1. Pre-op Phase: Injury recovery and readiness for surgery

Goals: Eliminate swelling and regain full range of motion

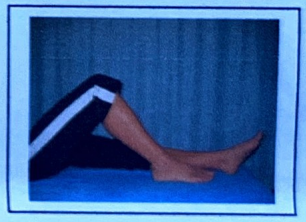
2. Recovery from surgery:

Goals: Full knee extension, swelling down to mild, increase quadriceps motor control

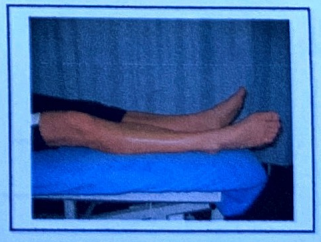
1) **Ankle Mobility-** Move ankle up and down and in circles at a moderate speed. Repeat half hourly for 30 seconds whilst resting.



2) **Knee Flexion-** Gently bend the knee by sliding the heel towards your bottom. Slowly relax into the straightened position again. You may need a plastic bag under the foot to help it slide.
Repeat ___times



3) **Static Quadriceps-** With the foot rotated slightly outwards, push your knee back into the bed and tighten the front thigh muscle. Repeat ___times



4) **Co Contractions-** Bend the knee to about 30°, turn the knee slightly outwards and dig the heel into the bed. At the same time try to tense the quadriceps muscle (on top of the thigh). Feel with your hand that the muscle is contracting if you like. Repeat ___times



5) **Prone Knee Hangs-** Lying over the edge of the bed with a rolled towel placed under your thigh, allow your knee joint to relax and straighten. Hold for 30 seconds and repeat 5 times.



6) **Active Knee Bends-** Lie on your tummy and rest your thigh on a rolled towel. You then use your leg that hasn't been operated on to help the other one to bend up to 90° maximum but as far as comfortable. Repeat ___times



7) **Knee bends-** Sit over the edge of the bed/on a high chair and use your good leg over your operated leg to gently swing the heel back and forth 20 times at a slow to moderate pace.
Repeat ___ times



8) ***Seated VMO-*** In sitting, with both knee over little toe and in contact with the floor, push down firmly into the floor and tighten your thigh muscle on top (quadriceps) as well. Do not bend your knee past 90°. Repeat ___times



Exit Criteria for Phase 2: Recovery from surgery

- 0 degrees passive knee extension
- 125 + passive knee flexion
- 0-1+ Stroke test
- 0 – 5 degrees Quadriceps lag test

Phase 3: Strength and Neuromuscular control

Goals: Good Single leg balance, muscle strength, and good single leg squat technique

1. Bridging- Lie on your back and squeeze your buttocks together so that your bottom lifts off the ground. Hold for 10 seconds and then return to starting position. Repeat ___times



-Progress to single Leg Bridge when able

2. Standing Hamstring Curl- Hold onto something in front of you in standing and bend your operated knee up to 90°. Hold for 20 seconds and then slowly lower back down.
Repeat ___times



3. Lunges- In standing place your operated leg in front with the thigh and toe pointed outwards. Slowly take your weight over the front foot so that your knee bends to about 30°. You can feel the front of your thigh to make sure that the quadriceps muscle is contracting. Repeat ___times



4. Squats- Stand with your feet shoulder width apart and slowly bend your knees to about 45° so that they move over the centre of your foot. Hold this for 10 seconds. Repeat ___times



5. Step Ups- Place operated leg up onto a small step with the foot and thigh turned slightly outwards. Take your weight over the operated leg. Slowly straighten this leg, lifting your good foot off the ground about 20cm. Hold for 10 seconds and slowly lower yourself back down.
Repeat ___times



6. Balancing- Standing on operated leg with it very slightly bent, slowly lift your good leg off the ground. Hold it for 20 seconds if able. Once this becomes too easy you can try doing the same exercise with your eyes closed



Progress single leg balance exercises as able

7. Double leg calf raises → Progress to Single leg calf raises- Standing with heel over step, put weight onto forefoot and push up.

8. Abduction- Stand with a rubber band around your ankle on your good foot. Pull the band to the side bringing your operated leg away from your body. Reverse feet. Repeat ___times



9. Adduction- Stand with a rubber band around your ankle on your good foot. Pull the band by crossing your operated leg in front of the other leg, keeping it straight. Reverse feet.
Repeat ___times



10. Extension- Stand with a rubber band around your ankle on your good foot. Pull the band by taking your operated leg out behind you, keeping the knee straight. Try not to arch your back! Reverse feet.
Repeat ___times



11. Hamstring Curl With Resistance- With elastic band firmly under your good foot, perform knee bends with looped end over foot to add resistance.
Repeat ___times



Other exercise options

1) **Swimming-** This can be begun as your surgeon allows and only using your upper body. Legs can be held together with a float to prevent kicking.

2) **Cycling on a Stationary Bike with Toe Clips-** Ask your physiotherapist if there is one available for you to use. With knee always slightly bent, cycle for 15 minutes at a time. Use no resistance or a very low resistance.



Remember- Your graft is at its weakest at 8 weeks so be careful to only stick with the given program. If you are experiencing pain with any of these exercises please consult your physiotherapist who will adjust your technique if necessary.

Exit Criteria for Phase 3:
Strength and Neuromuscular control

- 0 score on Stroke test
- Single leg calf raises >85% vs. contralateral
- Functional alignment test: 5 x single leg squat test (= 'Good')
- Unipedal stance test (eyes open: 43 sec, closed: 9 sec)
- Single leg bridge strength (20 reps) and endurance test (30 sec) and >85% contralateral

Phase 4: Running, agility and landings

Goals: Hopping performance, agility program introduced, modified game play, full strength/ balance

Squats can be progressed to performance on foam or a wobble/tilt board. Throwing and catching can be practiced in these positions to gradually increase the amount of perturbation. Your brace must be worn if your surgeon has advised this- and for as long as they deem necessary.

Preparation for jogging

1) **Walking and Running in Water-** Putting full and even weight through both legs and adopting a style as normal as you are able.

2) **Power Walking Along Beach-** To exercise your leg muscles, maintain fitness and keep up some balance and proprioceptive activities.



3) ***Swimming With Normal Kick-*** To maintain fitness and exercise against the resistance of the water. No breaststroke.

4) **Road Bike-** Cycling with a road bike to keep up fitness levels. A toe clip should be fitted on the operated side but leave the good side free to use if necessary.

5) **Begin hopping exercises as directed by your Physiotherapist**

6) **Running-** Commence running when exit criteria for Phase 3 is met. Begin with walking each day and then slowly introduce jogging, monitoring the effects on the day after and increasing the distance if there were no apparent ill effects.



A good way to begin training again is to choose an oval and begin doing laps. After each length of the oval, walk the corners. Similarly if jogging is resumed, walk after every 200m or so and relieve the pressure within your knee for a few minutes.

Further Leg Strengthening- Using gym equipment available, a general strengthening program can be put in place by your physiotherapist. Emphasis is on exercises with the feet kept on the floor to mimic forces in the knee when you walk and run.

- Leg press
- Romanian deadlift
- Squat and single leg squats



Jogging Agility Exercises- Jogging can be challenged by:

- Running in large circles and then progressing to smaller circles.
- Can also jog in figure 8s and increase the pace.
- High knee running
- Zig zag running
- Dodging and cutting
- Bounding

Your physiotherapist can perform a simple knee test at this stage to determine the focus of your rehabilitation from here on. Hopping tests are most often used with your operated leg compared to your good leg. If strength is the problem then the focus needs to be on more weights and functional strengthening but it is more likely that focus will shift to sports specific running and fitness skills.

1) **Sprints-** Practise starting from a line and taking off up to maximal speed and then slowing down

2) **Kicking-** Kicking using both legs and regaining strength in this area (if necessary for return to your sport).

Exit criteria for Phase 4: Running, agility, and landings

- Single leg hop test
- Triple hop test
- Triple cross over hop test
- Side hop test
- Single leg squat (>22 repetitions both limbs)
- Cooper & Hughes Sports Vestibular Balance Test = Pass on both limbs
- Star Excursion Balance Test (Gribble et al, 2012) >95% vs. contralateral side

Phase 5: Return to Sport

Goal 1: Return to most activities undertaken during sport but eliminate contact activities. Full training can be resumed with any sport but at a non-contact level. Running drills, fitness exercises, kicking, marking, throwing and basket shooting can all be included in training.

Goal 2: Achieve >95/100 Melbourne Return to Sport Score (Cooper & Hughes)

Examples of activities: Discuss with your Physiotherapist

- Kicking (both legs), with both a running start and a standing start
- "Suicide" runs
- Running and catching drills and these can ideally incorporate throwing (depending on your sport)
- Jumping practice, either incorporated with throwing and catching or in a static position
- Dancing for fitness as long as your therapist approves of the movements involved with your chosen field (i.e. ballet may require a longer term of rehabilitation due to twisting and high level muscle activity during many of the moves)

Criteria for a successful return to sport

Exit Criteria: >95/100 Melbourne Return to Sport Score (Cooper & Hughes, 2018) which is based on the following sections;

Clinical examination: *Pivot-shift test, *Prone hang test, *Effusion, *PROM flexion

Functional testing: Dynamic/vestibular balance tests as above Single leg rise test (90deg flexion) *Single hop *Triple hop *Triple cross over hop test *Side hop

Fatigued state (7/10 VAS scale): Single hop, Triple hop, Triple cross over, Side hop

General fitness tests: Pass/Fail sport specific (Yoyo test, beep test etc.)

Questionaries: *IKDC Subjective Knee Evaluation *ACL-RSI *Tampa Scale of Kinesiophobia.