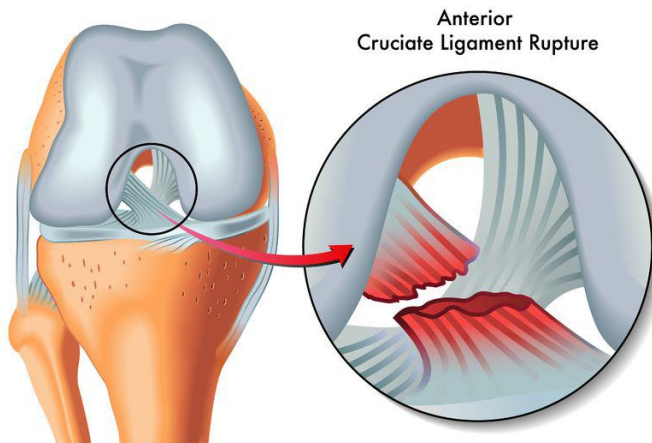


Anterior Cruciate Reconstruction

The anterior cruciate ligament (ACL) is responsible for the prevention of excessive forward motion of the lower leg bone (tibia) in relation to the thigh bone (femur) and also in the limitation of rotational movements of the knee.

ACL rupture is one of the most common knee injuries and is particularly prevalent in sports such as rugby, tennis, football, skiing and kitesurfing where more dynamic forces are imposed upon the knee joint. Most ACL tears are as a result of awkward landing or twisting on a planted foot.



Prehabilitation

Following your initial consultation with Mr Lusty, you may be given a Physiotherapy appointment at which you will be guided through an exercise program designed to prepare you for theatre and give you a head start in your post-op recovery. This is called prehabilitation and will include exercises to ensure a full range of motion of the knee and will ensure that you can correctly perform the post-operative exercises expected of you. Pre-programming post-operative rehabilitation is beneficial at every level.

Following injury, your brain will adapt your walking pattern (gait), which will often be carried through to the post-op period, restricting function of your newly reconstructed knee. This will delay your recovery. Most patients are unaware of an abnormal gait pattern and you may be asked to sign a consent form to allow filming of your pre-op gait. This is an essential tool to help you and the Physiotherapist see where improvements need to be made. This objective recording may be compared to filming at regular intervals along the rehabilitation pathway.

Goals For Prehabilitation

1. Pain free mobile joint
2. Full range of movement
3. Teach simple post-op exercises

Post-Operative Rehabilitation

Stage 1 (Day 1-14)

Following your surgery, you will be encouraged to progress from partial to full weight bearing as pain allows. You will be expected to keep the wound dressings covered and dry until your dressings appointment (this will be given to you prior to discharge). The wound area will be closely monitored at all Physiotherapy appointments. The first two weeks in rehabilitation will help you to restore a full range of motion of the operated knee and establish a normal gait pattern. Your Physiotherapist will help to mobilise the knee cap to avoid any limitation of movement and you will be instructed on how to do this at home. The knee will be swollen and you will be taught a RICE regime (Rest, Ice, Compression and Elevation) to aid the dispersal of any inflammation which will allow a fuller range of movement and decrease your pain level. Your Physiotherapist will instruct you upon frequency and duration of the exercises. Each patient has their own special needs and a tailor made exercise regime will be produced for you in order to help you reach the goals set at each stage of recovery.

Knee Extension

During Stage 1 of your recovery you will be instructed to encourage full knee extension (straightening) which is vital to a speedy recovery and long term success of your operation (Fig 1)



Fig 1

You will be advised to rest with no support underneath the knee and additionally to stretch the calf muscle by pulling the foot towards you using a trouser belt or towel as in Fig 1, above. All stretches should be held for 15 seconds. Full knee extension is vital for the restoration of a normal gait pattern

and your Physiotherapist will be watching for this as your heel strikes the floor when you are walking.

Knee Flexion

A full range of both extension (see above) and flexion of the knee is expected by the end of Stage 1 (1-14 days) In order to facilitate flexion (knee bending) you should sit with a towel, trouser belt or band wrapped around the foot to gently help the knee bend (**Fig 2 below**). Under no circumstances should this be forced. It will be uncomfortable but should not be painful. Alternatively, the hands can embrace the shin to gently pull the knee into flexion.



Fig 2. The band is placed around the foot and the knee gently eased into flexion.

Quadriceps Strengthening

Static Quadriceps

The quadriceps muscles (the large group on the front of the thigh that push the knee straight) are particularly prone to wastage and must be worked hard from day one.



Fig 3

Figure 3 above demonstrates a static quadriceps contraction. The foot is pulled towards you and the knee is pushed down hard into the couch. If this is performed correctly, the knee cap should brace towards you and you will feel the front of the thigh tighten.

Straight Leg Raise

A progression from a Static Quadriceps contraction is a Straight Leg Raise which is shown below in **Fig 4**. This exercise again, requires the foot to be pulled upward and the Quadriceps tightened prior to lifting the leg approximately six inches from the couch. Initially, you may find that the knee buckles a little before the leg is lifted. This is known as a Quadriceps Lag. Your goal is to keep the leg straight. You may see the Quadriceps muscle shake under the strain, which is perfectly normal at this stage of your recovery.



Fig 4 Note how the foot is pulled upwards and the knee is straight. The thigh muscles are noticeably contracted.

Inner Range Quadriceps

An exercise called Inner Range Quads is also encouraged and is shown in **Figure 5** below. This exercise requires a towel to be rolled up and placed under the knee. The Quadriceps are then contracted in order to straighten out the lower leg.



Fig. 5 Note how the knee is pushed into full extension and again, the Quadriceps muscles are visibly contracted.

Hamstring Strengthening

In addition to the Quadriceps muscles, Hamstring strength is essential for your recovery. The Hamstrings are the group of muscles at the back of the thigh responsible for bending the knee. During Stage 1 of your treatment, the Hamstrings are contracted statically, alongside the Quadriceps muscle group at various angles. This is easily achieved by tensing both muscle groups simultaneously and holding the contraction for approximately fifteen seconds. The knee is then bent up a little further and the exercise repeated. This should be repeated into your comfortable range of movement (**see Fig 6 below**). You will be advised against digging the heel into the couch which may place unnecessary pressure on the newly grafted ligament. This exercise will be progressed towards the end of Stage 1 into weight bearing positions. Resisted hamstring strengthening should be avoided for 6 weeks.



Fig 6. The knee is taken further into a bent position and both the Quadricep and Hamstring muscles are activated.

Hamstring Stretches

Following any type of surgery, scar tissue, if allowed to, can bind the soft tissues (muscles and ligaments) together. This is known as adhesions. In order to prevent this, a gentle hamstring stretching regime should be commenced early. In order to do this without placing undue pressure on the graft, you must sit on the edge of the couch/chair and extend the operated leg out in front of you. This requires a degree of Quadriceps strength and during the early part of Stage 1 you may need assistance from your Physiotherapist. Once the leg is extended, if the hamstrings are tight, you will find that your lower back drops into a bent position or you will have a tendency to lean backwards. It is essential that you sit upright. Imagine a helium balloon attached to your head pulling you upwards. Now push the knee out in front of you as straight as you can. If you are performing the exercise correctly, you should feel a tugging at the back of your thigh. Hold the stretch for approximately fifteen seconds and repeat. See Fig 7 below.



Fig 7. Note how the back is held straight and the knee is held in full extension.

Goals For Stage 1 (1-14 days)

1. Wound healing
2. Decrease joint swelling
3. Restore full extension of the knee (including hyperextension)
4. Establish muscle control