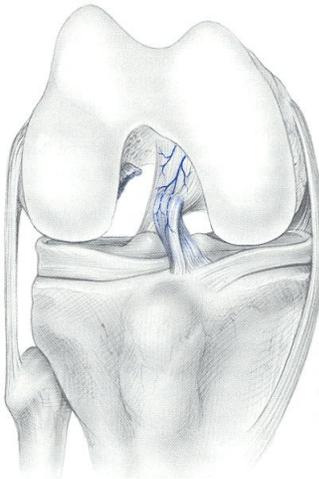
What is the ACL?

The cruciate ligaments are a pair of extremely strong, thick ligaments in the centre of your knee joint. You have an anterior cruciate ligament and a posterior cruciate ligament (PCL) and they cross each other, hence the name "cruciate". The ACL lies in front of the PCL running from the outer aspect of the femur (thigh bone) to the inner aspect of the tibia (shin bone). The direction of the fibres are as if you had your hands in your pockets.

Intact ACL



ruptured ACL



Functions of the ACL

The primary functions of the ACL are;

- To prevent forward movement/displacement of the lower leg bone(tibia) on the thigh bone (femur)
- To control excessive rotation movement of the tibia
- Helps to control the small rolling and gliding movements that occur in the knee to allow for smooth motion

ACL Injury

If the ACL is injured, excessive movement occurs with the lower leg moving forward and outwards when the knee is bent. This will lead to the knee 'giving way' or 'collapsing' during activities that involve twisting or turning. ACL tears can often go undiagnosed as, although the knee is swollen and painful immediately following the injury, this often resolves over 5-10 days. After this period of recovery there may be no pain but a feeling of instability with any attempted return to sports with activities such as sudden changes in direction or stopping suddenly.

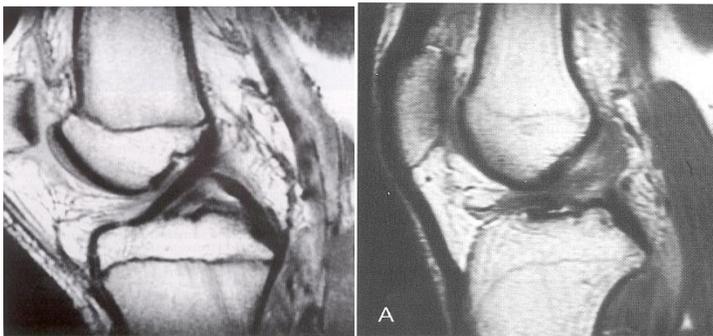
At the time of injury other structures may have been damaged; most commonly this is the meniscus ("cartilage"), other ligaments or the smooth articular cartilage that covers the end of the femur or tibia. If you have sustained other damage within the joint it may lead to a less optimal outcome.

No matter how successful the operation, it is important to understand that surgery to reconstruct your ACL cannot give you a normal knee as it probably does not truly replicate, anatomically and physiologically, the ACL that you had. However, surgical reconstruction can allow you to function normally and return to sports with no instability or risk of further damage to structures inside the knee, in most cases.

At present there is no evidence that ACL reconstruction decreases the incidence or progression of degenerative change (osteoarthritis). However by stabilizing the knee and reducing further damage to articular cartilage and meniscus it is reasonable to assume that the ACL reconstruction may have a protective effect.

Diagnosis

An MRI (magnetic resonance imaging) scan is not absolutely essential to diagnose an acute ACL tear as an accurate and detailed history and clinical examination is more reliable. MRI can however confirm the diagnosis and give additional information on injuries to other ligaments and structures within the knee. On MRI the ACL appears as an uninterrupted dark band. If damaged, there is disruption or complete absence of this band. Although there is good correlation for diagnosis MRI scanning is not 100% accurate. Occasionally an examination under anaesthetic and arthroscopy ("keyhole surgery") is necessary to confirm the diagnosis of ACL rupture and, more importantly, assess the extent of injury.



The scan on the left shows an intact ACL on MRI. This is the black structure in the centre of the picture running diagonally upwards from left to right. The scan on the right demonstrates a complete rupture of the ACL.

Surgical procedure

Often the ACL will not heal and it is, in most cases not possible to repair a torn one. Therefore, an alternative tissue must be used to replace it. There are 3 main types of grafts available;

1. Using the patient's own tissues (autograft)
2. Using another person's tissue (allograft) – not used commonly in this country
3. Using artificial material – not currently done, due to a high failure rate – This is because synthetic ligaments don't get accepted by the body, and incorporate, with a blood supply.

Using the patient's own tissue is by far the preferred way. **The choices for graft tissue are;**
Hamstring tendon graft (the gracilis and semitendinosus tendons)
Kneecap (patella) tendon graft
Quadriceps graft

I favour the hamstring tendon graft for a number of reasons. It does not disrupt the mechanism by which the knee is straightened. It has been shown to result in less post-operative pain over the front of the knee, less discomfort when kneeling post-operatively and a reduced loss of full extension (straightening) of your knee. The hamstring graft also more closely reproduces the forces of an intact ACL.

The hamstring tendons used can be felt on the inner aspect of the thigh at the back of the knee. You will manage perfectly well without them and in fact research now shows that they grow back to some extent. I always take consent for a second graft in case the hamstring is not suitable due to its size or if there has been difficulty in their harvest. My second choice is the opposite leg hamstrings, and then the quadriceps tendon, which is from the front of the knee just above the knee cap centrally.

Surgery to reconstruct the ACL is carried out via an arthroscopy and a small incision on the inner aspect of your lower leg just below your knee. The arthroscope allows additional surgery (i.e. trimming of meniscal ("cartilage") tears) to be performed at the same time.

Most ACL reconstructions are performed under general anaesthetic.

In most patients the knee is not put into plaster or braced at any time after surgery, unless there are other injuries/damage that requires this.

Timing of reconstruction

Often patients, especially if sporty, are keen to proceed with reconstructive surgery immediately after injury. They feel this will lead to earlier return of function. Unfortunately this is not so. The best results of surgery are gained after full rehabilitation of the knee prior to surgery, so as to regain a full range of motion, especially straightening, and good quadriceps strength. This will minimize the potential risk of post-operative stiffness. The optimum time

from injury (or arthroscopy) to reconstructive surgery is 4-6 weeks. This time may be longer if other structures are damaged. In this time it is important to understand that although the swelling decreases and movement returns in this period, the ligament has not healed. The knee is unstable and at risk of further damage if high risk sports involving pivoting are attempted.

You will come in on the day of your surgery having starved (i.e. no food or liquids) for approximately 6 hours prior to your anticipated surgery time. Nursing staff and a physiotherapist will assess you, explain post-operative procedures and measure you for crutches. You will also be requested to complete some questionnaires relating both to your general health as well as your knee.

Your Surgeon will examine your knee to ensure it is ready for surgery. He / she will also mark the leg to be operated on. This is also your chance to ask any last minute questions.

The anaesthetist will visit you to explain the anaesthetic and post-operative pain control.

The immediate period after surgery

You will wake up from the anaesthetic in the recovery area of the operating theatre. On return to the ward, you will rest until the following day. You will also be given 3 doses of antibiotics intravenously which is routine and helps to prevent infection. (infection can still occur but is very infrequent)

The next day all attachments are taken down i.e. drips, patient control anaesthesia etc. The physiotherapist will instruct you on exercises to gently flex the knee, gain full hyper-extension (straightening) and strengthen your thigh muscles. You will walk with the aid of crutches putting as much weight through your operated leg as is comfortable. There is no limitation to weight bearing and you will not require a brace.

A cold pack machine will be used post-operatively. Some bleeding can occur – Dr Bayes will see you after the op to discuss things and assess the knee.

You are normally in hospital for 1 night and discharged when you are safe and comfortable with crutches and Dr Bayes is happy with the range of movement of your knee. In this early phase you will continue with the exercise you were taught in hospital. These exercises are vital for the best possible results. You will be given a pamphlet by the ward staff which advises you about the dressings, contact telephone numbers and when to make appointments with Dr Bayes, as well as physiotherapy. Your post operative take-out medicines will also be explained.

You are advised to use ice packs at home until you return to clinic, 1 week after surgery for a wound inspection and to discuss the operation and rehab in general. Elevation and lots of rest will be advised also. You will not have commenced formal, outpatient physiotherapy by this time.

In the initial 3 week period after surgery it is quite common to experience bruising and swelling in the calf, the front of the shin or inner thigh from the site of your hamstring graft. This can appear quite alarming but is not serious. You may also experience some numbness over the front of the shin or around the scar; this is normal and sensation will usually return over a period of time.

Rehabilitation and physiotherapy

Physiotherapy is vital if there is to be a successful outcome of the ACL reconstruction. It takes a great deal of effort, commitment and time. If you do not feel you can commit yourself fully, it is probably best not to undergo the operation as you will have less favourable result.

In general, a brief outline of stages and goals after the reconstruction are;

Protected movement for weeks 1-6
Gym activities and swimming for weeks 6-12
Light jogging at 3-4 months
Non-contact sports training at 6 months
Full return to contact sports at 9-12 months

Associated with this document is also a guide to your rehabilitation protocol. Progress after the reconstruction is based on the time involved in the formation and maturation of the new ligament and on functional goals. All patients advance at different rates but the time factors are the average basis upon which progression is made. Progression too early may jeopardise your new ligament and cause it to rupture. At all stages you should be guided by your Consultant or Physiotherapist. If you have any specific queries about your rehabilitation please contact either your Consultant or your Physiotherapist.

Please be aware that this protocol relates only to a standard “isolated” ACL reconstruction. If there is other ligament or cartilage damage, the rehabilitation may vary from this protocol.

Brief Rehabilitation Protocol

Associated with this document is a detailed rehabilitation protocol relating to ACL reconstruction. However a précis of the protocol is as follows;

Stage 0 – Prior to Surgery

It is crucial that prior to an ACL reconstruction the knee is fully rehabilitated. There should be no significant effusion (swelling of the knee), the muscle tone should be good and there should be a full range of movement including full hyperextension and flexion.

Stage 1 (0-2 weeks)

The main objective in the initial two week period after surgery is to reduce swelling, regain muscle control, restore a normal walking pattern and regain the ability to extend and flex the knee. Use of ice packs for cold compression is very useful and beneficial. Aim to achieve short regular periods of exercises (“little and often”) rather than exercise in one period only during the day.

You will walk with crutches initially, gradually increasing weight bearing on the knee and try to walk without a limp. It is crucially important to be able to fully extend and lock your knee as soon as possible. This helps the quadriceps muscle above the knee pump blood and reduce swelling, as well as enabling a normal walking pattern. Exercises include static contractions of the quadriceps, gentle bending, as well as hamstring and calf stretches.

Stage 2 (2- 6 weeks)

Now the aim is to stop using crutches, gain confidence and strengthen the knee whilst restoring full movement, especially extension. You can use a static bicycle with no resistance, continue quadriceps strengthening and hamstring curls with no resistance.

Stage 3 (6-12 weeks)

Up to now the knee has only been bent, straightened and the swelling reduced. The graft fixation has now begun to occur biologically and is thus a little stronger than in the initial six weeks. You will now be able to progress to proprioceptive training to help improve balance and co-ordination. Proprioception effectively means co-ordination. At this stage the exercises will include wobble boards and the mini-trampet. At the gym you can swim, use a static bicycle and the leg press. At the same time progressive quadriceps and hamstring strengthening will continue.

Stage 4 (3-6 months)

You can continue in the gym, gradually stepping up intensity. Continue with proprioception and agility skills i.e. hopping in several directions. Start light jogging on a treadmill when sufficient strength and control of the knee has been achieved. Return to golf starting with the driving range at about 4 months after the reconstruction.

Stage 5 (6-9 months)

Return to sport specific training in a non-contact fashion. Use the 3 months to increase your level of fitness and be in good condition to compete when you able to return to full sports after 9 months.

Stage 6 (9-24 months)

Although you should safely be able to return to contact sport activities at 9 months after your reconstruction, it is important to continue with the exercises as outlined above, especially the proprioceptive work. Many professional sports persons note that although they can return to sport at 9 months, they do not feel fully rehabilitated until 24 months have passed as they “learn to use the knee” again.

A question often asked by patients is why do they have to wait 9 months before returning to contact sport when some professional sports people return at about 5-6 months. The answer is that the professionals, quite reasonably, are taking a risk as they need to return to their sport as soon as possible for financial or other reasons. Most orthopaedic surgeons would agree that it is safest to wait approximately 6-9 months before returning to contact sport to minimise the risk of re-rupture of the graft. If sport is not your livelihood it is probably wise to wait until 9 months to minimize the risk of a further rupture and starting from day one again.

Naturally the above is only a guide. It is advised you are supervised through your rehabilitation by a Physiotherapist. If you have any other questions relating to your surgery, progress or rehabilitation please contact your Consultant of Physiotherapist.

Possible risks and complications

There is no surgical procedure that is free from complications. ACL reconstruction, especially recently, has a very good record of safety and success, but complications can occur. Such complications can include;

Stiffness of the knee. The knee may have difficulty gaining full extension or flexion. This is minimised by early physiotherapy and in addition a great deal of effort on the part of the patient. Sometimes it may be necessary to manipulate the knee under anaesthetic or carry out an arthroscopy to break down adhesions if the knee does become stiff.

Persistent pain over the front of the knee. There may be persistent numbness on the inner aspect of the leg, or the front of the leg, and rarely an area develops tiny 'shocks' when lightly touched.

Persistent swelling of the knee. Deep venous thrombosis (DVT) or 'blood clots in the veins'. Every attempt is made to minimise this complication, although heparin is not given routinely. Unless the procedure is an emergency, patients should not be taking the oral contraceptive pill for 6 weeks prior to surgery. Finish your current pack and take other contraceptive precautions until after your operation. It is also advisable not to be taking HRT at the time of surgery. Please ask for advice if necessary.

Infection of the knee. This is a rare but extremely serious complication. Antibiotics are given during and shortly after the operation to minimise the risk.

Failure of the graft. The knee may start to give way again. This may occur within a short time of operation or after a considerable period. The 5 year success rate in preventing instability is approximately 90% (this figure has increased considerably in recent years).

In "double-bundle" surgery, revision of the ACL reconstruction may be more difficult, due to the fact that 2 tunnels have been used. Revision surgery may require 2 operations, one to fill the tunnels with bone, and the other to redo the drill-holes and replace the graft. This is also sometimes the case with failed "single-bundle" surgery.

Please contact your consultant if you are at all concerned that there is a problem. In particular, act immediately if you develop a fever, severe pain or significant wound problems. If you develop a problem after your surgery you do not need to contact your GP (unless you wish to do so). Please contact the clinic/consultant directly on his mobile telephone if you are concerned about anything.

I hope that this guide has been of use to you. You will have been recommended surgery only if the potential benefits of the operation outweigh the risks. If you have any questions relating to this please ask your Consultant.

IT IS ADVISABLE NOT TO UNDERTAKE ANY LONG HAUL AIR TRAVEL FOR 6 WEEKS POST SURGERY (SHORT HAUL – 4 WEEKS). THERE IS A RISK OF DVT (DEEP VEIN THROMBOSIS – CLOTS IN THE VEINS OF THE LEG). PLEASE DISCUSS THESE ISSUES WITH ME IF YOU INTEND TO TRAVEL.

If air travel is essential, then certain precautions are necessary:

1. You may be given “blood thinning” injections around the time of your flights – we will discuss this.
2. The most important factor that causes DVT is immobility – This results in inadequate venous blood flow to the heart, resulting in possible clots forming in the calf veins. The following may help to enhance the blood flow to the heart
3. During the flights I recommend TED stockings – these are compressive medical stockings, which may empty out the deep veins in the calf, resulting in less clot formation
4. It is recommended that you do calf pumping exercises during the flight, as often as possible.
5. It is also recommended that you get up and stretch, as well as walk up and down the aisle of the aircraft as often as possible.
6. Limit alcohol intake and drink a lot of water. Dehydration plays a role also