



Surrey Orthopaedic Clinic

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# ACL RECONSTRUCTION



**Patient Information**

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# Anterior Cruciate Ligament Reconstruction

## What is in your knee?

Your knee consists of the following structures:

### Ligaments

These hold the bones together, therefore stabilising the knee joint.

- The **Anterior Cruciate Ligament (ACL)** is one of the most commonly injured through sports such as football, rugby and netball which involve turning, pivoting or rapid deceleration.

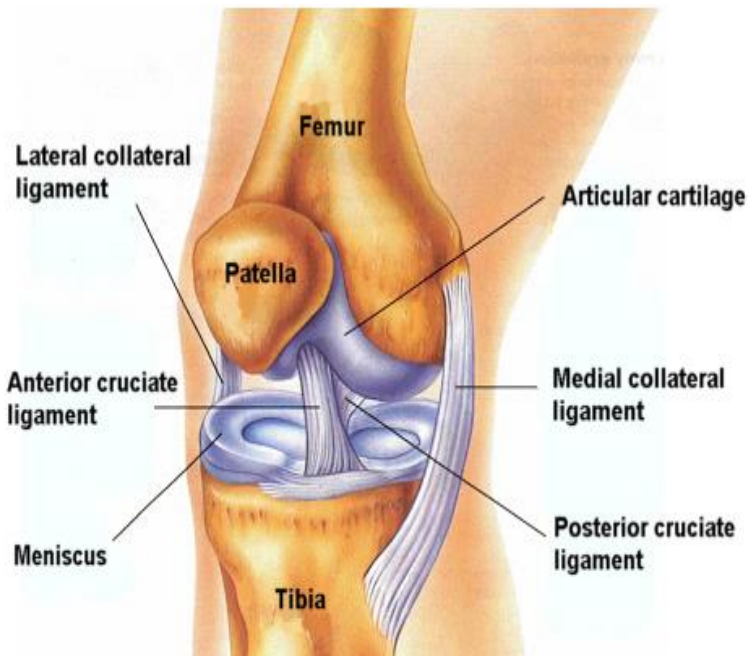
The ACL connects the femur to the tibia. It functions as a stabiliser of the knee joint and it resists forward movement of the tibia on the femur and also acts to prevent the tibia from excessive rotation when pivoting.

- The other major ligaments of the knee are the **Posterior Cruciate Ligament (PCL)**, the **Medial Collateral Ligament (MCL)** and the **Lateral Collateral Ligament (LCL)**.

## Cartilage

We refer to 2 common types of cartilage in the knee:

- The first type is the **MENISCUS** - two cartilage cushions ('menisci'), one on the inner side (medial meniscus) and one on the outer side of the knee (lateral meniscus) between the thigh bone (femur) and the shin bone (tibia). The menisci help the knee to function properly by bearing weight, absorbing shock, stabilising the joint and providing lubrication.
- The second type is **ARTICULAR CARTILAGE** which covers the surface bone ends of the femur, tibia and patella (knee cap) to reduce friction and aid load distribution in the knee joint.



# Common findings during ACL Reconstruction

The aim of this surgery is to replace/reconstruct your anterior cruciate ligament in order to restore stability to your knee joint. Occasionally other damaged structures are found that therefore need to be repaired or removed.

## 1. Torn meniscus / cartilage

A meniscal tear may be the result of a twist – a typical injury for someone like a netballer or footballer or from repeated squatting. These tears may cause pain, swelling and a catching or locking sensation.

If not corrected, a meniscal tear, like dirt in the ball bearings of a machine, can irritate the smooth joint surface and damage the articular cartilage. This can lead to more serious problems such as arthritis.

Early treatment can mean less damage to your joint. During meniscal surgery the surgeon may **REPAIR** or **REMOVE** the torn unstable piece of cartilage (meniscus) (**PARTIAL MENISCECTOMY**) leaving as much of a stable rim of meniscus behind as possible.

If a repair is required during surgery you will need to wear a brace post-operatively. Your physiotherapist will instruct you about this if necessary.

## 2. Articular cartilage damage

- **Chondroplasty:**

A procedure which smooths over loose damaged articular cartilage flaps from the surface of the bone. If the damaged articular cartilage is severe (all the way down to bone) any bare bone can be drilled or pinned to allow bleeding and thus allow new cartilage type material to fill in any defects left.

This technique is called **MICROFRACTURE**. Post-operatively you will need to wear a brace and may be partial or non-weight bearing as instructed by your surgeon. Your physiotherapist will fit your brace and teach you how to walk correctly with crutches. Follow-up clinical examination and MRI scans are sometimes required to assess any new cartilage.

- **Removal Of Loose Bodies:**

Torn flaps of articular cartilage can become detached and calcify with time leading to loose bodies within the knee. They can also be formed by some conditions causing inflammation of the lining of the knee (the synovium). Loose bodies can cause jamming or locking of the knee. Sometimes extra portals or key-holes are required to help remove these.

# **The ACL reconstruction procedure: key hole surgery**

## **What is involved in having ACL reconstructive surgery?**

In most cases ACL reconstruction surgery is performed as a day case under general anaesthetic. Arthroscopy is used to look inside the knee joint with a small camera. The knee joint is filled with fluid to allow the camera to be moved through the joint causing minimal disruption to the knee joint. The camera is inserted through a small 'key-hole' incision, less than 1 cm long, near the knee cap. One or two further small 'key-hole' incisions are made to insert the small instruments to carry out the surgical procedure. A section of tendon, most commonly hamstring but can also be the patella tendon, is taken from the same or opposite leg and formed into the new ACL. The new ACL graft is secured into the thigh and shin bones via screws. At this point any other damaged areas will be repaired or debrided away by the surgeon.

## **Complications**

These may include significant numbness around the scar or shin, bleeding, residual pain, metalwork issues, stiffness and infection. Rare complications include use of alternative grafts, deep vein thrombosis (DVT - a blood clot in the leg) and extremely rarely death. If the patella tendon is used there is a risk of fracture. There is also a risk that the new ACL may re-rupture however precautions are put in place to prevent this as much as possible.

## **After the ACL Reconstruction**

In most cases your recovery will be dictated by the degree of damage and how well you can rehabilitate your knee. Every injury is different and your recovery may be different from other people.

### **Painkillers**

You will be prescribed simple painkillers which you should take as required, although it may be beneficial to take them regularly in the early stages to aid your recovery and participation in exercises.

### **DVT prevention**

Your surgeon usually requests you wear TED Stockings. These should be on over the bulky bandage for 48 hours. The bulky bandage can then be removed at home leaving the small dressings underneath. Reapply the TED stockings over these small dressings. The stockings will usually stay on for 6 weeks in total (including overnight) and may be removed for washing your leg and for up to 1 hour per day. These help minimise swelling and prevent DVT following surgery.

Your surgeon may also request you take Aspirin or have a course of Clexane injections. The nursing staff will explain what you require upon your discharge from hospital.

## Dressings

You will be advised to check your wounds and change the small dressings at home after 3-5 days in order to keep your wound clean. However if your dressing looks soiled or coming off you are advised to change it at this stage. Keep your wounds dry for 2 weeks and look out for any signs of infection (ie. redness, heat, weeping). If you think your wound is infected, contact your GP surgery or attend your local walk-in centre. Your surgeon will use either clear absorbable sutures and steristrips (paper stitches) or metal clips. If you have clips in you will be required to get these removed at your GP practice at 2 weeks. On discharge, the nursing staff will discuss your particular needs.

## Rehabilitation

After surgery, you should care for your knee by resting, elevating and icing your knee and completing your exercises regularly. You will be given **crutches** and taught how to use them before you are discharged. Usually you will be able to put full weight on your operated leg however if your surgeon has requested something different your physiotherapist will discuss this with you and teach you the appropriate walking technique. You should continue to use the crutches until told otherwise by your physiotherapist in order to regain a symmetrical walking pattern. You will require **relative rest for the first week** to ensure adequate swelling management, after which you can slowly increase your activity level with guidance from your physiotherapist.



## Braces

You may require a post-operative brace to be fitted to your knee if you have had a meniscal repair or microfracture surgery. The brace is only to be worn when you are standing/walking and can be removed when at rest so that you are able to exercise your leg regularly and **maintain full knee extension. It does not usually need to be worn in bed at night.**

## Ice and Elevation

It is important to **PREVENT** swelling rather than reduce it once it has occurred therefore you must elevate and apply ice to your knee at regular intervals throughout the day for at least 1 week post operatively. Apply ice on your knee for 20 minutes at a time (ensure you wrap the bag of ice in a damp towel to protect your skin). Leave at least 20 minutes between icing sessions. Continue daily until the swelling subsides. When resting with your leg elevated ensure your leg is **straight** and not in a bent position. If you want to rest the leg on a pillow, make sure it is placed **under the heel** and calf, this ensures the knee is straight.

## NO open chain movement

This means your knee must be kept **straight** whenever your foot is not in contact with something solid ie. the floor or bed. Therefore, when you get on/off the bed you must ensure your operated knee remains straight throughout the whole movement until your foot reaches the floor/bed. If you are unable to do this

you will need to place your other leg under the operated one to provide support.

This is to ensure that your new ACL graft is protected throughout the movement, otherwise the weight of your lower leg would pull on the new graft and if repeated could potentially cause it to re-rupture. Your physiotherapist will practice this technique with you before you are discharged home.

## Exercises

**Start as soon as possible. Increase repetitions as able aiming for 10 of each. Repeat 4 times a day.**

Move your knee through as much range as possible within the limits of your dressings, swelling and pain. If you are in severe pain, time you exercises with your painkillers and reduce the number of repetitions for each exercise. If severe pain continues seek advice from your physiotherapist or doctor.

The aim of these exercises is to regain full range of movement and improve your strength. It is particularly important to regain full knee straightening as this will aid a normal walking pattern and reduce limp.

Pictures for exercises section only, provided by © Physiotec 1996 - 2017

**1) Siting with your operated leg straight with a rolled towel under your ankle.**

Allow your leg to straighten with gravity assisting the movement. Tighten your thigh muscle to further straighten your knee.

Hold for 5 seconds - relax. **If tolerated hold this position as a stretch for 10 minutes.**



**2)** Lying or sitting. Bend and straighten your knee by sliding your foot up and down. If you find this difficult use a towel to assist the movement within your pain limits.



**3)** Exercise 2 can also be performed sitting in a chair.



4) Lying or sitting with legs straight. Tighten your thigh muscles to push your knee down firmly against the surface. Hold 5 seconds – relax.



5) Lying or sitting. Straighten your knee fully and lift your leg straight up off the bed about 20cm. Hold for 5 seconds - relax. Only repeat 5 times.

**Only do this exercise if you are able to keep your knee straight as you lift the leg up.**



**Outpatient physiotherapy** is routinely arranged following an ACL reconstruction within 7-10 days of your operation. This will continue at regular intervals until you have reached your desired level of activity or have returned to sport. Please note that full recovery from an ACL reconstruction may take 12-18 months. It is extremely important to follow the advice provided by your physiotherapist as they will guide you through the rehabilitation process safely in order to gain the best possible outcome for your knee after reconstruction surgery.

## Using crutches

You will usually be able to put full weight through your operated leg however if your surgeon has requested something different your physiotherapist will discuss this with you and teach you the appropriate walking technique. You should continue to use the crutches until told otherwise by your physiotherapist in order to regain a symmetrical walking pattern.

When standing up place the crutches together with the handles facing in opposite directions to create a 'H' shape. Have one hand firmly holding the crutch handles and the other on the surface you are sitting on to help push yourself up into standing. Once standing and well balanced, place your hands through the crutches ready to walk. The reverse pattern is recommended when sitting down.

## Walking with Crutches

- Place both crutches a step distance in front of you
- Step your operated leg so your foot is in line with the crutches
- Step the non-affected leg alongside the operated leg or past it taking a normal step if you feel able.

Try to walk as normally as possible, putting one foot in front of the other as able.



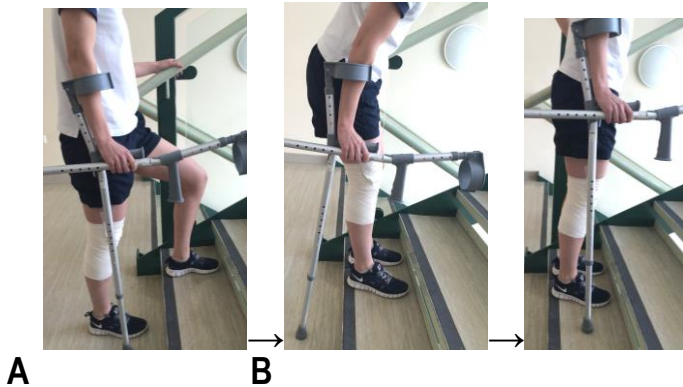
## Going up / down stairs

- **Always start close to the first step**
- Remove the crutch nearest to the handrail/banister if you have one and place it in the opposite hand - open your fingers and place it on the outside of the standing crutch and hold the crutches in a 'T' shape
- Firmly hold onto the handrail/banister with the free hand

## Going up stairs

The ABC sequence;

- A. Able leg** – place your able leg / good leg on to the first step.
- B. Bad leg** – place your bad leg/ affected leg onto the step
- C. Crutch** – place your crutch onto the same step



## Going down stairs

- The sequence is the reverse/opposite to going upstairs

## The CBA sequence

C. Crutch – place your crutch down onto the first step

B. Bad leg – step your bad/affected leg down onto the first step

A. Able leg – place your able leg / good leg onto the first step

## Completing a single step (or stairs with no handrail)

- This is the same pattern as for the stairs but you will need to keep hold of both crutches and move them both at the same time.

- Take your **time** between each step to maintain your balance and safety.

## Functional Milestones

The immediate goals of rehabilitation are to **prevent** swelling and pain. It is also vitally important that you maintain/ restore as much movement within your knee as possible. Your exercises will be progressed once you:

1. Show little swelling surrounding the knee
2. Have very little pain when walking
3. Can straighten your knee fully (THIS IS VERY IMPORTANT)
4. Do not need to use elbow crutches

Your physiotherapist will then progress you to mid-stage rehabilitation. This is all about strengthening the knee and lower limb. You will start exercises to strengthen knee, hips and ankles. You will also start exercises to work on your balance. You will be allowed to drive roughly around 4 weeks and you must confirm this with your physiotherapist. You can commence swimming after 6 weeks and cycling outdoors after 8 weeks. Your exercises will be progressed once you:

1. Can sit back onto your heels
2. Can stand up out of a chair on only your operated leg
3. Have no swelling surrounding the knee
4. Can walk normally forwards and backwards without an aid



Having worked to strengthen your knee up the next stage of rehabilitation is to commence running and advanced balance exercises. You will start multi-directional movements and increase your functional strength. Before you start to return to sport you will need to show:

1. You have full movement of the knee which is not affected by exercise
2. You can run a mile
3. You are able to exercise for 25 minutes cardio-vascular work
4. You have regained 85% of all your strength

Finally you will be expected to complete sport-specific exercises. These will depend completely on the sport you play, the level you play at and your previous sporting ability. When you complete these exercises your body must work harder than it does when you play your sport normally. Your physiotherapist will advise you which exercises are most appropriate for you.

**The next pages are a guide to demonstrate your progress through your stages of rehabilitation .**

<b>ACL Reconstruction Exercises – EARLY STAGE</b>					
<b>Exercises</b>	<b>Date</b>				
Treadmill - walking					
Trampette – marching on spot					
Step up/down					
Wobbleboard – 2-way					
Sit to stand					
Mini dips/lunge					
Cycling – no resistance					
Gym ball squat					
Bilateral calf raise					
Line walking forwards and backwards					
IRQs in standing					
Clam exercise					
Straight leg raise					
Bridge x2 feet from floor					
Prone knee bend					
Stretches quad, calf, hams					
<b>Objective Markers</b> - flexion - extension - effusion					
<b>GAIT</b>					

## CRITERIA ACHIEVED TO PROGRESS TO MID STAGE REHAB

Date					
Pain $\leq$ 3/10 (NRS)					
Achieve 90° wall squat & 120° active flexion					
Active SLR multi-direction no lag					
Full extension lock in weight bearing					
Crutches discarded					
Good patella mobility					
<1cm effusion					

## ACL Reconstruction Exercises – MID STAGE

Exercises	Date				
Treadmill - walking					
Trampette - jogging					
Step up and over					
Wobbleboard + task					
Unilateral sit to stand					
90° lunge					
Cycling – note resistance					
Squats +/- resistance					
Unilateral calf raises					
Walking around cones					
Unilateral stand IRQs					
Hip ext + abd					
SLR multidirectional					
Bridge on ball					
Hams curls					
<b>Objective Markers</b> - flexion - extension - effusion					
<b>GAIT</b>					

## CRITERIA ACHIEVED TO PROGRESS TO LATE STAGE REHAB

Date					
Pain free with NO/minimal swelling					
Full kneeling flexion					
Full terminal extension = unaffected leg					
Normal gait pattern forwards and backwards					
Good closed kinetic chain muscle control					

## ACL Reconstruction Exercises – LATE STAGE

Exercises	Date				
Treadmill jogging					
Trampette jogging and stick exercise					
Step up and over					
Wobbleboard + task					
90° unilateral sit to stand					
lunge + resistance					
Cycling with resistance					
Prone heel flicks					
Squats + resistance					
Unilateral calf raises					
Dribbling between cones					
Unilateral stand IRQs on air cushion					
Hip ext + abd					
Straight leg raise with weight					
Bridge on ball unilateral					
Hams curls with resistance					
<b>Objective Markers</b> - flexion - extension - effusion					

## CRITERIA ACHIEVED TO PROGRESS TO SPORT SPECIFIC STAGE REHAB

Date					
Good dynamic proprioception					
25 mins CV fitness					
Able to run 1 mile with non-antalgic gait					
Hop tests - single for distance - timed hop - triple hop - cross over hop					

## ACL Reconstruction Exercises – SPORTS SPECIFIC

Exercises	Date				
Rowing					
Cycling with resistance					
Treadmill running					
Wobbleboard + task					
Prone heel flicks					
lunge + resistance					
Unilateral calf raises					
Squats + resistance					
Hip ext + abd					
90° unilateral sit to stand					
Hams curls with resistance					
Unilateral stand IRQs on air cushion					
Bridge on ball unilateral					
Trampoline jogging					



Multi-directional lunges					
Star drills					
Ladder drills					
Introduction to lateral running movement					
Plyometrics - - - - -					
Impact attenuation					

### PATIENT SPECIFIC FITNESS TESTING

Date					

## References

BOA publications – Best Practice to ACL reconstruction –  
*available via BOA website*

Bynum EB, Barrack RL, Alexander AH. (1995) Open versus closed chain kinetic exercises after anterior cruciate ligament reconstruction: A prospective randomized study. *Am J Sports Med* **23**:401-406

Decker MJ, Torry MR, Noonan TJ, Sterett WI, Steadman JR. (2004) Gait retraining after anterior cruciate ligament reconstruction. *Arch Phys Med Rehabil.* **85**:848-856

Grinsven, S. van Cingel, R. Holla, C. van Loon, C. (2010) Evidence-based rehabilitation following anterior cruciate ligament reconstruction *Knee Surg Sports Traumatol Arthrosc* **Jan**; online

Risberg MA, Lewek M, Snyder-Mackler L. (2004) A systematic review of evidence for anterior cruciate ligament rehabilitation: How much and what type. *Physical Therapy in Sport.* **5**:125-145.

Shaw T, Williams MT, Chipchase LS. (2005) Do early quadriceps exercises affect the outcome of ACL reconstruction? A randomised controlled trial. *Aust J Physiother.* **51**:9-17.

Shelbourne KD, Nitz P. (1990) Accelerated rehabilitation after anterior cruciate ligament reconstruction. *Am J Sports Med.* **18**:292-299.

## **FURTHER INFORMATION:**

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### **Contact:**

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