

SIMON W. YOUNG

*MBChB FRACS MD
Specialist Orthopaedic knee Surgeon, Associate Professor*

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION Rehabilitation Protocol

The anterior cruciate ligament helps stabilize the knee, however muscle strength and control is just as important to stability. Rehabilitation after ACL reconstruction aims to protect the graft while it is healing, and also restore muscle strength and control. This is so that the knee is as strong and as stable as possible before it is placed at risk again by returning to sport.

There is a large variation in how people recover from surgery. Progress through this protocol may be faster or slower depending on pain and swelling and the nature of the original injury. Tubigrip (compression sleeve) and regular icing can continue for as long as swelling is present, which may be 6-8 weeks. Icing can be done with a bag of frozen peas for 15 minutes, 3-4 times per day. After 8 weeks post surgery, icing the knee after an exercise/physiotherapy session may still be beneficial.

Some numbness around the scar is normal and tends to lessen with time. There will also be bruising, which can sometimes appear dramatic. If you have had a hamstring graft, some pain and bruising around the back of the thigh is common. The hamstrings grow back over 1-2 years, and as they do so you can occasionally disrupt scar tissue, causing a tearing sensation in the back of the thigh. This settles quickly without long-term problems.

PRIOR TO ACL SURGERY - 'PREHABILITATION'

Physiotherapy is an essential component of recovery from ACL surgery, and it is important to establish a relationship prior to surgery. Additionally, following an injury to your ACL some muscle wasting and loss of range of motion will occur, so it is essential to ensure you have a full range of motion and maximum muscle mass prior to your ACL surgery.

If you have symptoms of ACL instability, you risk further damaging your knee each time your knee gives way so avoid any activity or sport that involves pivoting or cutting movements. Cycling, swimming, and controlled gym exercises are encouraged to aid recovery from your injury and keep your knee strong.

PREOP PHYSIOTHERAPY GOALS

1. Restore full range of motion
2. Strengthening
 - Quadriceps
 - Hamstrings
 - Glut Max
 - Core exercises
3. Proprioception

POST OPERATIVE REHABILITATION

Your physiotherapist will guide you through the following program.

People respond to surgery in different ways, and progression through the program should be based on achieving goals rather than specific time frames. There are some minimum times before certain activities can begin, in order to protect the graft while it is healing.

REHABILITATION CAN BE DIVIDED INTO 4 PHASES

1. **Early Post Operative** (0-2 weeks)
2. **Range of motion/Strength/Balance** (2-12 weeks)
3. **Function: Running, jumping, hopping, landing** (3-5 months)
4. **Sport specific training and return to sport** (5-12 months)

continued over...

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Rehabilitation Protocol - Continued...

1.

PHASE ONE

EARLY POST OPERATIVE

GOALS

1. **Reduce pain and swelling**
2. **Restore motion especially extension (getting the knee straight)**
3. **Restore quadriceps contraction**

REDUCING PAIN AND SWELLING

Rest is important following surgery, keeping your leg elevated as much as possible. You can come off the crutches during the second week, but keep walking to a minimum until the swelling has subsided. Ice is very helpful, use a bag of crushed ice or frozen peas for up to 30 minutes, 4-5 times per day. Ankle pump exercises also help reduce swelling and prevent clots.

RESTORING MOTION

This is extremely important, as loss of motion due to knee scarring is a known complication of ACL reconstruction, especially loss of extension (getting the knee out straight). When lying flat, push down to lock your knee out straight and hold for 10 seconds. Repeat 3 times, at least 3 times per day. This exercise may be easier with a rolled towel under your heel.

RESTORE QUADRICEPS FUNCTION

Your physiotherapist will develop an exercise program with you, focusing on range of motion, patella mobilisations, straight leg raises, and quadriceps exercises.

2.

PHASE TWO

STRENGTHENING/RANGE OF MOTION/BALANCE (2-12 WEEKS)

GOALS

1. **Build knee strength**
2. **Restore full range of motion**
3. **Restore normal balance and walking**

During this phase you should focus on building strength and restoring range of motion, progressing as pain and swelling allow under the guidance of your physiotherapist. Regular icing may continue to help, especially after exercise.

BUILDING KNEE STRENGTH

Set aside time for your exercises 2-3 times per day. Your physio will work with you on a progressive program with quadriceps exercise such as straight leg raises, wall squats, and lunges. Hamstring curls should be avoided for the first 6 weeks if you have had a hamstring graft used.

You can start on an exercise bike as soon as you feel comfortable, initially you may have to raise the seat until your knee flexion returns.

Aim to be on the bike by the end of the fourth week, initially with no resistance to work on motion then building the resistance up to work on strengthening.

You can get in the pool as soon as your wounds are healed (usually after 2 weeks), but avoid breaststroke.

You can begin a gym programme as soon as directed by your physiotherapist, let them design the program to ensure the correct exercises are used which do not stretch the graft.

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Rehabilitation Protocol - Continued...

RESTORE FULL RANGE OF MOTION

Don't forget to make sure you can get your knee out straight; your physiotherapist will help focus your exercises (such as prone leg hangs) on this if you are having difficulty. Flexion (bending) exercises such as heel slides can be done while sitting in a chair, pushing your knee back as far as comfortable and holding for 10 seconds, then repeating 10 times per day.

RESTORING BALANCE AND WALKING

Your physiotherapist will work on balance 'proprioception' exercises such as one leg stands/squats, progressing to using a wobbleboard. From 6-8 weeks you can try walking/jogging on a mini-tramp, and treadmill walking can build up to a fast walk. Towards the end of this phase supervised plyometric exercises can begin. No running before 12 weeks.

3.

PHASE THREE

FUNCTION - RUNNING, HOPPING, LANDING (3-5 MONTHS)

GOALS

1. **Restore strength to 80% opposite limb**
2. **Restore functional movements - Running, jumping, hopping, landing**

During this phase continue your strengthening exercises, building resistance as your strength allows. You can start light jogging on grass or a treadmill, gradually building up to sprints.

Your physio will also start you on jumping, hopping, and landing drills. These work both on restoring strength and balance (proprioception) to your knee, re-training your muscles so they are able to protect the ACL graft from reinjury. Return to running is variable, and can take anywhere from 3-6 months.

4.

PHASE FOUR

SPORT SPECIFIC TRAINING AND RETURN TO SPORT (5-12 MONTHS)

When you are confident with straight line running and hopping, you can start changing direction and cutting movements. You can also recommence sports-specific drills such as kicking a football, hitting tennis balls, and shooting baskets. Be careful during this phase as restoring muscular control and graft healing takes time, so ensure you are ready before placing your knee 'at risk' again with return to sport.

The earliest you can return to sports is 6 months post surgery, but everyone's recovery is different. Even professional sportspeople may need 9 or even 12 months before they can return to contact sports safely. Focus on achieving functional goals with your physiotherapist to determine when you are ready, rather than specific dates. Some criteria that are often used:

1. **Full range of motion**
2. **No swelling**
3. **Run without a limp**
4. **Squat and rise from squat**
5. **Figure 8 running without limitation**
6. **One-leg hop test 90% of opposite side**
7. **Single leg vertical jump 90% of opposite side**

PHYSIOTHERAPIST QUICK NOTES

Anterior Cruciate Ligament Reconstruction

PHASE ONE

EARLY POST OPERATIVE (0-2 WEEKS)

RICE, WBAT, discard crutches when able (usually 1-2 weeks).

Ankle pumps, quad sets, SLR, patella mobilizations, AROM + PROM, extension exercises (prone leg hang if difficulty getting straight).

PHASE TWO

RANGE OF MOTION/STRENGTH/BALANCE (2-12 WEEKS)

Continue Phase 1 exercises, **closed chain** quads, mini-squats, squats, step-ups, exercycle, proprioception. Can use pool if wounds fully healed.

Aim full ROM by 6 weeks, contact Simon if concerns. Towards end of phase can begin supervised plyometrics.

PHASE THREE

FUNCTION - RUNNING, JUMPING, HOPPING, LANDING (3-5 MONTHS)

Continue previous exercises, can begin running if able and **open-chain** quads. Running/jumping/hopping landing drills, jump rope okay.

PHASE FOUR

SPORT SPECIFIC TRAINING AND RETURN TO SPORT (5-12 MONTHS)

Progressive plyometrics, incline plyometrics, running, hopping, skipping, sport specific drills. Sample criteria for return to play above, Fifa 11+ and PEP program also useful.

Aim full training for at least one month prior to return.

Many thanks for your help with the rehabilitation. If you have any concerns or would like to modify the protocol for an individual patient, please feel free to contact me anytime.

Phone 021 616 183 or email simon.young@auckland.ac.nz