

Rehabilitation following Anterior Cruciate Ligament Reconstruction

These notes have been prepared to help guide you through your recovery following your anterior cruciate ligament reconstruction. At each postoperative appointment your progress will be reviewed and further suggestions made regarding your exercise program.

The most important aspects of your recovery are to achieve and maintain full extension (straightening) of your knee and to regain good function of your quadriceps muscle at the front of your thigh. Your progress should essentially be guided by pain and swelling. These should continue to gradually decrease although short term increases of less than 48 hours duration are not uncommon and simply indicate that you have done a little too much too soon.

The use of the Tubigrip compression sleeve and regular icing should continue for as long as swelling is present (usually 6 to 8 weeks). Even after the swelling has resolved, it is worth icing the knee after each exercise session for at least four months.

For simplicity, the rehabilitation program has been divided into phases. These are not meant to be strict and your progress may be faster or slower depending on the response of your knee.

0 to 2 weeks

Key goals

- Restore knee extension (straightening)
- Reduce swelling
- Restore quadriceps function

Lock your knee out straight

This is extremely important. You should lock your knee as often as possible by resting with a rolled towel under your heel (e.g. 30 minutes, 3 or 4 times a day).

If you are not able to lock your knee out straight after three weeks you greatly increase the chances of needing an arthroscopy at a later date to restore full extension.

Reduce the swelling (R.I.C.E.)

- **REST:** Recovery will be aided by taking things easily, especially during the first week. You should basically be resting at home and keeping your leg up for the first week. During the second week you can gradually come off the crutches, but will be essentially housebound.
- **ICE:** Any kind of ice pack will do. A device such as the Cryo Cuff that is used in hospital makes icing much easier. A cheaper alternative is a large bag of frozen peas (you will probably need two, so that one can re-freeze while the other one is in use).

For the first 2 weeks use icing/cooling for 20 minutes at least 3 times a day. After 2 weeks ice the knee at the end of the day and after exercise.

- **COMPRESSION:** Wear the compression bandage (Tubigrip) provided for at least 6 weeks to minimise your swelling. After the first ten days you do not need to wear it at night.
- **ELEVATION**

Control your pain

Take regular analgesia which you can reduce as your pain subsides. Ice also reduces your pain. An increase in pain in the shin and calf at about four or five days following surgery is quite common and is usually associated with the appearance of bruising which can be quite dramatic. Ice, compression and elevation will all help reduce your symptoms.

Try to walk normally

Take as much weight as is comfortable, but use the crutches for as long as you feel you need them. This varies from one person to another and may be as little as a few days or as long as a few weeks. To walk normally, try to heel strike and lock your knee when you step. Most people are off their crutches by 2 weeks. You may find that a good transition is to use just one crutch in the OPPOSITE hand.

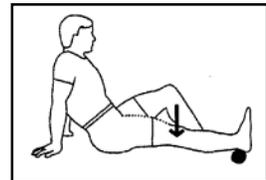
Do your exercises

You must do your exercise program 2 or 3 times a day. Your progress through these exercises should be gradual and guided by your pain and swelling. Take painkillers 45 minutes prior to exercising if necessary.

Begin exercises (1) and (2) the day after your operation and repeat these exercises 3 times a day for the first two weeks.

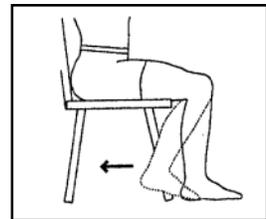
1) Knee locking

With a rolled towel under your heel, tighten the quadriceps muscle at the front of your thigh and push your knee into the bed. Hold for 5 seconds. Repeat 20 times.



2) Knee bending

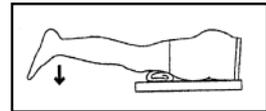
Sit on a chair on a slippery floor (e.g. tiles) with socks on. Slide your heel back on the floor, bending the knee as far as comfortable and hold for 3 seconds. Then slide it forwards and relax. Repeat 10 times.



Two weeks after your operation add exercise (3) repeat 3 times a day.

3) Prone leg hang

This exercise straightens your knee. Lie on your stomach with your lower legs hanging over the end of a bed (knee caps off). Try to relax and hang there for up to 2 minutes.



CRUTCHES

The pattern of walking is:

- "crutches, bad leg, good leg".

To manage steps with crutches:

- UP: good leg, bad leg, crutches
- DOWN: crutches, bad leg, good leg.

It is not uncommon for bruising to appear in your leg a few days after surgery. Sometimes this can cause some pain, especially over the shin. Regular icing and taking painkillers will help reduce any discomfort.

Patients usually notice an area of numbness on the outside (lateral side) of the scar. This is due to small nerves in the skin being cut as part of the incision for surgery. The area involved varies a lot but usually decreases with time. While you may always have some numbness, it does not usually cause any problems and tends to be forgotten.

2 to 12 weeks

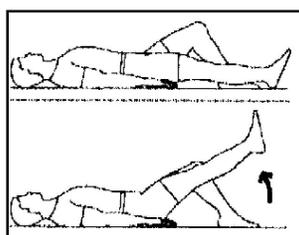
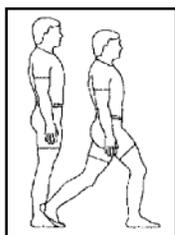
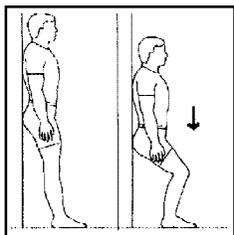
During this period you should continue with the exercises from the first phase and also gradually add the exercises outlined below. You should continue to use regular icing and the compression stocking.

Progress should be guided by pain and swelling. If these are increasing, you are probably overdoing things.

Don't forget about extension and be sure that you are able to lock your knee out straight. Use prone leg hangs if you are having any difficulty at all with extension.

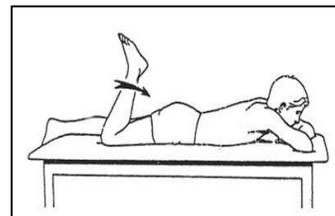
You can get in a swimming pool provided the surgical wound is clean but avoid kicking until the 8 week mark. Use a pool buoy if you want to do lap work for fitness.

Quadriceps strengthening: You should start doing wall squats, forward lunges and straight leg raises as described in the pictures below:



Each exercise is repeated at the rate of one every 5 seconds. You should do 2 or 3 sets per day, building up to 20 repetitions per set. Exercise each leg separately.

Hamstring curls: See picture. These are often quite difficult if you have had a hamstring tendon graft. Be patient and build up gradually to 2 or 3 sets per day, working up to 20 repetitions per set. Exercise each leg separately.



It is very common to experience a sensation of tearing your hamstring at around 3 weeks from surgery. This is really just stretching of some of the scar tissue that has been laid down where the hamstring tendon was taken from.

There may be quite a sharp tearing sensation at the back of your knee, followed by difficulty extending the knee. There may be some bruising at the back of the thigh and knee. This usually will settle over a few days.

Exercise bike: You can start as soon as you are comfortable. You will need to be able to bend your knee past a right angle and will have to start with the seat raised. . Most people are able to ride an exercise bike for short periods by the end of the fourth week.

Gradually build up to 20 to 25 minutes, 3 or 4 times per week. Initially there should not be any resistance. Once you can ride for 15 minutes you can alternatively increase the resistance and the time you spend on the bike.

If you feel confident you can start riding a road bike from about 8 weeks, but be careful. The risk is in having a fall and re-injuring your knee.

Gym: By about 5 weeks you will probably be able to start a gym program. Ideally you should continue with a program 3 times a week for 3 to 4 months. Get a gym instructor to design a program for you including the following exercises:

- leg press including single leg work, both concentric and eccentric
- half squats
- exercise bike, rowing machine, cross trainer and stepper
- hamstring curls
- leg/knee extensions should be avoided

Jogging on mini-tramp: From about 8 weeks onwards you can try to jog on a mini-tramp, but not a treadmill. Gradually build up to 10 minutes.

Balance work: There are many exercises that you can do to improve your balance. Standing on one leg and doing 1/3 squats is a good way to start. You can make it more challenging by standing on a pillow. You can then progress to using something like a wobble board or DuraDisc.

Once you have mastered shallow squats you can start with “arabesque” exercises. If standing on your left leg, you should start with your right arm straight and pointing upwards and forwards and your right leg straight and point backwards. Then tilt forwards, keeping your trunk straight. Lean forwards until your right arm and leg are parallel with the floor and then straighten up again.

12 to 16 weeks

During this phase you should continue with your gym program and remember to control swelling and maintain the ability to extend your knee.

When you can jog comfortably on the mini-tramp for 10 minutes you can start jogging outside. Start on grass and begin with jog/walking. Gradually build up until you can do the equivalent of four laps of an oval. At this point you can start some run-throughs and build up to sprints.

You can also start doing some hopping and landing drills. These should initially be done with both legs together (i.e. jumping) and as you gain confidence you can do the same exercises for each leg separately (i.e. hopping). The exercises should be done with the weight on the balls of your feet and your knees slightly bent. Start with small hops and gradually increase the distance. Initially start with forwards and backwards movements and then progress to side to side and diagonal movements. You should build up to 10 repetitions on each leg.

Once you can hop comfortably on a flat surface, you can start hopping down from a small step and then up on to a small step. Gradually increase the height of the step.

4 to 6 months

Once you are running confidently in a straight line you can start changing direction, gradually increasing the sharpness of the turn and the speed at which you make the turn. You can also recommence sports-specific drills such as kicking a football, hitting tennis balls, and shooting baskets. Use your commonsense and progress gradually. You may feel more comfortable wearing a neoprene (wetsuit material) knee support such as a Thermoskin.

There are a couple of useful programs that have been designed to prevent anterior cruciate ligament injuries, but are also a very good preparation for return to sport. These are the FIFA 11+ and the PEP programs. They can be found at <http://www.f-marc.com/11plus/index.html> and at www.aclprevent.com/pepprogram.htm. If you can do either of these programs comfortably, you can recommence non-contact training.

6 to 12 months

During this period you gradually increase your training and can resume full training provided that you have no swelling, full movement, and good quadriceps strength. You need to be doing full training for at least a month before you resume competition.

These notes have been prepared by Associate Professor Julian Feller, FRACS, orthopaedic surgeon, for use by his patients and reflect his views regarding appropriate rehabilitation following anterior cruciate ligament reconstruction. They are not intended for use by patients who have undergone surgery by other surgeons.