

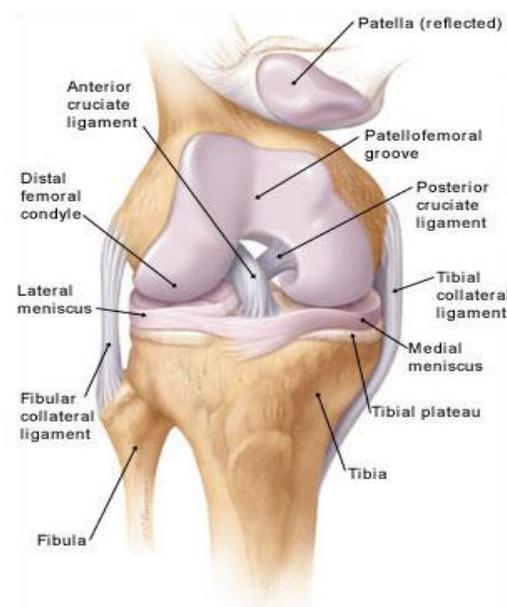
# A Guide to the Management of an Anterior Cruciate Ligament (ACL) Injury

## Overview

Advances in our understanding of ACL injuries have led to major changes in the management of these injuries over the last decade. These improvements include surgical techniques and an advanced understanding of ACL rehabilitation. The aims of this guide are to provide you with information about ACL injuries and the management options that are currently available.

## What is the ACL?

The knee joint is a complex joint that relies upon its surrounding ligaments and muscles for stability. The knee joint is able to flex (bend) and straighten (extend) and is also able to slightly rotate. The ACL is one of the four primary knee ligaments which connect the bones of the femur (upper) and tibia (lower leg). Ligaments are strong fibrous bands which are composed of connective tissue bundles known as collagen fibres.



## What is the anatomy and function of the ACL?

The ACL originates from the back of the femur (thigh bone) and runs diagonally through the centre of the knee to the front of the tibia (shin bone). The Posterior Cruciate Ligament (PCL) runs in the opposite direction and the two ligaments cross near the centre of the knee. Together, these two ligaments provide stability for the knee by controlling the amount of forward and backward movement of the tibia underneath the femur, and the degree of rotation at the knee. Both ligaments are vital in activities or sports requiring fast changes in direction, pivoting and twisting motions.

## How is the ACL injured?

The ACL can be injured indirectly or directly.

- **Indirectly:** During non-contact or contact sports a sudden twisting of the knee whilst the foot is fixed can injure the ACL – for example, whilst slowing down or changing direction rapidly. Skiing is another common cause of ACL rupture, especially if the ski boot bindings don't release so that the ski twists the knee awkwardly.
- **Directly:** In contact sports the ACL can be injured in conjunction with the Medial Collateral Ligament (MCL) when a direct blow is applied to the outside of the knee, such as during a football or rugby tackle.

## What are the signs and symptoms of an ACL injury?

- **Pain:** Most patients report severe pain, especially immediately after the injury has occurred. This usually makes weight-bearing on the injured leg initially very difficult.
- **An audible “pop”:** Most patients, but not all, may experience a popping or cracking sensation in the knee at the time of the injury.
- **Swelling:** The knee will normally swell up immediately following injury, due to bleeding inside the knee joint.
- **Severity:** patients usually know that they have suffered a severe injury
- **Instability:** A feeling of instability of the knee or a sensation of giving way. This may not be felt until several weeks after the injury.

## How is an ACL tear diagnosed?

ACL tears can be diagnosed by several methods. A clinical examination by your consultant will usually make the diagnosis. Clinical tests such as the Lachmans (below) and the anterior draw test can be used to assess the integrity of the ACL. In the early stages following injury, the knee can be very painful and swollen and this can make examination difficult.

An MRI (Magnetic Resonance Imaging) scan may be performed to reinforce the clinical diagnosis and assess the damage to the ACL, as well as the other ligaments and cartilage.

## Why does the ACL commonly fail to heal?

Unlike the other three ligaments around the knee joint, the ACL often fails to heal naturally. Because of the location of the ACL, bleeding following an injury to the ligament is uncontained and fills the joint, creating pain and considerable swelling. The blood irritates the lining of the knee joint causing synovial fluid to be produced. The function of the synovial fluid is to dissolve and prevent blood clotting within the joint, but if blood clotting doesn't occur, then scar tissue cannot form. If scar tissue is unable to form, the body is unable to heal the ligament and so the ACL fails to heal.

Some partial tears may heal by themselves without surgery, particularly in children and adolescents. However, complete tears usually fail to heal by themselves and may require surgery to rebuild the ligament.

## What is the treatment for an ACL tear?

Once the initial symptoms have subsided and you have received a diagnosis, your orthopaedic surgeon will decide and discuss with you which treatment will be best for you.

The two main factors that will be considered are:

- What level of sport and activity you wish to return to.
- How “loose” your knee feels, both to yourself and when it is examined

Other factors include:

- How you injured the knee and how old the injury is.
- Your age.
- Whether other structures within the knee, for example the cartilage, are also injured.

There are two main forms of treatment available following ACL injury: non-operative management (also known as conservative management), or surgery.

### Non operative management

Some partial tears of the ACL can still result in quite a strong and stable knee. With the help of physiotherapy, these injuries may be treated conservatively without surgery. In some instances a complete ACL rupture may also be treated conservatively with physiotherapy alone. The decision on whether to treat a complete ACL rupture conservatively is dependent on factors that include activity levels of the patient and their age.

Early after the injury a physiotherapist can help reduce pain, swelling and stiffness in the knee. They can also help improve confidence in walking and regain trust in the knee. A large part of physiotherapy management is then addressing any muscle weakness present around the knee, spine and pelvis and any deficits in ‘proprioception’. Proprioception is a mechanism whereby nerve endings within the ligaments and muscles send information to the brain about knee joint position sense. It is essential for good stability and balance of the knee and is disrupted if the ACL is injured.

Proprioception can be re-trained using exercises designed to test your balance and co-ordination. Good muscle performance and enhanced proprioception are both key factors in a successful conservative approach to ACL injury.

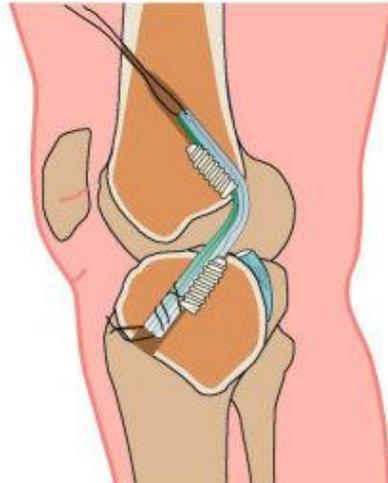
Adjustments may be required to daily activities and sports whilst having physiotherapy and a carefully graded progression back to competitive sports will be planned, if that is your goal. Sometimes it is a good idea to wear a supportive knee brace to provide extra stability when returning to sports.

### Surgical management

You and your surgeon may decide that reconstructing your ACL is the best way forward. If that is the case, it is important to know that it is very rarely necessary to perform the surgery as soon as possible. Unless there is significant damage to other structures in the knee, then the best time to rebuild the ligament will be once the knee has recovered from the injury. The time it takes for the knee to recover movement, and for the pain and

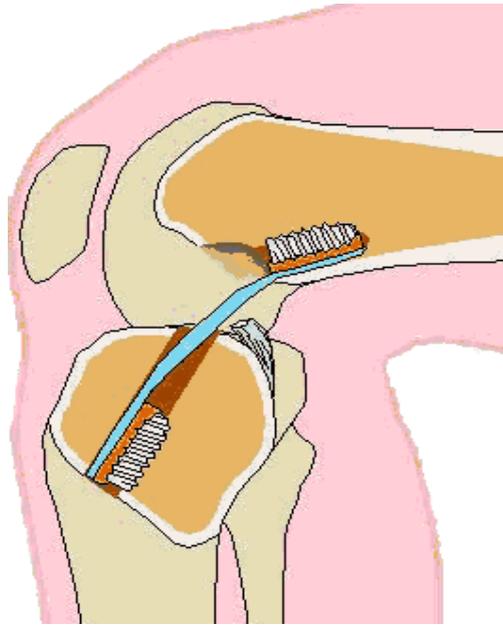
swelling to go, will vary from person to person but is usually in the region of 4 to 6 weeks. Please don't feel that this is wasted time. It is part of your recovery and a little patience in this phase may well save you a lot of time in the long run.

The surgical method used during your operation is called an arthroscopy. A small fibre optic camera is inserted through two small incisions on either side of your kneecap tendon. The camera allows the surgeon to accurately view your knee joint and perform the surgery with minimal disruption to the knee. The procedure is normally performed under a general anaesthetic and surgery will take approximately 1 hour, either as a day case or with an over night stay in hospital. Further advice about common surgical questions can also be found in our document ***Common Questions About Your Surgery.***



The remains of the damaged ACL are firstly removed and then a new ligament is formed, using an alternative soft tissue known as a graft. The graft is commonly formed from the patient's own hamstring tendons and is known as an autograft. Strands from one of the smaller hamstring muscles (called Semitendinosus and Gracilis) are used to create the new ACL graft. Occasionally, your surgeon may choose to make the graft using a small portion of the patellar tendon instead of the hamstrings. The patellar tendon is a strong tendon that is positioned just below your knee cap and attaches the quadriceps to the tibia.

Tunnels are created in the tibia (shin bone) and the femur (thigh bone) to allow the graft to be positioned correctly across the knee. The new reconstructed ligament is then threaded through and fixed securely at both ends with screws.



### What will happen following the operation?

- Following the operation you will wake up with a bulky dressing and ice pack around your knee.
- You will be seen by a physiotherapist in your room, and once you have recovered from the anaesthetic you will be allowed to fully weight bear as pain allows. On occasions you may be required to use elbow crutches on the first few days following surgery.
- The knee may be swollen, but this is common up to three months after surgery. You should try to keep your leg elevated when not walking or exercising.
- Bruising is very common and you may find that bruising appears down the leg as far as the inner aspect of the heel. This may take 4-6 weeks to settle.
- You may also notice that you have some numbness, especially over the scars at the front of the knee. This should begin to settle after a few months, but you may always notice a residual area of reduced sensation.
- The hospital based physiotherapist will give you exercises to do whilst you are in your room, and for when you are discharged home.
- The use of ice is also permitted if the knee is swollen and should be applied for 10-15 minutes at a time. Please note that you should not place an ice pack directly on the skin, but you should place the ice in a damp towel to avoid an ice burn.
- At the time of your discharge from hospital, if you have not already arranged a post operative appointment with a physiotherapist from the Jonathan Webb Clinic, (or another clinic if this is more convenient for you), then you should contact us on 08450 60 44 66 to ensure that you continue your rehabilitation. Out-patient physiotherapy should begin approximately one week after surgery.

## When will I see my consultant following the operation?

- Four weeks after the operation you will see your consultant and the dressings will be removed.
- At six months you will have another consultant appointment..
- If there are any complications with your rehabilitation within this time your physiotherapist may refer you back to your consultant for a further review and will liaise directly with the consultant about any issues.

## Complications

Complications following ACL reconstruction are pretty rare. However, they include;

- Infection (<1%) can almost always be treated with antibiotics and usually just involves the skin. If bacteria get into the knee itself then it may be necessary to do a further arthroscopy to wash the knee out with saline solution and give stronger antibiotics via a drip. In extremely rare cases the new graft and metal screws may need to be removed to allow the body to get rid of the infection completely.
- Deep vein thrombosis (DVT, <1%) is a complication of any knee surgery but is unusual if early mobility is encouraged after surgery.
- Swelling is almost normal after ACL surgery and is most easily seen just above the kneecap. The swelling should not become so tight as to become painful though, and if it does then you should contact the clinic.
- Stiffness will always be present in the early post operative phase but usually gets better with exercises and physiotherapy. Sometimes some excess scar tissue builds up in the knee, particularly around the front of the new ACL graft. This can block or jam the knee preventing it coming out completely straight. This excess tissue can usually be squeezed away by gentle but persistent “extension” exercises that your physiotherapist will show you. However, if it persists beyond 8 weeks then it may be necessary for your surgeon to do a further minor arthroscopy to remove the extra tissue and allow full straightening of the knee.

## Post-Operative Rehabilitation: FAQs

### When do I start rehabilitation?

Your rehabilitation begins before surgery and continues immediately after your surgery. Initially you will be seen by a hospital physiotherapist on the day of your surgery, to make sure you get back on your feet safely before you go home. You’ll also be given some simple exercises to get you started. It is recommended that you then arrange to begin your out-patient physiotherapy approximately one week following surgery.

When arranging your out-patient physiotherapy, you should choose an experienced physiotherapist with expertise in knee rehabilitation. If you have already been treated by your own local physiotherapist then you should continue treatment with them. If you have not seen a physiotherapist before we offer an physiotherapy service within the Nuffield Hospital, where all our physiotherapists work closely alongside our team of surgeons and

physicians. However, if you have any queries regarding your ongoing rehabilitation, our physio team are happy to provide advice and assistance to all patients. It is the role of your physiotherapist to guide you through your recovery safely and ensure you achieve the best outcome following surgery.

### How long does it take?

The time it takes to recover following an ACL reconstruction varies from one person to the next. There are many factors that determine the rate of recovery following surgery, and how soon someone returns to sport. One of the biggest factors that will determine the rate of recovery and long-term outcome following surgery is your motivation and adherence to rehabilitation.

### What will I be doing?

The rehabilitation following ACL surgery is split into three different phases (early, middle and late). Within each phase there are specific goals that your physiotherapist will help you to achieve. Once you have achieved all the goals in each phase, you will be able to move on to the next phase of your rehabilitation. The time it takes to progress to the next phase will vary from person to person, so the timeframes that are included in these guidelines are only an approximation. The detailed phases of rehabilitation can be found in our separate document entitled **ACL Post-Operative Rehabilitation Phases**.

Access to a gym will really help your progress, particularly during the middle and late phases of your rehabilitation. You may wish to consider joining a gym in order to be able to use exercise equipment regularly.

### When can I drive?

When considering a return to driving following surgery, it's essential that you consider the safety of yourself and other road users. After 2 weeks it is usually safe to return to driving if you have had surgery to the left knee. Within this timeframe you should have regained sufficient mobility and strength in the knee to use the clutch pedal. Following right knee surgery the time to return to driving is usually longer. It may take up to 4-6 weeks for the right knee to be strong enough and react quickly enough to use the brake pedal in the event of an emergency stop. You will be advised by your surgeon or physiotherapist when it is safe to start driving again but you should also check with your vehicle insurer to confirm you are covered.

### When can I start back at work?

The time when you can return to work depends entirely on the type of work you do. If your job is sedentary, for example desk-based work, you should be able to return within 1-2 weeks following surgery. If your job requires you to be on your feet for longer periods of time, but does not require manual duties such as heavy lifting and kneeling, you may return to work within 2-4 weeks. Jobs that require a greater degree of manual work and physical demand, for example lifting and running, may require 3-4 months before the knee is strong enough to perform all duties safely. Again, your surgeon or physiotherapist will give you advice on when to return to work.

## When can I return to sport?

Opinion amongst experts regarding when it is appropriate to return to sports following surgery is variable. People recover at different rates for many reasons, and so the return to sport criteria is based on an individual's physical and psychological readiness to return to their sport, rather than based on a set timescale.

If you perform your rehabilitation satisfactorily you may be able to return to jogging at approximately 3 months. For light individual sports (for example non-competitive golf), you may be able to start again at 3-4 months. The time it takes to return to high performance/contact sports (for example, rugby, football and skiing), is longer. There is a big difference between practicing sports and playing competitively. Dribbling a football around a set of cones does not place the same demands on the knee joint as playing a 90 minute football match! It will take 6-9 months or more to regain the physical and psychological strength, agility and fitness levels required to meet the demands of high performance/contact sports.

## Further information

If you have any questions which have not been answered in this document, please contact the clinic on the numbers below. Our admin team will take your details and discuss them with an appropriate clinician, then call you back as soon as we can.

Tel: 08450 60 44 99 (Nuffield Chesterfield Hospital, Bristol)  
Tel: 0203 195 2443 (Fortius Clinic, London)

Written by Nick Ashton, Physiotherapist & Jonathan Webb, Consultant Orthopaedic Surgeon on behalf of the Jonathan Webb Clinic.  
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