



## ACL RECONSTRUCTION

This handout describes details of the post-operative care of your knee. The rehabilitation of your knee after surgery is essential for the success of your treatment. Your surgeon and physiotherapist will advise you on the specifics of your rehabilitation, but the ultimate responsibility to exercise consistently is yours.

The main goals of rehabilitation are:

1. Healing of the ACL graft
2. Restoration of full knee motion
3. Restoration of knee strength and function



## PHASE 1: (WEEKS 0 – 2) INITIAL POST-OPERATIVE PHASE

Goals:

1. Control of pain and inflammation
2. Regain full extension (straightening) of knee
3. Actively bend knee to 90°

*Control of pain and Inflammation: "RICE"*

1. REST: as much as possible when not doing rehabilitation
2. ICE: 10-15 min as required, especially after exercising
3. COMPRESSION: Keep tubigrip bandage on if significant swelling still present
4. ELEVATION: Keep leg elevated on stool or couch whenever sitting if still swollen

You have also been given medication to help with the pain, take the paracetamol and anti-inflammatories regularly and the stronger medication as needed in addition to the others. They work together for a greater effect.

*Wound Care:*

There is a waterproof dressing on the skin, this remains undisturbed until clinic review. Some oozing can be expected in the 1<sup>st</sup> 24 hours. This is normal. After 24h, the loose dressings under the tubigrip can be discarded. You can shower over the waterproof dressing and pat it dry with towel. Reapply the tubigrip after showering.

If you have had a meniscus repair and are in a brace, this may be taken off for sleeping and showering. You can rest your foot on the ground, but support most of your weight with the crutches. Exercises will be commenced after the first clinic visit.

*Things to watch out for:*

Contact the clinic if you have a significant amount of **ongoing oozing** or bleeding after the first 24h, or if you have **worsening swelling and pain** in spite of RICE, taking your painkillers and decreasing exercise intensity



## PHASE 1 EXERCISES

## 1. Gravity-assisted extension

Place rolled towel behind ankle, allow gravity to stretch knee into extension.

Hold for a minimum of 1 minute, up to 5 minutes if tolerated



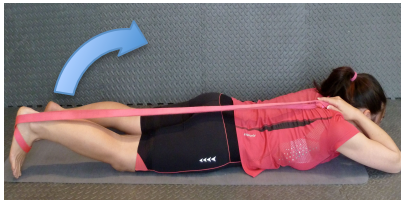
## 2. Assisted knee flexion and extension: seated

Starting with leg comfortably bent, gently straighten using other leg to assist. Hold in stretch for 30 sec, return to starting position, then, using your other leg to pull the operated leg back as far as comfortable. Hold 30 sec, then return leg to starting position



## 3. Prone knee flexion

Lying on your stomach, bend the operated knee using the other leg. *Slowly* lower the leg, using your non-operated leg to assist as required to control speed. Perform 5-10 reps



## 4. Assisted knee flexion and extension: prone

Starting with leg straight, gently pull the operated leg back up towards the buttock, use your other leg or a towel to assist

Hold for 5 sec, then use other leg to assist lowering leg slowly to floor again



## Walking

- Concentrate on trying to walk with a normal movement while on crutches. Developing a normal walking pattern is more important than trying to get off the crutches quickly.
- Gradually wean off crutches as tolerated, wean off operated side crutch first.
- Continue to use crutches when on longer walks or in crowds etc



## PHASE 2: (WEEKS 2-4) WALKING PHASE

## Goals:

1. Control swelling
2. Maintain full extension (straightening) of knee
3. Actively bend knee to 120°

Physiotherapy can be commenced at this point to help with the rehab exercises. The most important focus initially is on regaining full extension (without hyperextension). Once this is done, more emphasis can be placed on the other exercises.

If you are getting ongoing swelling and discomfort, continue with the icing and elevation, especially after rehabilitation sessions. Doing your rehab: continue with all of the phase one exercises and add in the phase 2 exercises.

Each phase of the rehabilitation from this phase on is divided into:

- Range of motion (stretching) exercises
- Strengthening exercises
- Proprioception (co-ordination and balance) exercises
- Functional activities

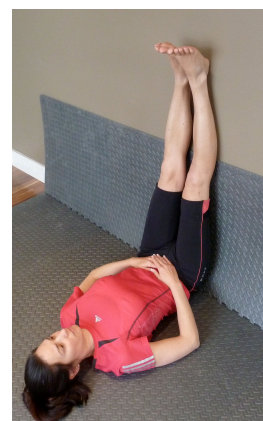
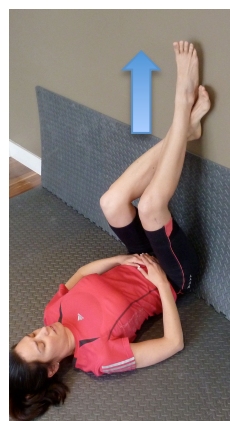
## RANGE OF MOTION: PHASE 2

Perform range of motion (ROM) exercises until you feel a mildly uncomfortable pulling or tightness. Do not bounce at the end range, rather apply persistent gentle pressure during the count. **Stop before the stretch is really painful.** Unless otherwise specified, maintain the stretch for a minimum of 30 seconds and repeat 3 times.

Avoid hyperextension (straightening past 0°) of the knee. This puts excessive pressure on the reconstructed ACL.

*1. Wall slides*

Lie on floor with feet up wall and knees nearly straight, slowly allow feet to slide down wall, bending knees. Hold for a minimum of 30 sec. Use non-operated leg to assist straightening operated leg.





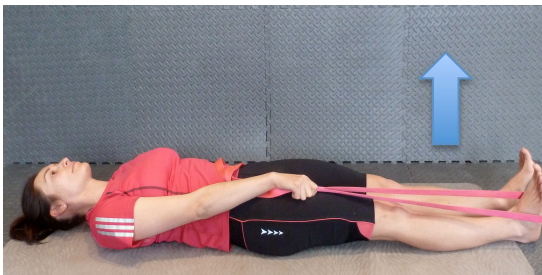
## 2. Calf stretches

While seated, use a strap to pull ankle up as far as possible. Start with the knee straight, hold 30 sec. Repeat with the knee bent. Once fully weight-bearing, this exercise can be performed standing by pushing the heel into the ground and leaning body forward to provide stretch to calf.



## 3. Hamstring stretches\*

Lying on back with leg straight, using the strap to assist gently lift the operated leg up in the air, pulling will be felt in the back of the thigh. Hold 30 sec, then slowly lower, repeat 3 times



## STRENGTHENING PHASE 2

All exercise should be performed at least 2 times per day.

Start with one set of 10 repetitions, increase reps and number of sets as tolerated

Perform strengthening exercises equally on both legs, not just the operated one.

Movement should always be smooth. Slow and under control. Concentrate on good form with the exercise, rather than on increasing the resistance or number of repetitions.

## 1. Hamstrings: Series I\*

Using progressive resistance elastic tubing.

Attach tubing to a mid-shin level support, start with a near straight knee. Use hamstring to bend knee. Support the return to extension with your other leg to avoid sudden knee extension.



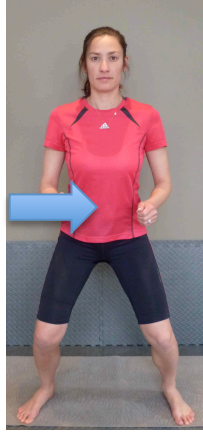
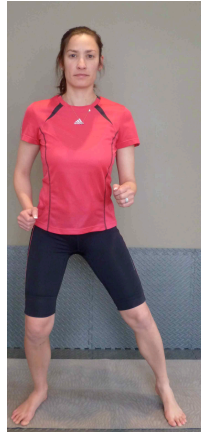
\* If you received a hamstring ACL, go gently with the stretching exercises, and avoid starting the strengthening exercises for 4-6 weeks post op to avoid reinjuring the hamstrings muscle.



## 2. Quadriceps Series 1:

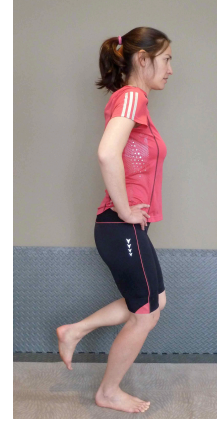
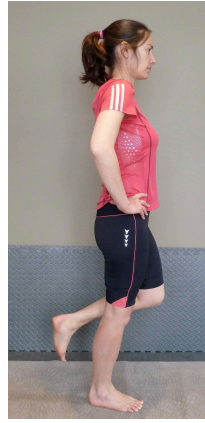
### A. Weight shifting

Stand with weight on non-operated leg, gradually transfer weight onto operated leg. Increase to full weight as tolerated. Initially use some support, eg a table edge, then progress to performing exercises unsupported.



### B. Double and single leg squats

Start in full extension and bend slowly to a maximum of 40°. Once performing double leg unsupported, progress to single leg.



## 3. Hip Strengthening series I

Using progressive resistance elastic tubing. Attach tubing to a knee level support and place at just above knee, keep knee slightly bent throughout movement. 3 different exercises:



Abduction (moving leg outwards)



Adduction (across the body)



Extension (move leg backwards)



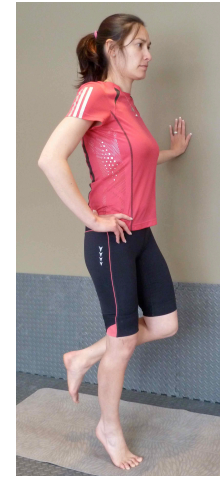
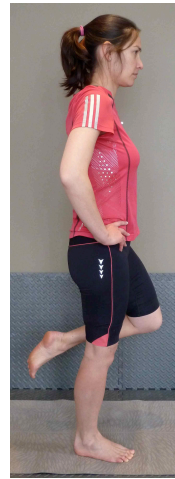
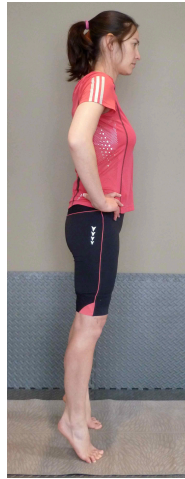
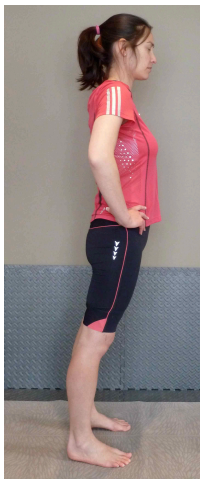
#### 4. Bridging I

Lie on your back on the floor. Bend knees to 90° with your arms at the side  
Lift pelvis off the floor, hold for 10 seconds, then slowly lower to the floor  
Repeat 5 times



#### 5. Calf raises

Start with your legs in full extension (straight knees).  
Rise up onto tip toes and then return back to the ground. Slow controlled movement up and down.  
Once comfortably performing double leg unsupported, progress to single leg raises. You can use a wall or table to steady yourself if required.



### BALANCE AND COORDINATION EXERCISES: PHASE 2

Perform easy stance and single leg stance exercises as described in the section and the end of this booklet.

### ACTIVITIES: PHASE 2

1. Walking
  - Continue to wean off crutches, walk outside up to 20-30 min per day
  - Commence backwards walking and sideways stepping exercises
2. Exercycle
  - Once able to bend knee to 90°, raise the seat if necessary, resistance on the lowest setting, so you are not pushing hard on the pedals.
  - Pedal forwards and backwards, start at 5 min and build up to at least 20 min /day
3. Swimming pool
  - Chest deep walking
  - Swimming (arm-dominant – ie no kicking and no breaststroke)



## PHASE 3: (WEEKS 4 – 8) INTERMEDIATE REHABILITATION

## Goals

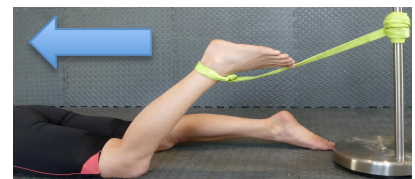
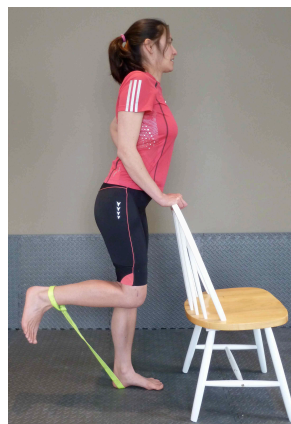
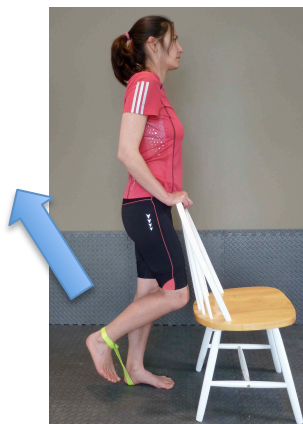
1. Eliminate swelling
2. Achieve full range of motion
3. Perform all normal daily living activities
4. Return to work (all jobs except heavy manual labour)

During this period you will increasingly be able to perform your normal daily activities, while continuing with your rehabilitation. **Continue doing the range of motion exercises from the earlier phases** and add in the phase 3 exercises. These should be performed **at least one session per day**. In addition, duration and intensity of exercycling, walking and swimming can be increased as described.

## STRENGTHENING EXERCISES: PHASE 3

1. *Hamstrings: Series II*

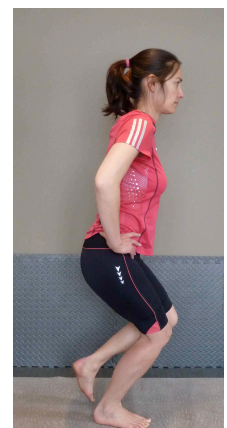
1. Standing: Have resistance band secured at ground level and attach other end to ankle.
2. Prone: Lying face down. Resistance band secured as shown.
3. Slowly flex knee to bring foot as close to buttock as possible. Lower back down slowly in a controlled manner. Do 3 sets of 10 repetitions.

2. *Quadriceps: Series II*

Single leg  $\frac{1}{4}$  squats progressing to  $\frac{1}{3}$  squats ( $\frac{1}{3}$  squat shown in photo).

Up to 20 repetitions per set for 5 sets.

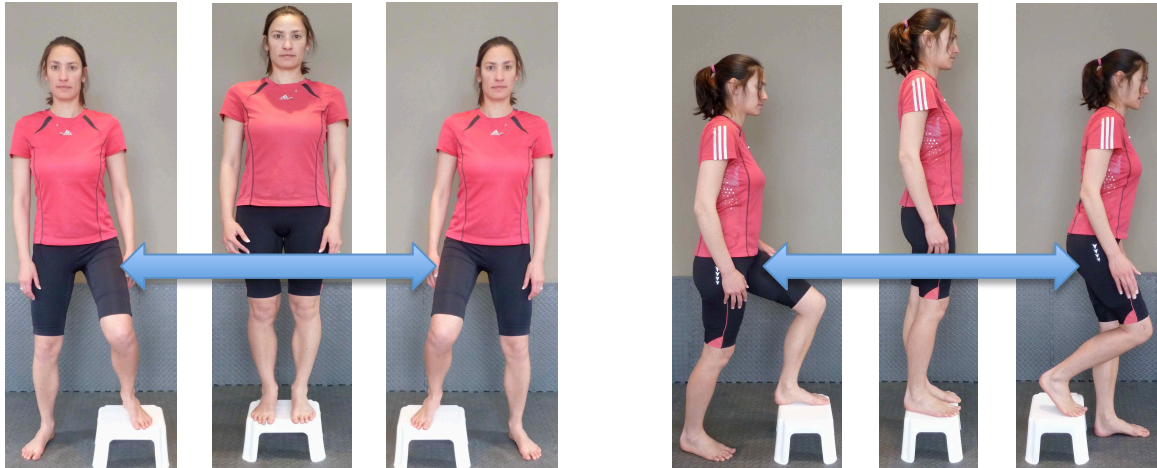
Once performing this easily, hand weights or resistance bands under the feet and held in both hands can be used to increase workload.





### 3. Step-ups:

These should be done forwards, backwards and from side to side. Alternate leading with the operated and non-operated leg. Start with a 10cm step and gradually increase it to 30cm. Do 3 sets of 20 step-ups in each direction



### 4. Hip strengthening series II

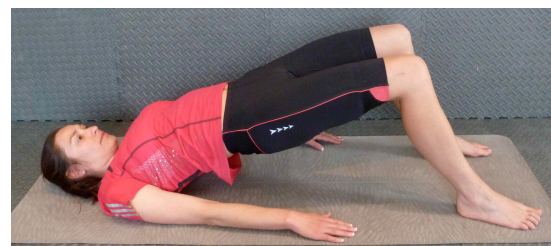
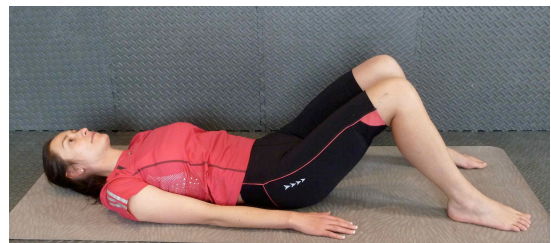
This is simply a progression of Hip Strengthening series I. Use a higher resistance band, and increase the number of repetitions. Keep the knee slightly bent throughout the movement.

### 5. Bridging series II

Set up as for Bridging I,

Raise your pelvis off the ground, then while maintaining this position, straighten one knee, so that the foot comes off floor. Once your leg is fully straight, hold for 5-10 sec, slowly lower foot, then repeat for the other side.

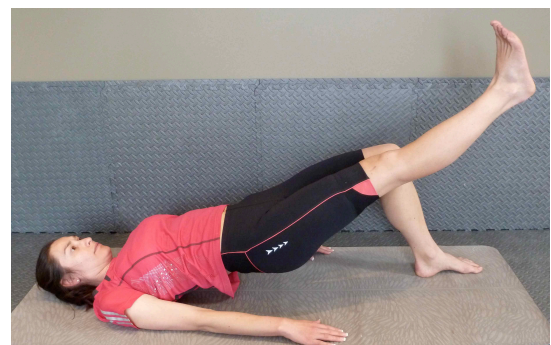
3 sets of 5 repetitions



### 6. Calf Raises series II

As for double leg calf raises, but perform on a single leg. Slow, controlled movement up and down.

A hand can be placed on a wall for stability if required.





### BALANCE AND COORDINATION EXERCISES: PHASE 3

---

- Perform 2 sets of 5 minutes each daily
- Single leg stance exercise, eyes closed
- Functional stance exercise, eyes open
- Wobble board – double leg, progressing to single leg if able to do so comfortably

### ACTIVITIES: PHASE 3

---

#### 1. Walking

Walking outside up to 45 min per day

Can commence walking figure 8s and swerves

#### 2. Jogging (after 8 weeks – see return to running program)

Gradually introduce straight line gentle jogging on treadmill or in protected environment

#### 3. Exercycle

Low to moderate intensity and speed

Increase time to 30 min or more

Lower seat to aid knee flexion as tolerated

#### 3. Swimming pool

Easy aquajogging

Chest deep walking, include sideways and backwards walking

Swimming with easy flutter kick (no breaststroke)





### BALANCE AND COORDINATION EXERCISES: PHASE 3

- Perform 2 sets of 5 minutes each daily
- Single leg stance exercise, eyes closed
- Functional stance exercise, eyes open
- Wobble board – double leg, progressing to single leg if able to do so comfortably

### ACTIVITIES: PHASE 3

#### 2. Walking

Walking outside up to 45 min per day

Can commence walking figure 8s and swerves

#### 4. Jogging (after 8 weeks – see return to running program)

Gradually introduce straight line gentle jogging on treadmill or in protected environment

#### 5. Exercycle

Low to moderate intensity and speed

Increase time to 30 min or more

Lower seat to aid knee flexion as tolerated

#### 4. Swimming pool

Easy aquajogging

Chest deep walking, include sideways and backwards walking



#### Goals

1. Maintain full range of motion
2. Improve muscle strength
3. Improve balance and proprioception
4. Improve agility

Swimming with easy flutter kick (no breaststroke)

### PHASE 4: (WEEKS 9 – 16) STRENGTHENING & CONTROL

At this stage, you should continue the strengthening and introduce some more dynamic co-ordination activities as described below. At no stage during the progression through strengthening should you experience an increase in pain or swelling. If this occurs, you need to discuss it with your physiotherapist. Initially decrease to the exercises that did not provoke symptoms and return to icing the knee after exercising

### RANGE OF MOTION EXERCISES: PHASE 4

Use the phase 1, 2 and 3 exercises at least once per day

Continue as much as required to attain and maintain ROM goals

### STRENGTHENING EXERCISES: PHASE 4

Hamstring series II

Quadriceps standing series II and III



#### BALANCE AND COORDINATION EXERCISES: PHASE 4

- Single leg stance exercise, eyes closed
- Functional stance exercise, eyes closed
- Wobble board – single leg

#### ACTIVITIES: PHASE 4

1. Walking
  - Walking outside unlimited, gradually progress to uneven ground as tolerated
2. Exercycle
  - Increase intensity and duration as tolerated
  - Road cycling (flat roads) as tolerated
3. Jogging
  - Increase as tolerated by adding sideways and backward jogging
  - Figure 8 and square jogging from week 12 at 50-57% speed, once comfortable with straight line
4. Swimming pool
  - Swimming with flutter kick (no breaststroke)
  - Flutter board

#### Goals

1. Graduated return to sport-specific training
2. Return to non-pivoting and non-contact sports
3. Eventual return to pivoting and contact sports after minimum 6 months

#### PHASE 5: (WEEKS 4 – 6 MONTHS) RETURN TO SPORT

##### EXERCISE PROGRAM

ROM exercises should be completed as part of the daily training to maintain flexibility

The strengthening exercises can be exchanged for sport-specific strength work once quads and hamstrings strength are back to at least 80% of the normal leg.

Continue the agility drills, increasing the speed and intensity.

Continue the balance and co-ordination drills.

You can return to sport-specific activities once you can:

- Do a maximum effort jump without pain or instability
- Hop test >75% other side
- Figure 8s run without difficulty at 75% speed
- Rate your knee function as better than 80% normal

*Sport-specific activities include:*

- Sprinting
- Sudden direction changes when running
- Pivot and drive in basketball
- Kicking in soccer or rugby
- Spiking in volleyball



## BALANCE AND COORDINATION EXERCISES

### 1. Early standing exercise

Hold table for balance, take weight on operated leg and stand with knee as straight as possible.

3-5 reps of 30 sec each with 1-2 min rest between sets

Once comfortably performing this. Lift hand from table to stand unsupported.



### 2. Single leg stance exercise

If comfortable with early standing exercise, progress by flexing the knee to 30° balanced on single leg and then extending again. 3 sets of 10 reps.

Once comfortable with this, start swinging your other leg back and forward to mimic a slow motion running action. 3-5 sets of 10 reps

### 3. Functional stance

In single leg stance, perform the following actions. Do sets of 30-60 seconds per action

1. Perform arm circles in both directions
2. Raise other knee and swing it back and forward
3. Lean body forward, backward and to each side while maintaining balance



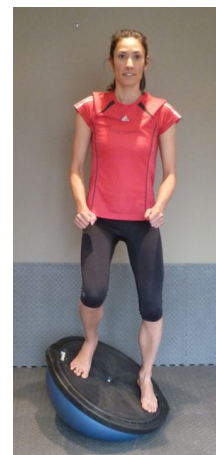
### 4. Wobble board

Start with double leg wobble board or Bosu ball with feet wide apart.

Initially, aim to keep balanced with the edges of board off the ground for 30 sec.

Once successful, progress to placing feet closer together, then move to single leg stance.

Once comfortable in single stance, begin performing functional stance exercises as shown above.

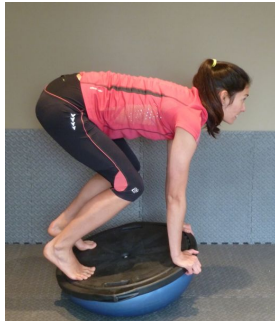




### Crouch and extended leg crouch exercise

Crouch on a large wobble board or Bosu ball as shown.

Without letting the edges touch the ground, tilt the surface in different directions. Once comfortable doing this, lift and extend the non-operated leg and repeat the tilting movements.



Initially continue for 30 seconds. Gradually extend the time to 1 minute or more.

### WALKING AND JOGGING EXERCISES

1. Concentrate on walking normally in a straight line with no limp, then progress to backwards and sidestep walking (not crossovers).
2. Once comfortable with this, progress to figure 8s, squares and swerves
3. When able to complete all walking exercises well, straight line jogging can be initiated, once comfortable and confident, progress through agility drills as above
4. Knee pain or swelling should not occur with these exercises (some post-exercise aching is acceptable)

#### Figure 8s

Start with 20 meter long "8s".

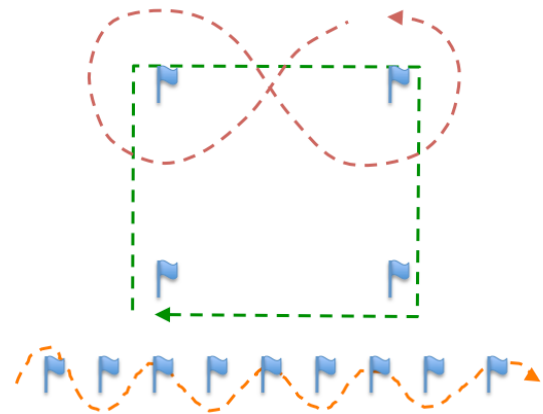
Once confident, increase speed and decrease the length gradually to 5 meters.

#### Squares

Start with 20 meter squares. Walk 5 circuits in one direction, then reverse direction.

Decrease side length and increase speed once confident

#### Swerves



### WHEN CAN I RETURN TO SPORTS?

Usually return to pivoting or contact sports is a minimum of 6 months of rehab. Additionally, in order to minimize the chances of reinjury, you should have:

- No functional complaints
- Quads and hamstrings strength at least 80% of the contralateral side
- Confidence when running, cutting and jumping at full speed
- 85% contralateral values on a single leg hop test

Complete a return to sport assessment to determine whether you are ready to get back into it or not.