

ACL Reconstruction Rehabilitation Program

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1. Introduction to your Rehabilitation

If you want to achieve your best outcome, adhering to your rehabilitation programme is essential after this surgery. It will take perseverance and hard work. There are no short cuts to success.

Your Key Functional Goal

Your surgeon and rehabilitation advisor will work with you to select a realistic goal. This becomes a focus for your rehabilitation, especially in the later stages which are usually sport specific.

MY GOAL

Functional Goal	Achieved by

2. The Keys to Successful Rehabilitation

Your Condition before Surgery

The way you present at surgery is essential to a good outcome. Research and clinical experience strongly emphasizes the following pre operative requirements:

- ✓ Full knee extension (the same as the opposite side)
- ✓ No swelling
- ✓ Strong quadriceps and hamstring muscles (thigh muscles)

Work with your treatment provider to achieve these goals prior to surgery.

Early after surgery, the key objectives are to decrease swelling, obtain a full range of movement (especially knee extension), and regain active control of your knee joint.

In the next stage, it is important to improve your walking ability and to start increasing strength and balance.

In the middle stages, it is a time of consolidation where there is a focus on strength, endurance and coordination.

In the final stage, the focus is on sport and work specific activities, improving your ability to do the physical tasks required of you in these endeavors.

Things that prevent you achieving your best result are called barriers to recovery and include:

- ✓ Working too hard when pain and swelling are present.
- ✓ Not having immediate and long term goals to aim for.
- ✓ Not following a staged rehabilitation programme.
- ✓ Failure to obtain good movement, especially knee extension.
- ✓ Not appreciating that you do need to focus on your knee joint and work at improving its function.

Overall confidence, perseverance and sticking to the plan are the keys to success.

3. Stage One: To the End of Week One

The immediate goals include:

- a. Reducing swelling
- b. Obtaining full passive knee extension
- c. Obtaining 90 degrees of knee flexion

To control swelling

- ✓ R = Resting the knee between sessions of regulated exercise (lying down with the knee up).
- ✓ I = Icing the knee at regular intervals during the first week.
- ✓ C = Compression – Leave the knee bandaged for at least 48 hours and continue with a good quality compression bandage after that time.
- ✓ E = Elevate your knee to allow swelling to flow toward your trunk.

Range of Motion

Extension

- ✓ To obtain full extension (i.e.: a straight knee), sit on a flat surface (floor, bed or lounge chair), with a cushion or pillow under your heel. Relax your leg and let gravity slowly straighten your knee. Hold your knee in this position for at least one minute each time. Longer is better. This exercise can be performed hourly.
- ✓ Your therapist can show you other similar exercises.

Flexion

- ✓ Sit on a table or chair with your knee bent comfortably. Cross your legs and use your non operated leg to assist in increasing your flexion (knee bend). Aim for 110 degrees of bend by the end of week 1 after your operation.
- ✓ Lie on your back and slide the heel of your operated knee towards your bottom. Do this exercise in sets of 30 three times per day.
- ✓ Sit on a chair and place your heel on a skateboard. Then move your heel up towards your trunk bending your knee as far as you can and then straighten your knee as far as it can go. Repeat up to 50 times, at least 3 times per day (note this exercise can replace the one above).

Knee Cap

- ✓ With your knee in a straightened position, and your muscles and joint in a relaxed state, check that your knee cap moves freely by moving it from side to side gently with your hands for one minute. Do this exercise once per day, do more if it is stiff as it will prevent the knee from gaining full movement.

Strength

- ✓ In lying, every hour tighten your quadriceps muscles and hold them tight for 5 seconds. Do 5 repetitions every hour. Try to gain a maximal contraction.
- ✓ In sitting, from a bent knee position, straighten your knee contracting your quadriceps muscles with extra effort at the end of the range. Do 3 sets of 15 repetitions three times per day.

Regaining control of your knee in standing

Standing exercises will help control at the knee joint and also maintain strength in other muscles in our leg (e.g.: hip and ankle muscles). Do the following:

- ✓ Single leg standing: Hold on to a table and stand on the injured leg for 30 seconds.
- ✓ Weight shifting: Tighten your thigh muscles and shift weight from left to right leg.
- ✓ One leg calf raise: Standing on either leg (do both) and use your calf muscles to lift your heel off the ground. Do these exercises 10 times.
- ✓ Side steps: try 2 steps left and 2 steps right. Do these exercises 5 times.
- ✓ Double leg squat: Holding on to a table, in the standing position gently bend your knee (knee cap over second toe) to about 40 degrees or as comfortable. Do these exercises 5 times, and then rest for 2 minutes. Do at least 2 sets twice per day.

Function

- ✓ Walking: Walk regularly with crutches for the first few days. Towards the end of week one try walking without crutches for short periods (10 minutes).
- ✓ After all exercise sessions and specific walking activities, ice your knee joint as described above and rest with the knee elevated. In the first 2 weeks, this is very important. With a swollen joint, you will not be able to proceed to the next stage.

You should report to the physiotherapist one week after surgery. Your surgeon may recommend alternatives to this. You should have full terminal extension, flexion to 90 degrees, minimal swelling and normal walking.

4. Stage to the End of Week Two

The immediate goals include:

- a. Reducing swelling further
- b. Obtaining/maintaining full passive knee extension
- c. Obtaining 110 degrees of knee flexion
- d. Walking normally, and increasing walking ability to 2 x 10 minutes per day.
- e. Increasing balance to standing comfortably on one leg.
- f. Cycling on a stationary bike for 10 minutes.

To achieve these goals:

Continue to control swelling using RICE, as above but only if swelling is a problem or it increases after exercise.

Range of Motion

Extension

- ✓ To obtain full extension (knee straight) same as week one except you can place a very gentle amount of overpressure with your hands above and below the knee cap to further straighten your knee. Your physiotherapist will show you how much force to apply.
- ✓ Try lying on your stomach hanging your knee off the end of a table or bed. Make sure your knee cap is not under direct pressure (you place a towel in front of it). Hold this for some time (1 minute to 10 minutes), gradually letting the knee straighten.

Flexion

- ✓ Same as week one except more force can be applied. Aim for 130 degrees of bending.
- ✓ Sit on a stationary cycle and gently move the knee back and forth to increase the ROM. It is unlikely you will be able to complete the pedal stroke but it is good to work towards this. Do this for 5-10 minutes.

Knee cap

- ✓ Same as week one; you should be aiming for a knee cap that moves freely. If it is stiff your physiotherapist can assist you with progressions.

Strength

- ✓ Same as week one, but now add:

- ✓ Single leg squat: In the single leg standing position gently bend your knee (knee cap over second toe) to about 40-60 degrees or as comfortable. Repeat 5 times, and repeat during the day up to 2 hourly
- ✓ Sitting leg extension off table. In the sitting position straighten your knee to the fully extended position. Repeat 10-15 times and do this 2 hourly.
- ✓ Hamstrings can be strengthened by lying on your stomach and bending your knee to 90 degrees (do 3 X 15), and

Function

Walking

Walking should now be with a regular normal gait pattern. More time can be spent off the crutches. You should now try going for 2 x 10 minute walks as a minimum. Use crutches for uneven ground, or when in congested places.

- ✓ Walking sideways, in good floor space 10 -20 steps, 3 times per day.
- ✓ Walking backwards 10 -20 steps, 3 times per day.
- ✓ Walking heel to toe, walking with a high knee lift and in front of a mirror should also be practiced.

Cycling

- ✓ You can start endurance training on the stationary cycle when you have 90 degrees of flexion. Keep the pressure low, turning the legs rather than loading them (10 minutes at about level 2 of 20 on the lifecycle).

Control and Balance Exercises

- ✓ Improve time standing on one leg and if confident start to close eyes for short periods.
- ✓ Standing and locking your knee back is good for control and ROM. Repeat 10 times every 2 hours.
- ✓ Single leg heel raises (2 x 10). Trying to straighten your knee and lift our heel off the floor.
- ✓ Some limb matching exercises (your physiotherapist will describe these to you).

Other exercises

After all exercise sessions and walking activities, ice your knee joint as described above and rest with the knee elevated. This is very important. With a swollen joint, you will not be able to proceed to the next stage.

If full ROM and other goals have been met then strengthening may progress.

5. Stage Three to the End of Week Four (2-4 weeks)

The immediate goals include:

- a. Formal strengthening with supervision can commence.
- b. Continue to increase ROM, flexion should now be 130 or more and extension full.
- c. Increase walking to 30 minutes, and being able to change directions and walk sideways and backwards without difficulty.
- d. Improve balance and knee joint awareness.
- e. Increasing endurance

To achieve these goals:

Strength

Same as week two, now add:

- ✓ Step downs from a small step or wedge, single leg (3 X 15, with 90 seconds rest between sets) .
- ✓ Leg extension (3 X 15, with 90 seconds rest between sets). The shin pad should be placed higher than normal towards the knee to avoid any chance of stress at the ACL graft. Load should be small.
- ✓ Leg curl (3 X 15, with 90 seconds rest between sets). If you have had a hamstring graft then take a little longer building up to this exercise as the hamstring is still in process of healing.
- ✓ Leg Press (3 X 15, with 90 seconds rest between sets).
- ✓ Calf raiser with knee straight and bent (3 X 15, with 90 seconds rest between sets).
- ✓ Hip abduction, flexion and extension (1-2 X 15, with 90 seconds rest between sets).

Note; some of these are gym based exercises but good alternatives can be found for a home program. It is best to start with both legs but **quickly progress to all single leg strengthening exercises.**

Function and Endurance

- ✓ Walking can be progressed including changes in direction, speed, endurance (30 minutes) constant walking.
- ✓ Cycling: Daily if possible, moderate to low resistance up to 20 minutes. Once this is achieved progress to interval type training.
- ✓ Stepper and or cross trainer can be introduced.
- ✓ Swimming: Can be used to supplement training. Avoid any frog like kicking, keeping to free style and back stroke. Your physiotherapist can make specific recommendations.

Balance Exercises

- ✓ Improve time standing one leg to at least 30 seconds and if confident start to close eyes for longer periods.
- ✓ Standing on the wobble board or bosu ball (see your physio as these exercises should be supervised) .
- ✓ Limb matching exercises (see your physiotherapist).

Other exercises

- ✓ There are other exercises you could do at this stage. These can be supervised by your physiotherapist, and include upper body and core strengthening programs.

6. Stage Four to the End of Week Ten (4-10 weeks)

Note: This is the period where your graft is at its weakest and extra care should be taken. Try to avoid situations where you can unexpectedly twist or pivot on your knee.

The immediate goals include:

- a. Progress and consolidate the strengthening, endurance and coordination.
- b. Increase walking to 45 minutes and be able to change direction, stop and start quickly and go up and down stairs with good gait.
- c. Avoid damage to the graft as this is when it is at its weakest.
- d. Improve strength of quadriceps to around 70% of the other leg.

To achieve these goals:

Strength

Over these weeks, repetitions are lowered and the load is increased progressing slowly toward 3 x 8-10 repetitions with rest intervals of 2-3 minutes between sets.

- ✓ Step downs from a small step or wedge, single leg (3 -4 X 8-10, with 2-3 minutes rest between sets). You can add a small weight on the opposite side to increase resistance and hip control.
- ✓ Leg extension (3 -4 X 8-10, with 2-3 minutes rest between sets).
- ✓ Leg curls (3 -4 X 8-10, with 2-3 minutes rest between sets). If you have had a hamstring graft than take a little longer building this exercise as the hamstring is still in process of healing.
- ✓ Leg Press (3 -4 X 8-10, with 2-3 minutes rest between sets).
- ✓ Lunges or split squats can be added as an alternative to leg press.
- ✓ Calf raiser with knee straight and bent (3 -4 X 8-10, with 2-3 minutes rest between sets).
- ✓ Hip abduction, flexion and extension (1-2 X 15, with 90 seconds rest between sets).

Function

- ✓ Walking progressed including hills, uneven ground, steps and stairs (30 -40 minutes), increase speed and backward walking pace. Add figure 8s, squares, swerves, stops and starts, as described by your physiotherapist
- ✓ Cycling for endurance: Add load with the aim to be cycling for 30 minutes at an intensity that leaves you sweating mildly and slightly out of breath (65 – 80% of your maximum heart rate).
- ✓ Stepper and or cross trainer. Regimes should focus on endurance (10-20 minutes at 65 – 80% of your maximum heart rate).

- ✓ Jogging: Can start week 8 with straight line jogging only, and with supervision of running style. Include walk to jog progressions, no speed or direction changes. It is important your physiotherapist observe and coach your running style to reduce load through the knees.

Balance and coordination Exercises

- ✓ Improve time standing one leg and if confident start to close eyes for longer periods and progress to moving the upper limbs to create more challenge to the balance system. This can be further progressed by holding a small weight in your arms as you move them around.
- ✓ Standing on wobble board or bosu ball, also using limb movements and arm weights for progressions. Also you can try some easy jumping exercises. Jump off the bosu ball landing on your mid foot with knees slightly bent, absorbing shock through the limb. You can also jump from the floor to the ball. Repeat 10 times.
- ✓ Agility exercise can be progressed in terms of their intensity. These include figure eights, cutting and turning, carioca, running backwards, and high knee running drills.

Other exercises

At this stage your therapist can progress your core and upper body regime. However this should be very basic as total time in the gym should not be much more than 50 minutes. Some work or specific exercises maybe appropriate if your physiotherapist advises you.

7. Stage Five to the End of Week 16

At this stage intensity increases in all areas of strengthening, walking and balance. Add speed direction changes to running. Start some sport and work specific training under supervision if possible. Jumping exercises can be included. Training should focus on improving function and reducing re-injury.

The immediate goals include:

- a. Quads should be 80-90% of the opposite limb.
- b. Running should be normal gait.
- c. Sports and work specific drills need to be commenced.
- d. Endurance increased.

To achieve these goals:

Strength

Over these weeks, repetitions are lowered again in some exercises and the load is increased, progressing slowly toward 4 x 6-8 repetitions with rest intervals of 2-3 minutes between sets. **It is important at this stage to strengthen the lower limb using single leg exercises.**

- ✓ Leg extension (4 X 6-8 with 2-3 minutes rest between sets).
- ✓ Leg curls (4 X 6-8 with 2-3 minutes rest between sets).

- ✓ Leg Press (4 X 6-8 with 2-3 minutes rest between sets). Squats or dead lifts can be added with supervision (4 X 6-8 with 2-3 minutes rest between sets).
- ✓ Calf raiser with knee straight and bent (3 -4 X 8-10, with 2-3 minutes rest between sets).
- ✓ Hip abduction, flexion and extension (1-2 X 15, with 90 seconds rest between sets).

Function

- ✓ Walking and the walking exercises for agility/control should be progressed in terms of intensity or pace.
 - ✓ Cycling for endurance: Same as previous trying to increase intensity. No limitations on duration.
 - ✓ Stepper and or cross trainer. Same as previous trying to increase intensity. No limitations on duration
- Jogging: Direction changes should be incorporated. Depending upon your sport this may also include some light interval training. Your physiotherapist will assist you with this.

Balance and coordination Exercises

- ✓ All previous exercise regimes continued and progressed (your physiotherapist will help).
- ✓ It is good to add a formal jumping regime such as the PEP program.
- ✓ Jumping exercises include, single hop for distance, 6 meter timed hop, triple hop for distance and cross over hop for distance

Other exercises

At this stage your therapist can progress your core and upper body regime. However this should be very basic as total time in the gym should not be much more than 50 minutes.

8. Stage Six to the End of Week 26

Progress adding in alternatives to previous exercises, using more free weights and starting power work. Make sure your work is now specific towards your goals. This is a good time to use an advanced rehab program or a trainer focusing on performance. At the end of this stage you should be ready to return to pivoting sport.

The immediate goals include:

- a. Quads should be 90 -100% of the opposite limb.
- b. Running should be normal gait.
- c. Sports and work specific drills should be focused on return to sport, with return to sport possible at 6 months.
- d. Familiarity with warm up drills, and commencement of a preventative regime such as the PEP program for neuromuscular retraining.

To achieve these goals:

Strength

Over these weeks, repetitions are lowered again in some exercises and the load is increased, progressing slowly toward 4 x 4-6 repetitions with rest intervals of 2-3 minutes between sets, some of these can include speed or power.

- ✓ Leg extension (4 X 6-8 with 2-3 minutes rest between sets).
- ✓ Leg curls (4 X 6-8 with 2-3 minutes rest between sets).
- ✓ Leg Press (5 X 4-6 with 2-3 minutes rest between sets).
- ✓ Squats or dead lifts can be progressed with supervision (2 X 6 2-3 minutes rest between sets, power development can be included by increasing speed on the up movement).

Function

- ✓ All exercise progress in intensity and duration.
A sports or work specific regime needs to be implemented, aiming at return to function at around 6 months.

Balance and coordination Exercises

- ✓ All previous exercise regimes continued and progressed (your physiotherapist will help).

PHYSIOSOUTH