CG APPROVED

Multiple Knee Ligament Reconstruction

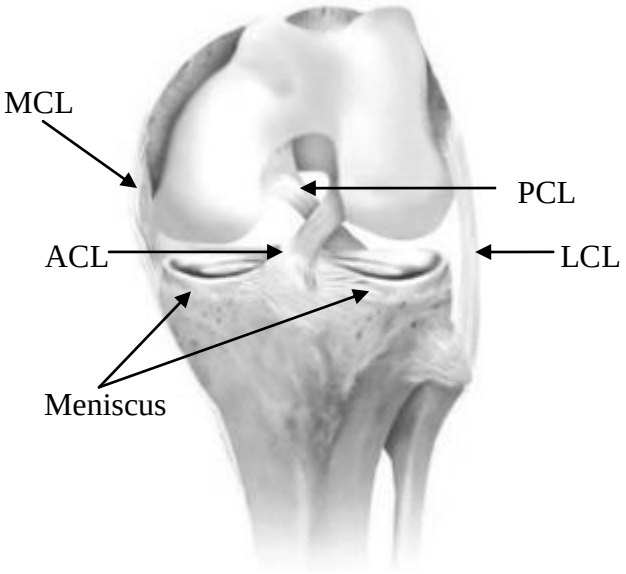
NHS
Liverpool University Hospitals
NHS Foundation Trust

Trauma and Orthopaedics

Aintree Site
Lower Lane, L9 7AL **Tel:** 0151-525-5980
Royal Site
Prescot Street, L7 8XP
Broadgreen Site
Thomas Drive, L14 3LB
Royal & Broadgreen Tel: 0151-706-2000

This leaflet aims to improve your knowledge and understanding of the rehabilitation involved after multiple ligament reconstruction. It includes basic anatomy and information about the operation.

. **Left Knee Joint**



Anatomy

There are four main ligaments around the knee:

- The medial collateral ligament (MCL) on the inside of the knee and lateral collateral ligament (LCL) on the outside of the knee both prevent excessive sideways movement of the knee.
- The anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) lie deep within the knee and prevent excessive forwards and backwards movement of the knee.

All the ligaments work together to help control rotational movement at the knee.
There are two smaller ligamentous structures that act to reinforce the joint capsule and also restrict rotational forces. These are:

- the postero-lateral corner (PLC).
- the postero-medial corner (PMC).

It is very common to injure one of the four main ligaments but less common to injure two or more of the ligaments during the same incident. When this occurs it is called a knee dislocation and may require you to have extensive surgery to reconstruct the injured ligaments.

Injuries to the joint surfaces and/or menisci can also occur at the same time.

Aim of the Operation

Surgery is designed to allow individuals to return to their normal function and, possibly, sporting activities. It should help stabilise the knee and stop the knee from buckling or giving way.

However, the results can be unpredictable with the more ligaments involved. 'Wear and tear' arthritis is associated with ligament injuries and is not necessarily prevented by ligament reconstruction surgery.

The Procedure

The operation to reconstruct the ligaments, involves replacing them with grafts taken from tissues around the knee. In severe cases grafts from both legs may be required. The ones commonly used are the middle third of the patella tendon and/or the hamstring tendons.

The incisions required vary from patient to patient. You may have a 20cm scar down the front and/or side of the knee and a scar on the opposite knee if grafts are needed from that side also.

The surgery itself is done under general anaesthesia and can take from 2-5 hours. If any other structures have been damaged e.g. a meniscal cartilage, then it is usually dealt with at the same time.

This, however, may only be apparent at the time of surgery. Tunnels are made in the tibia and femur and the grafts are passed into the knee. They are held in place with either screws or buttons. These materials do not usually need to be removed unless they are causing problems.

Complications

Complications do occur. Some are minor but others may require further surgery. It is important you understand this before undertaking surgery. Examples include:

- Deep vein thrombosis (DVT– clot in the calf) - 10% in the literature (1.5% at Aintree Hospital).
- Graft failure – 4-13% (10% at Aintree).
- Infection in joint (septic arthritis) – 5% (7% at Aintree).
- Complex regional pain syndrome (an abnormal pain reaction to any surgery, which may need prolonged physiotherapy or pain clinic referral – unknown (3% at Aintree).
- Arthrofibrosis (knee joint stiffness) – 5-15% (5% at Aintree).
- Further surgery to cartilage – 6% (8% at Aintree).
- Removal of metalwork – 15-18% (16% at Aintree).
- Other surgery – 4.5% (8% at Aintree).
- Joint Replacement – unknown (3% at Aintree).
- Patella fracture – unknown (1.5% at Aintree).
- Superficial wound infection – 5-17% (5% at Aintree).
- Heterotopic ossification (abnormal bone formation) – 17% (0% at Aintree).

Rehabilitation

The **surgery will be unsuccessful without a properly supervised exercise programme.**

It is important that you are aware of this and prepared to follow a programme for **up to 12 months** in order to obtain the best results from the surgery. It may take 12-18 months before you are able to return to sports.

There are restrictions in the amount of weight that can be taken through the leg and the degree of bend and straightening you can perform after the operation. Initially, exercises are aimed at increasing movement of the knee joint, reducing pain and swelling and gentle strengthening exercises. The grafts need time to heal and the exercises are designed to maintain muscle strength as much as possible without placing unnecessary stresses on the healing grafts.

Timescales

'Prehabilitation'
Rehabilitation can begin before your surgery. It is important that you have full knee range of motion and good quadriceps and hamstrings strength. Physiotherapy may begin at this stage to guide you towards surgery.

0-6 weeks

Your leg will be placed in a **long lever brace** after the operation. It needs to be worn **24 hours a day**. It is only to be removed for bathing (when the wounds are healed). **When bathing, a support must be placed under the knee to stop it from straightening fully**. Great care must be taken getting in and out of the bath and the brace must be the last thing to take off before entering, and the first thing to put back on when exiting the bath.

The brace will limit your knee movement from 10-90 degrees of bend. You will not be able to fully straighten your knee. This helps the ligaments to heal and reduces the stress on the metal that is holding the grafts. For the same reasons, you are **not allowed to place any weight on the leg for the first six weeks following the operation.**

6-12 weeks

The brace is opened from 0-120 degrees. Your knee will be stiff and it is hard work to get the knee fully bent and straight. The **brace is still worn 24 hours a day but can be removed for exercise, only when it starts to limit the knee bending**. It is then replaced for all other exercises.

You are now able to start placing some, but not all your weight, through the leg whilst using crutches.

12 weeks onwards

Your leg will probably look much thinner than the other one, due to the muscles wasting from lack of use. **You can now walk without the crutches but must continue to wear the brace** until your muscles get stronger.

The brace does not need to be worn at night and you can start to do without it over the coming weeks. This happens gradually as your leg gets stronger and you become more confident with daily activities.

Pre-operative Assessment

- An assessment of your fitness to undergo surgery including a detailed medical history, height, weight, blood pressure and pulse will be performed before surgery. Blood tests and a heart trace (ECG) may also be needed.

The Day of the Operation

- You are asked not to drink or eat anything for at least 6 hours before your operation.
- You will be seen by your Anaesthetist and a member of the surgical team before your operation.

- In the anaesthetic room, you will have a needle put into your arm and will be placed on an anaesthetic machine.
- Surgery usually takes around 2 hours.
- You will wake-up in the theatre recovery room. On return to the ward you will have the following:
- Dressings – wool and crepe bandage on the knee and a brace to limit knee movement.
- Drips and drains – there will be small tubes in your knee and into the back of your hand. You might also have a tube into your bladder (catheter).
- Analgesia – this may be oral medication or patient controlled analgesia (PCA), which looks similar to a drip.
- Exercises - to commence as soon as you are able to aid circulation and help reduce blood clot formation. These include vigorous movement of toes and ankles, quadriceps and hamstring tightening and gentle knee bends.

Post-op – Day 1

- Dressings removed and clean ones applied.
- Drain removed.
- Your leg may be placed on a machine that helps to bend and straighten your knee for you (CPM).
- Continue with exercises and increase knee bending within the brace by using a sliding board and band around foot. Add straight leg raise and knee straightening as brace allows.
- Mobilise with crutches taking no weight through the operated leg.
- You must avoid active exercise with the leg off the floor from 30° knee bend to fully straight for the first six weeks.
- You can be discharged from hospital if progressing well, managing exercises, and safe on the stairs.
- You should be given an outpatient physiotherapy appointment.

Discharge Instructions

- The wound is to be kept dry until healed and the dressing is not to be disturbed unless soiled and a clean one applied.
- You will be given pain relieving medications to take home with you, please take these as prescribed to prevent pain from building up to a level that is hard to control.
- Regular ice application (10-15mins every 1-2 hours).
- Physiotherapy appointment arranged.
- Expect bruising in the thigh and lower leg.
- Remember your scar is highly susceptible to the sun, and use of a higher factor sun block is advised.

Return to work will depend greatly on the job that you do (desk-based jobs 6 weeks; manual jobs 6 months; jobs requiring ladders etc... 9-12 months).

Return to driving at 12-16 weeks for manual geared cars and automatic cars if it is the right leg that has been operated on. If it is the left leg that has been operated on, you may drive an automatic car once the wounds are healed at 2 weeks.

You should notify your insurance company of the procedure that has been undertaken to ensure that your cover is valid. For further information follow this web link: www.dvla.gov.uk

Flying is not permitted for 8 weeks following surgery due to a higher risk of developing a blood clot. For further information follow the web link below: http://www.nhs.uk/chq/Pages/2615.aspx?CategoryID=69

Long term follow-up

You will be seen regularly post-operatively. Your knee will be examined and questionnaires completed. This data may be provided to the National Ligament Registry:

http://www.uknlr.co.uk/i-m-a-patient/

We monitor results of this surgery to provide information on our performance.

We would be grateful for your co-operation to enable us to achieve our long-term follow-up plans, which will help to further improve our knee service. If you change address in the future could you please inform us so that we can continue your post surgery follow-up.

Contact Details:

- **Ward 16**
  Tel: 0151 529 3914 / 3527

- **Fracture Clinic**
  Tel: 0151 529 2554 (Mon – Fri)
  Please leave a message on the answer machine stating your name and contact number and a member of staff will return your call.

- Phil Ellison
  Lower Limb Extended Scope Practitioner
  Tel: 0151 529 3335 (Mon - Fri)

Rehabilitation (Physiotherapy) Programme

After attending individual physiotherapy sessions, you will be transferred to the Lower Limb Gym. This is usually somewhere between 8-12 weeks post-operatively depending on your progress. The gym sessions are individually tailored and will be hard work.

Most of the exercises can be performed at home. You will attend the gym once a week, but it is important you continue with daily rehabilitation exercises. It can be useful to put ice on your knee for 10-15 minutes at the end of exercise sessions.

The following exercises are to be performed daily. They have been split into stages depending on the length of time from your operation. All exercises should be pain free or uncomfortable (at the most) when performed.

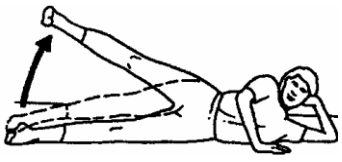
Unless instructed otherwise by your Physiotherapist, **all exercises should be completed with the knee brace in place**. If you have any problems with them please consult your Physiotherapist.

0-6 weeks

The aim of this phase is to regain range of movement. Knee swelling should start to reduce a little but can remain until the brace is no longer required. Pain and swelling are used as a guide to how much activity the knee can tolerate. Continue with pain medication as required, and keep the leg elevated at home.

Do not spend too much time on your feet as this will make your leg and knee swell. This then makes bending and straightening your knee even harder. You should attend for physiotherapy appointments regularly. Exercises during this time will be non-weight bearing (bed or chair exercises).

Exercises – 0-6 weeks

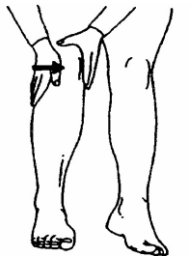


1. Lying on your side supporting yourself on your elbow. Roll top hip slightly forward, use top arm to support yourself in front. Keeping top leg straight lift it up towards the ceiling. Make sure the leg stays in line with your body and toes point forwards. Repeat 20 times.

2. Lying on your side with top leg bent in front of lower leg and the foot on the floor. Roll top hip slightly forwards, use top arm to support you in front. Lift lower leg cm from the floor keeping toes pointed forwards. Return to starting position. Repeat 20 times.

3. Long sitting. Put a band around your foot. Bend your knee as far as possible. Gently pull the band to bend your knee a little more. Aim to reach the 90° allowed by the brace. Hold 5 secs. Repeat 10 times.

4. Stand in a walking position with your operated leg straight behind you and resting on the floor. The other leg is bent in front of you and takes all the weight. Take support from a wall or chair. Lean your body forwards and down until you feel the stretching in the calf of the straight leg. Hold approx 30 secs. Repeat 5 times.



5. Sit with leg straight and relaxed. Push your kneecap from side to side. Hold 5 seconds. Repeat 10 times.

6. Lying. Tense your thigh muscles within your brace (quads and hamstrings). Hold for 10 secs. Repeat 10 times.

7. Lying with non-operated leg bent. Straighten your operated leg as much as possible within the brace. Raise the leg 10cm and hold for 5-10 secs. Repeat x 10.

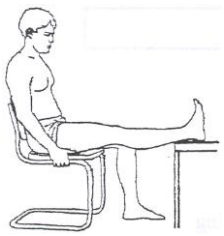
The goals that you should aim to achieve by 6 weeks are:

- Swelling improving.
- Pain-free range of motion within the brace.
- Post-operative pain settling.

6-12 weeks

The aim of this phased is to gradually start weight bearing and strengthen the whole leg. Balance exercises will also be started. Expect your leg to look much thinner and be very weak.

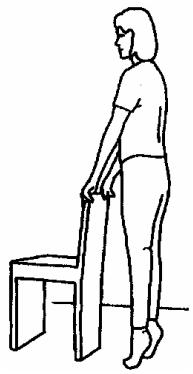
8. Stand with the leg to be stretched on a stool. Flex your ankle and push the heel towards the stool keeping your knee straight. Hold for 30 seconds. Then bend your upper body forwards from your hips keeping your back straight. You should feel the stretching behind your knee and thigh. Repeat 5 times.



9. Sitting on a chair, with the leg to be exercised supported on a chair. **With brace on** let your leg straighten in this position to a straight position. Hold 10 seconds. Repeat x5.

10. Lying on your back with knees bent and feet on the floor. Lift your pelvis and lower back off the floor. Hold the position. Lower down slowly returning to starting position. Repeat 20 times.

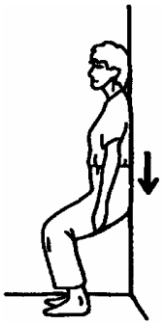
11. Lying face down with your hips straight and knees together. Bend your knee keeping ankle flexed. You can do this with an exercise band around your ankle. Repeat 20 times.



12. Stand with a chair for support. Push up on your toes. Repeat 20 times.

13. Standing. Bend one knee and take hold of the ankle. Do not lock the knee of the leg you are standing on. Draw your heel towards your buttock. Tilt your hip forwards so that your knee points towards the floor. Feel the stretch in the front of your thigh. The brace will allow 120° of bend which should be enough to allow this thigh stretch. Hold 30 secs. Repeat 5 times.

14. Sitting with your arms at your hips. Stand up and then sit down slowly on a chair. Repeat 10-20 times.



15. Stand leaning with your back against a wall and your feet about 20cm from the wall. Slowly slide down the wall until your hips and knees are at right angles. Return to starting position. Repeat 10 times.

16. Stand on your operated leg using light fingertip support if needed. Aim to hold your balance for 30-60 secs.

17. Stand in front of a 20-40cm step. Step up 10 times with the operated leg leading. Repeat for 3 sets.

The goals that you should aim to achieve by 3 months are:

• Full weight bearing.
• Knee bending and straightening getting closer to the other leg.
• Muscle tone returning and swelling less.

3-6 months

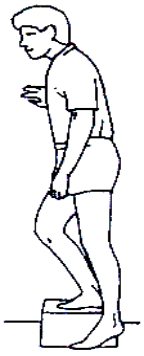
During this phase muscle strengthening becomes very important, as well as balance and control activities. The muscles will be getting bigger and stronger and the use of your knee brace is gradually reduced.

You can use the following cardiovascular machines at a gym:

- Rower, Bike, Stepper, Elliptical (cross) trainer.
- Swimming is allowed but avoid breaststroke initially.

18. Lying face down on a bed with your feet over the edge. Let the weight of your feet straighten your knees. Hold 10 secs. Repeat 5 times.

19. Lying on your back with operated knee bent, other leg straight. Lift your hips up and hold. Repeat 5-10 times.



20. Stand sideways on a step with one foot hanging over the edge of the step.
Slowly bend your knee allowing your other foot to brush the floor.
Repeat 5 times and repeat for 3 sets.

21. Stand on one leg on a step facing down. Slowly lower yourself by bending your knee to 30 degrees. Return to starting position.
Repeat 5 times for 3 sets.

The goals that you should aim to achieve by 6 months are:
• More equal strength in all leg muscles.

6-12 months

Aims
Running and twisting manoeuvres are introduced gradually, building up to light sports if appropriate. Attendance at a gym is encouraged until leg strength is equal. Manual work should be possible within the restraints of the occupation – check on this at your clinic appointment.

The goals that you should aim to achieve by 12 months are:

- Leg now returning to near normal function.
- Return to non-contact sport/training if appropriate.
- Sport training is progressed to provide a baseline of strength and endurance for return to full sporting activities.
- Return to contact sport is recommended when the leg is at least 85% the strength of the other. This may take as long as 18 months after surgery.

References

1. Liow RYL, McNicholas MJ et al. Ligament repair and reconstruction in traumatic dislocation of the knee. J Bone Joint Surg Br August 2003; vol. 85-B (6):845-851.
2. E.B. Goudie, E.M. Will, J.F. Keating. Functional outcome following PCL and complex knee ligament reconstruction. The Knee. 2010; 17: 230–234.
3. M Subbiah, Pandey V et al. Staged arthroscopic reconstructive surgery for multiple ligament injuries of the knee. Journal of Orthopaedic Surgery 2011;19(3): 297-302.
4. Mook WR, Miller MD et al. Multiple-Ligament Knee Injuries: A Systematic Review of the Timing of Operative Intervention and Postoperative Rehabilitation. J Bone Joint Surg Am, 2009; 91(12): 2946-2957.
5. Lind M, Menhert F, Pedersen AB. The first results from the Danish ACL reconstruction registry:epidemiologic and 2 year follow-up results from 5,818 knee ligament reconstructions. Knee Surg Sports Traumatol Arthrosc 2009; 17: 117–124.
6. Jenkins PJ, Clifton R et al. Strength and function recovery after multiple ligament reconstruction of the knee. Injury December 2011; Vol 42 (12): 1426–1429.
7. Azar FM, Brandt JC et al. Ultra-Low-Velocity Knee Dislocations. The American Journal of Sports Medicine; Vol. 39(10): 2170- 74.
8. Engebretsen L, Risberg MA et al. Outcome after knee dislocations: a 2-9 years follow-up of 85 consecutivepatients. Knee Surg Sports Traumatol Arthrosc. 2009; 17: 1013-1026.
9. Tzurbakis M, Diamantopoulos A et al. Surgical treatment of multiple knee ligament injuries in 44 patients: 2–8 years follow-up results. Knee Surgery, Sports Traumatology, Arthroscopy August 2006; Vol 14(8): 739-749.
10. Seong-Il Bin, M.D., and Tae-Seok Nam. Surgical Outcome of 2-Stage Management of Multiple Knee Ligament Injuries After Knee Dislocation. Arthroscopy: The Journal of Arthroscopic and Related Surgery October 2007; Vol 23 (10): pp 1066-1072.
11. Kim KM, Chun CH. The Management of Knee Dislocation and Multiple Ligament Injuries. Korean J Sports Med. June 2012; 30(1): 1-8.
12. Mills WJ, Tejwani N. Heterotopic ossification after knee dislocation: the predictive value of the injury severity score. J Orthop Trauma. May 2003;17(5):338-45.

VTE (blood clots)

VTE is a collective term for two conditions:

- **DVT** (deep vein thrombosis) – this is a blood clot most commonly found in a deep vein that blocks the flow of blood.
- **PE** (pulmonary embolism) – a potential fatal complication where a blood clot breaks free and travels to the lungs.

Whilst you are less mobile, especially during the first few weeks following your procedure, the risk of VTE is higher because of your immobility.

Your consultant may prescribe you a daily injection of heparin to help thin your blood and these should last approximately 14 days. If this is needed, you will be shown how to inject this drug yourself.

Symptoms:

- Swelling – you will have some swelling due to your surgery but if you have any concerns please call for advice
- Pain – any new pain we want to know about
- Calf tenderness
- Heat and redness compared with the other leg
- Shortness of breath
- Chest pain when breathing in

Things you can do to prevent VTE

- Move around as much as possible. Be sensible though, short and regular movement is best.
- Drink plenty of water to keep yourself hydrated
- We strongly advise you not to smoke – this will have been discussed in pre op but we can also refer you to our smoking cessation team within the Hospital.
- Move your ankle around as much as possible to keep your calf muscle pumping

Small preventative measures can have a huge impact on your recovery.

If you require a special edition of this leaflet

This leaflet is available in large print, Braille, on audio tape or disk and in other languages on request. Please contact:

Tel No: 0151 529 2906

Email: interpretationandtranslation @liverpoolft.nhs.uk