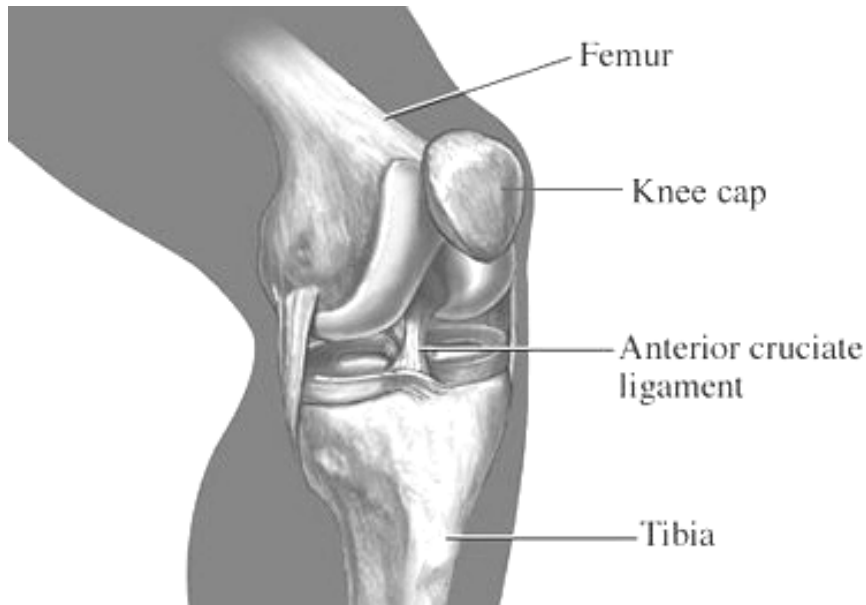


Advice and information for patients having anterior cruciate ligament (ACL) reconstruction



Introduction

Anterior cruciate ligament (ACL) surgery and rehabilitation have changed dramatically over the past decade. This is due to extensive clinical experience, improved surgical technique and a better understanding of the rehabilitation necessary to return the patient to full function as quickly as possible. Rehabilitation of your knee both before and after the surgery is a major factor in the success of ACL reconstruction. Early restoration of full joint movement and weight bearing are very important for successful rehabilitation. The major goals of ACL surgery and rehabilitation are:

- To restore normal joint anatomy
- To provide static and dynamic knee stability
- To return to work and sport as soon as possible

It is important that you take an active part in the rehabilitation both before and after the operation. Our aim is to guide you through your rehabilitation with as few problems as possible. This booklet provides guidelines for your recovery and is not a strict protocol. Patients vary and the exercises will be tailored for you by your physiotherapist.

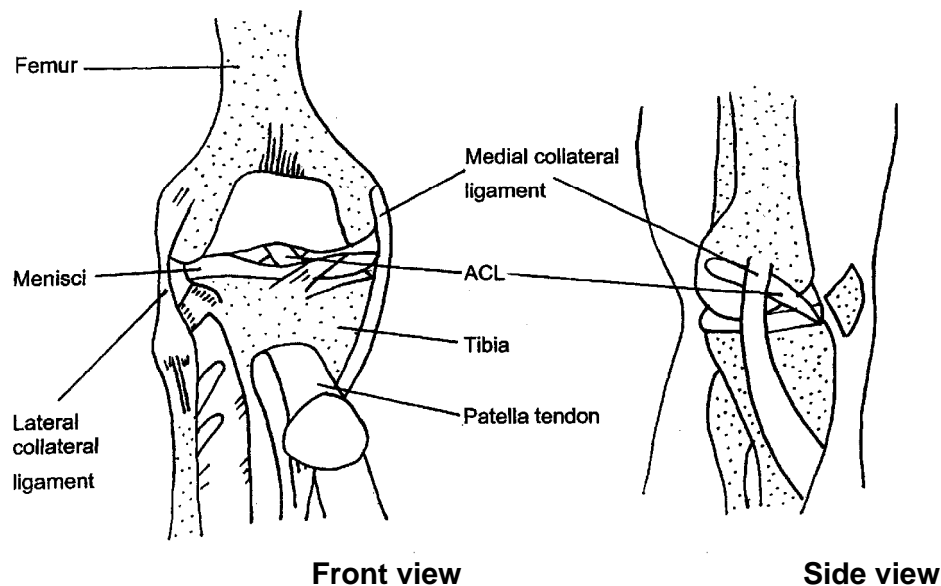
Anatomy

The anterior cruciate ligament (ACL) runs from the back of the thigh bone (femur) to the front of the shin bone (tibia) and acts to prevent excessive forward movement of the shin bone. It is one of the main restraining ligaments in the knee and plays an important role in maintaining the stability of the knee, especially in rotation movements e.g. during turning or side stepping (cutting) manoeuvres.

In addition to its restraining properties, the ACL provides important feedback information to the muscles surrounding the knee. This in turn affects the perception of what position the knee is in and the reflex muscular stabilisation of the joint (proprioception). Proprioception is a normal feature of joints and is essential for normal joint function in daily activities and sports. Following an ACL rupture, the proprioception is diminished but can be compensated for by specific rehabilitation exercises for the muscles surrounding the knee. If this does not prove sufficient then an operation to reconstruct the ACL may be necessary. After ACL reconstruction and rehabilitation, proprioception has been found to be significantly restored.

Mechanism of injury

The ACL is typically injured in a non-contact twisting movement, usually due to abrupt slowing down and change of direction. Side stepping (cutting), pivoting and landing from a jump are examples of activities that may cause an ACL tear. The injury is often associated with a tearing or popping sensation which may be audible, often associated with rapid swelling of the knee due to bleeding from the ruptured ligament. Other symptoms may be pain and giving way of the knee, especially with twisting movements. In major 'giving way' episodes it is possible to further damage the other structures in the knee, such as the joints surfaces (articular cartilage) or the mobile cartilages (menisci) and collateral ligaments (see diagram below).



Pre-operative rehabilitation

ACL reconstruction is not an emergency operation. Prior to surgery, treatment is aimed at regaining full joint mobility and reducing the swelling whilst maintaining the strength of the muscles around the knee. Increasing the balance reactions (proprioception) of the muscles is also important, thus reducing the chance of problems post-operatively. Delaying surgery also allows the patient to prepare mentally for the surgery and the intensive physiotherapy post-operatively.

Some patients do not require surgery and are able to achieve satisfactory stability and function with conservative rehabilitation and modification of their daily activities and sports. However, chronic ACL deficiency can result in gradual damage to the mobile cartilages (menisci) and joint surfaces (articular cartilage) and consequently early joint degeneration.

Before the operation

Prior to the operation you will be given an appointment for pre-operative clerking. At the appointment all necessary tests and examinations will be completed and you will be measured for a brace.

If you are on an oral contraceptive pill containing oestrogen, you do have a slight increased risk of a thrombosis (blood clot) occurring. For this reason, it is advised that patients come off the oral contraceptive pill for a full month prior to the surgery. You are advised that you must use an alternative contraceptive method for that month and for the month following re-starting your pill (the risk of a thrombosis occurring during pregnancy are at least equivalent to the risks during this surgery). If for medical reasons or personal choice you are either unable or unwilling to come off the contraceptive pill, it is recommended that a once daily injection of a blood thinning medication is given during your period of hospitalisation only.

The operation

Once ruptured, the ACL has minimal ability to heal and the aim of surgery is to accurately replace this ligament. The operation to reconstruct the ligament involves replacing it with a graft taken from tissues around the knee. Different tissues can be used and the two most common types are the middle third of the patella tendon (kneecap tendon), including small pieces of bone from the knee cap (patella) and the shin bone (tibia), or two of the hamstring tendons. Both are equally strong but choice is made dependent on occupation and other existing problems with the knee e.g. patella tendon may not be used if you have a job involving kneeling. The skin sensitivity is altered around this area which may make kneeling uncomfortable.

It is not possible to reproduce the normal anatomy of the knee completely but the surgery, along with the intensive physiotherapy rehabilitation programme to re-educate and strengthen the muscles around the knee, aims to produce a functionally stable knee for both activities of daily living and for sport.

Surgery usually involves an overnight stay in hospital but may sometimes be carried out as a day case, and then several months of intensive physiotherapy to restore the normal range of movement, strength, flexibility and proprioception.

After the operation

Day 1:

- After the operation you will return to the ward with a dressing over the wound and a knee immobilising splint on.
- You will be visited by a physiotherapist and taught some exercises.
- An ice pack will also be applied to help with the swelling and pain.
- You should take painkillers regularly so that you can complete your exercises.

Day 2:

- You will be taught further exercises and your previous exercises will be checked.
- You will get out of bed and learn how to walk with your crutches.
- You will also be taught how to climb stairs, if this is necessary.

Prior to discharge from hospital you should:

- Have adequate pain control.
- Be able to achieve a straight leg raise (SLR) in your cricket pad splint.
- Have been taught an exercise programme to continue with until seen in the outpatient department.
- Be given an appointment date and time to start your outpatient physiotherapy and for a review in the orthopaedic clinic (approximately two weeks post-operatively).

Outpatient physiotherapy

- This usually starts at one week post-operatively, but there will be exceptions to this.
- You will be assessed and a series of exercises will be started to improve the mobility and strength of your knee. Balance exercises to improve knee joint proprioception will also be taught.

Guidelines for treatment

At 2 weeks

- Minimum knee flexion of 90°.
- Full knee extension equal to other side.
- Able to start work on static bike with no resistance.
- Able to remove cricket pad splint if has good SLR.
- You may begin driving (short distances only) once you have been given the all clear to remove your cricket pad splint and your knee is less swollen. You should also be "in control of the vehicle". Practice doing an emergency stop under supervision.
- You may now possibly return to a sedentary job.
- You may be able to take short haul flights, if essential.
- Start to practice kneeling.

Clinic appointment

Your stitches will be removed unless this has already been done by the nurse at your GP's surgery.

At 4 weeks

- Minimum knee flexion of 100°.
- Full knee hyperextension equal to the other side.
- Minimal swelling of the knee.
- Discard crutches once walking well and confident with activities of daily living.

At 4 to 6 weeks

- Can return to work in physical job if able to carry out light duties with limited walking.
- You may start golf at the driving range (15 minutes initially), or putting practice.

At 6 weeks

Clinic appointment

An MUA (manipulation under anaesthetic) and/ or arthroscopy may be arranged if you cannot achieve full knee extension.

- You may now take short and long haul flights as necessary.
- You may return to the gym (with guidance from the physiotherapist).

At 7 weeks

- Able to begin swimming (but not breaststroke). If your knee swells you are doing too much.

At 8 weeks

- May start gentle jogging on a trampete under supervision.

At 10 to 12 weeks

- May start resisted exercises for all muscle groups under guidance from the physiotherapist.

At 12 weeks

Clinic appointment

At 12 to 14 weeks

- Gentle sports specific training to retrieve skill levels and regain confidence may be started with guidance from your physiotherapist.
- May start cycling, using low gears initially and avoiding rugged terrain.

At 4½ to 5 months

- You will be discharged from physiotherapy treatment. This may take longer if progress has been slow.
- You will be given advice regarding returning to your chosen sport and the type of exercises to continue with. You should ensure you have an orthopaedic clinic appointment for six months.

Discharge criteria (from physiotherapy treatment)

- No swelling.
- Full mobility.
- Full muscle strength and function (at least 80% of unaffected side).
- Full proprioception, equal to or better than the opposite leg.

At 6 months

Clinic appointment

At 4½ to 6 months

- Return to full activity and non contact sports.

At 7 months

- Return to contact sports.

At 1 year

Clinic appointment with the consultant

At 2 years

Clinic appointment for professional athletes

Return to work

As a guide, you can expect to return to office work at about two weeks after surgery when discomfort and travel to and from work allows. If you have a physical job but are able to carry out light duties that involve limited walking, you may return at around four to six weeks. If your job is more physically active than this, it may take you anything up to three months to return to work, particularly if this involves full squatting or heavy lifting.

Return to sport

It should be remembered that full return to unrestricted sporting activity is a progressive continuum, not an isolated event. It is advisable to complete three to four months of training to rebuild skill acquisition prior to your first competitive game. This training period will also allow you to gradually rebuild your confidence in returning to sporting activities.

Expectations of surgery

The aim of surgery is to prevent the knee giving way or buckling and to allow individuals to return to full contact sports. However, often the patients sporting aspirations have changed by the end of the surgery and rehabilitation and they return to sport at a lower level. The new ligament is no weaker than the original and rate of re-rupture is the same as rupture of the other knee cruciate ligament.

A good or excellent result can be expected in 80 to 90% of cases. This would appear in part to be dependent on the length of time that has elapsed since the original injury. Those who are reconstructed within a year or so from injury appear to do better than those who have had an unstable knee for much longer. The results regarding the long-term risk of degenerative arthritis within the knee joint following this surgery are not yet known.

Postoperative problems

- **Pain at the front of the knee**

Patients may occasionally complain of pain at the front of the knee (anterior knee pain) on kneeling, squatting etc, for up to two years after ACL reconstruction. This does not usually affect participation in sporting activities.

- **Proprioception**

Despite functional stability, the operated knee may not feel right for a long time. Regular balance exercises and wearing a tubigrip occasionally may help this problem.

- **Infection in the knee joint**

Deep infection within the knee joint following surgery is very rare having an incidence of less than 1%. Special precautions are taken to avoid this but if infection occurs and is left untreated, serious problems could result.

- **Deep vein thrombosis**

The risk of deep vein thrombosis (clot) occurring in the deep veins of the calf is also very low. Early mobilisation following the surgery minimises the risk. It is advisable to avoid lengthy car journeys and air travel, particularly any journeys over an hour, should be avoided in the first two weeks following surgery.

- **Stiffness in the knee**

Stiffness may occur following this surgery, especially if it is performed in the early days following the acute injury. In about 2 to 5% of patients, a further arthroscopy is required at about six to eight weeks post-operatively to break down scar tissue to enable the knee to move fully.

- **Functional failure rate**

Technical problems with the positioning and fixation of the graft can occur during surgery and failure of the graft can occur during surgery. Failure of the graft or its fixation can also occur post-operatively but both these complications are rare. If the knee sustains a further major injury following surgery, you can re-rupture the new ligament just as the original was ruptured.

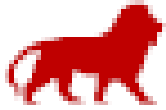
If you have any queries regarding the risks of surgery please ask your consultant before the surgery either by appointment or in hospital immediately prior to surgery.

Other useful information

The Royal College of Surgeons of England have some patient information publications available on their website www.rcseng.ac.uk/services/publications

Other weblinks: <http://orthoinfo.aaos.org/menus/leg.cfm>

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