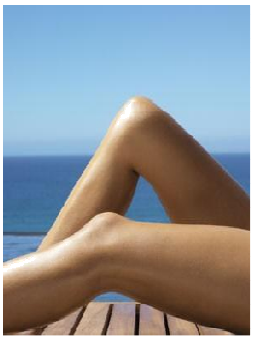
ANTERIOR CRUCIATE RECONSTRUCTION



Dr Greg Sterling

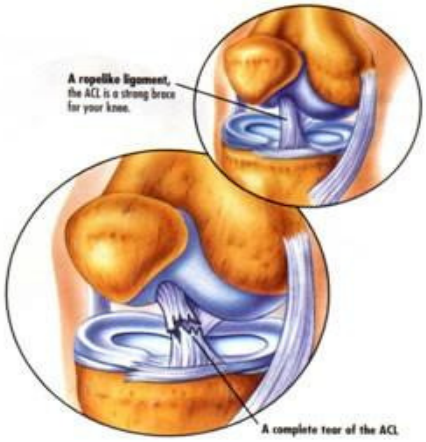
Surgery of the Knee

Introduction

The anterior cruciate ligament (ACL) is one of the main restraining ligaments in the knee. It runs through the centre of the knee from the back of the femur (thigh bone) to the front of the tibia (shin bone) and it acts as a link mechanism between the thigh and lower leg.

The main function of the ACL is in stabilising the knee especially in rotation movements and sidestepping, cutting or pivoting manoeuvres.

This means that when the ACL is ruptured or torn the tibia moves abnormally on the femur and almost jumps out of joint such that the knee buckles or gives way. The main feeling is a sense of the knee giving way on twisting or pivoting movements and a feeling of not trusting the knee. It is usual for individuals to be able to return to walking and straight line running following a torn ACL but to not trust the knee on rough ground or twisting movements.



DO YOU NEED A KNEE RECONSTRUCTION?

The main role of a cruciate reconstruction is to prevent your knee from giving way.

If you wish to return to pivoting or twisting sports you will need a new ligament.

If you are happy to reduce your activity levels and avoid twisting, you may cope without an ACL– building up your thigh and hamstring muscles will help. Some people will find that there knee gives way even with simple day to day activities; - if this is the case a reconstruction of the cruciate is required. Braces are available as an option and some people wear them for limited periods, eg whilst snow skiing. They cannot be worn for contact sports and usually are not tolerated for regular use.

WHAT HAPPENS IF I DON'T HAVE A RECONSTRUCTION?

If your knee does not give way, you will do well but may still develop arthritis (Usually after 20 or so years) as a result of the initial injury.

If your knee gives way, as well as limiting your activities and causing discomfort, over time (Often within 12 months) you are likely to tear or rupture one of your meniscal cartilages. This often requires arthroscopic surgery and may increase the chance of developing arthritis.

WHAT IS INVOLVED IN A SURGICAL RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT?

Surgery can be performed anytime beyond the first week or two after the injury to allow the inflammation and pain from the injury to settle. You may spend some of this time in a brace, if you have ruptured another ligament (eg medial) Sometimes other ligament injuries necessitate earlier surgery. Usually an MRI scan would be performed to plan treatment if injuries as well as the ACL rupture are apparent.

SURGERY

The operation takes about one to one and a half hours depending often on other injuries in the knee – which are treated at the same time.

There are two options for the tissue to make a new ligament:

1. HAMSTRING TENDONS

These are the most commonly used by me. The tendons taken are responsible for only a small part of the strength of the hamstring muscles. They produce a small scar and apart from some feeling of a “hamstring tear” for some time, cause few problems. If you have had a significant torn hamstring in the past, have other ligament injuries or looseness or wish to return to high level activities at a very early stage, patella tendon may be preferred.

2. PATELLA TENDON

This works just as well but is more painful after the operation. It involves a bigger scar and may cause problems with kneeling in the future. In some cases it is preferred but usually I use it for revision surgery or if multiple ligaments are involved.

Before and After the Operation

Before the Operation

Prior to surgery, Dr Sterling will see you and mark the leg. Any last minute questions can be answered. The nursing staff and physiotherapist may also visit you to explain the procedure.

After the Operation

On the Ward - When you return to the ward, you will be resting in bed. You will have a drip in your arm for fluids. You will have a bulky dressing over the wound on your knee.

A physiotherapist will see you on the morning following surgery and teach you to walk fully weight bearing on that leg with crutches.

Most people stay in hospital for one night; two nights is sometimes needed, usually if pain or post operative vomiting is a problem.

Crutches are used for a few days. By three weeks most people would be comfortable in an office job, six weeks for an active job and three months for heavy work.

The rehab involves ongoing physio – starting after two weeks when I have reviewed your wounds and knee. A detailed programme is outlined below..

Pain Relief - At the end of the operation the knee is local anaesthetic is placed in the knee joint that lasts for up to 24 hours. It is not unusual for the knee to become more painful at around this time as the anaesthetic wears off. You will be supplied with strong oral analgesics (Tramal or Panadeine Forte) that may be required over the first few days. Please take these only as directed. Take one **Aspirin** tablet (300mg) each day for clot prevention.

THE EARLY POSTOPERATIVE PERIOD

Mobility at Home -For the first ten days following the surgery, expect to be mobile at home using crutches, but resting otherwise, doing your exercises. After this your mobility will improve, but you should avoid any prolonged car or air travel for at least three weeks.

Wound Care – Yo should apply ice to your knee with your leg elevated. Place an ice pack on the bandages; 20minutes each hour. The bandages can be removed for showering after **48 hours from** operation. (ie on Friday after Wednesday Surgery) Leave the other dressings and steristrips over the wounds in place.

DVT and Clot Prevention - You will be commenced on a **single aspirin tablet a day (300mg daily)** to be taken with food. This will be continued for six weeks or until mobile, and is taken to help thin the blood slightly and prevent blood clots in the legs or elsewhere. You should do **foot and ankle pumps** for five minutes in each ½ hour

Post-operative appointments - Dr Sterling's secretary will usually make your first post operative appointment prior to your surgery. You need to see Dr Sterling **ten** to **fourteen** days following your operation. If you do not have an appointment please phone to make one.

Return to Work - Most people are fit to return to sedentary (Office) type employment after two to three weeks. Expect six weeks before being fully mobile and able to stand all day and up to three months for heavy manual work such as labouring or gardening etc.

The basic expectation is that by;

6 weeks **Walking normally with good endurance. 90% normal movement**

commence pool and gym work

3 months **Straight line running begins**

Controlled stepping with physio

6 months **Individual pivoting sports (Non opposed eg shooting baskets)**

9 months **Return to sport**

SUCCESS of SURGERY

95% of people end up with a knee that feels completely stable.

75-80% of people return to their previous level of sport. (Some don't make it whilst others don't try)

IF YOU ARE CONCERNED:

You may have moderate pain following the surgery and can take panadeine forte as provided or paracetamol. The pain should lessen each day. You should contact Dr Sterling (through the switchboard of the hospital where you had your surgery), or his secretary on 1300 478 375. Whilst it is unlikely, if you feel extremely unwell, or there is an unexpected delay in finding Dr Sterling, attend the nearest Hospital Emergency Department.

Rehabilitation

Pre Op

Rehabilitation begins before surgery in the pre operative phase to ensure that you and your knee are ready for the operation.

- Ensure full range of movement, especially normal hyperextension.
- Exercises to maintain quadriceps and hamstring muscle strength.
- Advice session in physio department for familiarisation with post op exercises and hospital stay.

Operative Day

- Admitted on morning of day of surgery.
- Your leg marked for the correct side.

Pain Relief Following Surgery

There are several strategies to reduce the discomfort following surgery. Essentially they include the following: nerve blocks which numb the leg for the first 12 – 18 hours, a Cryo cuff which is a cold water compression device to reduce swelling and pain, and anti-inflammatory painkillers and medication.

Initial Post Operative Period

You will be able to go home the first postoperative day after a night in hospital.

Patients stay overnight and start to move their knee on the morning after surgery under the instruction of the physiotherapist.

On return from the operating theatre you will wake up with a bulky dressing A Cryo cuff (ice compression device) will be applied to the knee in order to keep the knee cool and reduce swelling.

The dressings are removed on the 1st or 2nd postoperative day and you will then be instructed on crutches and on the exercises to perform for the first 2 weeks. Crutches are usually required for the first 1-2 weeks but full weight bearing is allowed.

Summary of Rehabilitation Phases

There are five main rehabilitation phases and example exercises for each phase are given in the sections that follow.

- Phase 1: Initial Post Op Phase – first 2 weeks
- Phase 2: Proprioception Phase – weeks 3 – 6
- Phase 3: Strength Phase – Weeks 6 – 12
- Phase 4: Early Sport Training - 3 - 6 months
- Phase 5: Return to Sport - 6 – 9 months.

You will be reviewed at the following times in clinic and the goals for those stages are detailed:

- 2 weeks.
- 6 weeks.
- 3 months.
- 6 months.
- 1 year.

Instructions On Discharge From Ward

Keep the wound dry for 10-14 days or until the wound has sealed.
Date for review in clinic after 2 weeks – wound review.
Date for Outpatient physiotherapy appointment.
Work Advice: to expect to be able to return as follows:

Desk work at 3 – 4 weeks
Light manual work at 6 weeks
Heavy manual work (ladder work etc) at 3 – 4 months.

Driving Advice: To return to driving at 3 – 4 weeks depending on knee function. Instruction on use ice packs to control swelling.

Outpatient and Home Exercise Programme: Rehabilitation Phases

The rehabilitation phases and goals are presented below. There are many different exercises available to achieve the goals and these are tailored to each individual by the physiotherapy team. Various example exercises are outlined in each section.

General Principles for understanding the rehabilitation process

- **Exercises need to be done 4 – 5 times per day:** - Little and often is better than an extensive overload period.
- **Pain, heat and increasing swelling in the knee are bad:** - Any of these symptoms can mean that you may be overdoing exercises. It is unlikely that it indicates a serious problem but you should always call your physiotherapist to discuss any extreme pain, heat or increasing swelling within or around the knee.
- **The difference between good and bad pain:** - After major knee surgery your knee will be sore. It is important to understand that discomfort is normal particularly when performing some of the stretching exercises. In addition, your knee may ache after an exercise session. This is expected and normal so long as it is not associated with any significant increase in swelling. 'Bad pain' is usually sharp and severe in nature. It may be brought on by pushing too hard and it may be accompanied by an increase in swelling. Activities causing such a problem should be stopped and advice sought from your physiotherapist.

1: Initial Post Op Phase – first 2 weeks

Aim

The aim of this phase is to regain range of movement and to allow the swelling in the knee to settle. The most important aim is to regain normal and full extension (straightening) of the knee. The physiotherapist usually sees you one week following surgery to add in extra exercises.

1st Week Exercises

- Heel props resting the ankle on a pillow or support and pushing leg into extension to match the normal side in order to prevent build up of scar tissue around the new graft.
- Flexion exercises (knee bending): active and passive movements over the edge of the bed using the other leg for support and small range of swinging action if possible. Increase using heel slides, side lying on the bed or wall slides (feet on the wall).
- Patella mobilisation exercises to prevent tethering of the patella in scar tissue.

- Mobilise weight bearing as tolerated using crutches.
- Control swelling with regular use of Cryo cuff or ice packs.
- Avoid active exercise with the leg unsupported (open chain exercise) from 30° flexion to full extension for the first 6 weeks.
- Static muscle exercises (quadriceps, gluteal contractions and hamstring exercises).

2nd Week Additional Exercises

- Hip extension by bridging.
- Static bike to full movement with minimal resistance.
- Physio ball sitting: rocking / wall / balance. Progress as required.
- Gait education weaning off crutches.
- Scar mobilisation if wound healed.
- Four planes of straight leg raising.
- Quarter squats (using crutches or a chair for support initially).

2-Week Review Goals

Range of motion: full terminal extension to 110° flexion. Wound healed.
Minimal swelling in knee and around wound.
Normal gait pattern.
Independent leg control.

2:Proprioception Phase – weeks 3 – 6

Aim

The aim of this phase is to work on proprioceptive exercises and to develop light endurance and strength training. This stage is also important for developing core stability to provide the framework to progress to full active function. By the end of six weeks your knee should feel normal in activities of daily living.

Example Exercises

- Range of motion: active and passive, wall slides, heel slides on bed.
- Weight bearing: full weight bearing off crutches working to establish normal gait.
- Mini step ups and dips.
- Treadmill work: gradual increase in speed and gradient.
- Gym ball (bridging exercises).

- Start swimming (no breast stroke kick).
- Hamstring curls lying on the front using a lightweight or elastic cord resistance. (Delayed until 6 weeks if hamstring tendons used for the graft)
- Mini trampette balance exercises.
- Rowing with low resistance.
- Outdoor cycling on the road tolerated once confidence achieved.
- Kneeling on a pillow or gym ball to desensitise the scar region.
- Static bike utilising gradual increase in resistance.

6-Week Review Goals

Full range of movement including normal hyperextension.
Minimal swelling.
Full patella mobility.
Minimal discomfort.

3: Strength Phase – Weeks 6 – 12

Aim

At six weeks the thigh muscle tone and definition (quadriceps / hamstrings) will be poor but the soft tissue hamstring graft will now have become solid within the femur and tibia tunnels such that more vigorous strength training can commence. Progress is monitored and controlled by the physiotherapist according to the speed of recovery of strength and control.

It is important to avoid too rapid progress, as there is a risk of developing overload complications.

Example Exercises

- Start early jog training as control allows – on trampette or treadmill.
- Gradually progress to treadmill running.
- Step exercises with increased height speed and weight.
- Step machine working at a steady level.
- Gait re-education drills: walking fast / slow, side, front and backward.
- Progress walking to change of direction.
- Slow walking backwards on the treadmill.

3 Months Review Goals

No swelling
Full range of movement
Confident feeling of stability.

4: Early Sport Training Phase – 3 - 6 months

Aim

Pivoting and cutting manoeuvres are introduced at this stage, building up to light sport training. This involves a progressive programme of slow and moderate speed strength training and agility drills. Manual work should be possible within the restraints of the occupation. Exercises for power and agility training are introduced.

Month 3 Example Exercises

- Jog / run on the treadmill or on the pavement.
- Normal skipping introduced.
- Lunges with increased intensity and frequency.
- Hopping: both or single leg action. Also side to side as tolerated.
- Mini trampette hopping.
- Running including gradual changes of pace plus acceleration/deceleration.
- Progress running through slow turns, figure of 8 turns, to tighter turns and cutting.

Months 4 – 6 Example Exercises

Hard pivoting and cutting is introduced at this stage providing satisfactory progress with running training.

- Functional testing (single leg hop test).
- Agility training: shuttle runs, ball dribbling and other sports drills promoted.
- Specific sports training aimed at the individual.
- At the six months stage ready for discharge from rehabilitation and return to non contact sport.

6 Months Review Goals

Functional and strength tests: 85% of normal side.
Return to non contact sports / training.

5: Return to Sport Phase – 6 – 9 months

Aim

The aim of this phase is to progress sport training and to develop strength / endurance levels in order to establish a base for return to full sporting activity. This takes time, especially in building up confidence to progress to full contact activities. Return to contact sport is not recommended until strength and functional outcomes are measured at greater than 85% of the normal side.

The time to regain pre injury level of skill and performance is very variable but can take 3 – 4 months of training and playing.

Guidance from the physiotherapist in regaining confidence in a sport environment by modifying training and specific drills, can help with a quicker return to contact or full level sport competition.

- Sports specific skills training is introduced with club activities.
- Progress is best achieved in conjunction with a general fitness programme.
- Full contact is best avoided until you are able to tolerate a full training session and you are confident with your fitness and endurance.

Remember:

If you have any queries or if you require any advice regarding your knee or the rehabilitation programme please do not hesitate to call your physiotherapist.