



British
Orthopaedic
Association



Anterior Cruciate Ligament Reconstruction (ACLR)

Introduction

We know that you are currently experiencing a long wait for your anterior cruciate ligament (ACL) reconstruction operation and that this can be very difficult.

We have developed this advice and information to help support you whilst you wait. It is designed to help you manage your symptoms, to help prevent these from getting worse and help you prepare for the operation. It also provides information about what you should do if your symptoms do worsen.

This guide has been written by the national experts in ACL reconstruction and rehabilitation and draws on the latest evidence and advice about how best to support people waiting for your procedure.

It includes links to advice and information which you can click on if using online, and details with regard to helplines and other supportive websites.

You can also download and print this support guide and share with your family, friends and carers.

Waiting for your anterior cruciate ligament reconstruction

Our [pain management resource](#) includes advice to help you manage your ongoing pain. Prolonged waiting can create [worries about money](#), [difficulties if you're a carer](#) and can impact your [mental health](#). Have a look at these links on this web platform for further advice and support if needed.

Maintaining a balanced diet and a healthy weight can also help. The Versus Arthritis [eating well with arthritis](#) information is worth a look. The NHS [lose weight](#) resource also has lots of support available including a free 12 week weight loss plan. [Quitting smoking](#) is one of the best things you can do for your general health, and it will also help you recover better from your operation, so can [drinking less](#) alcohol.

Managing your knee swelling

It is important to manage knee swelling. Increased swelling can increase pain and make the knee feel more unstable.

The following will help:

1. Elevate the leg whenever possible.
2. Use a cold compress (an ice pack or other similar cold packs such as a bag of peas or frozen vegetables) over the knee. It is important that you don't place the cold packs directly on the skin. This can burn the skin. So, we recommend placing a towel over the knee first and then putting the ice pack on top of the towel.
3. A compressive sleeve or bandage can be very use full for helping to reduce the swelling. These can be purchased from your local pharmacists at little cost and should be worn during activity and taken off to sleep.

Exercises to maintain movement strength balance and fitness

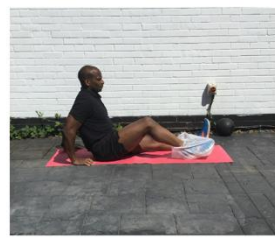
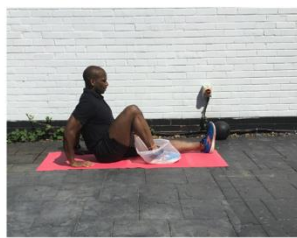
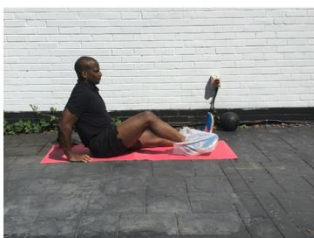
It is also important to maintain knee movement and improve your lower body strength, your core strength, your ability to balance and your aerobic fitness. Doing this will both help you manage your symptoms whilst waiting and improve your chances for a successful recovery after the operation. You may have been given exercises to help previously and it is safe to continue these if you're able to. If not already doing so, the exercises in this guidance may help too.

Start with those you find the easiest and then add a few more as you feel more confident. We have provided guidance about how to progress these exercises as they get easier. Specifically, for the lower limb strengthening exercises start with the phase 1 exercises, and then as they get easier move to phase 2. It is normal that these exercises may make your leg feel a bit tired and achy. If your pain and swelling increases, or keeps you awake and this lasts for a few days you may have done too much. If this happens take a couple of days rest, and then as you feel better gradually start again.

Maintaining knee movement

Exercises to help bend the knee:

- **Heel slides:**
 1. Lie on the floor with your legs out straight.
 2. Place the foot of the injured knee in a plastic bag. This makes bending your knee easier.
 3. Now bend your knee sliding your heel towards your buttocks. When the knee starts to feel tight hold it in that position for about 5 seconds and then return to the start.
 4. Repeat this 5 to 8 times.



- **Knee stretches:**
 1. Lie on your stomach with your legs out straight.

2. Hook a towel or scarf around the ankle of the injured leg.
3. Using the towel or scarf pull the ankle towards the buttocks. When the knee starts to feel tight hold the knee in that position for about 5-10 seconds and then return to the start.
4. This exercise should be done 5 to 10 times.



Exercises to help straighten the knee:

Aim to gradually increase how far you are able to straighten the knee over several weeks. You should practice at least one of the following exercises daily.

- **Sitting knee hang**

1. You will need two chairs or a chair and a table or box of similar height.
2. Sitting on a chair place the heel of the injured leg on a chair, box or table in front of you.
3. Place a 1-2 kg ankle weight or similar on the thigh. As your muscles relax the weight on your thigh will cause the knee to straighten. This position can be held for 30-60 seconds.
4. The exercise should be done 5 to 10 times.





- **Prone knee hang**

1. You will need a block or a stack of books to do this exercise.
2. Sit on the floor with both legs out straight.
3. Place the heel of your injured leg on the edge of the block. This position can be held for 30-60 seconds. As the leg hangs in this position the knee will slowly straighten out.
4. This exercise should be done 5 to 10 times.



Improving lower body muscle strength

After a serious injury to the knee the muscles often don't work properly. The muscles at the back and front of the knee, calf and buttocks lose their strength very quickly. It is important that you strengthen these muscles. To begin with, try the following Phase 1 exercises. As these get easier you can move to the more advanced Phase 2 exercises.

Starting exercises: Phase 1

The muscle strengthening exercises in this phase are often used in the first few weeks after the initial injury. This is the time when pain and swelling is at its worse. This is why gentle strengthening exercises are used. The following strength exercises should be used 1-2 times per day.

- **Static muscle pumps:**

1. Sit on the floor or on a bed with both legs straight.

2. Place a rolled-up pillow under the injured knee so the knee is bent.
3. Tighten the thigh muscles above your kneecap so the knee straightens.
4. Keep the knee straight for 2-5 seconds and then lower the leg to the floor or bed.
5. Repeat 3 to 5 times. This exercise can be done once or twice per day.



- **Sitting Knee extensions:**

1. Sit in a chair with both knees bent.
2. Tighten the thigh and straighten the injured knee.
3. When the knee is straight, keep the thigh muscle tight for 2 to 5 seconds and then lower the leg to the floor.
4. Undertake this exercise 4 to 8 times and repeat another 4 to 8 times. This exercise can be done once or twice per day.

This exercise can be made harder by the following:

5. Increasing the time of the hold from 5 – 10 seconds when the knee is straight.
6. Using an elastic exercise band tied to the ankle and chair.



- **Double leg Hip thrusts**

1. Lie on your back with your knees bent and feet flat on the floor.
2. Push through your heels and you lift your buttocks off the floor
3. Squeeze you buttock and stomach muscles as your hips lift off the floor.
4. Lower your hip towards the floor to finish the exercise.



- **Knee curling exercises**

1. Stand up tall holding on to a chair with both feet on the ground.
2. Slowly bend the knee of the injured knee. Keep bending the knee until the heel of that leg is close to your buttocks.
3. Then slowly lower the injured leg to the floor.
4. Undertake this exercise 4 to 8 times and repeat another 4 to 8 times. This exercise can be done once or twice per day.



A progression for this exercise when you are feeling more confident is to try the following:

- **Knee curling exercise with elastic band**

1. Secure an elastic exercise band around the ankles of both legs.
2. Stand up tall holding on to a chair with both feet on the ground.
3. Slowly bend the knee of the injured knee. Keep bending the knee until the heel of that leg is close to your buttocks.
4. Then slowly lower the injured leg to the floor.
5. Undertake this exercise 4 to 8 times and repeat another 4 to 8 times. This exercise can be done once or twice per day.



More advanced exercises: Phase 2

It is important that you have full movement in your knee before you start these exercises. This means you should be able to bend your injured knee back as far as your uninjured knee. The injured knee should be able to fully straighten as well. If you are unable to bend or straighten the knee fully then you should continue with phase 1 strengthening exercises 1-2 times per day and the range of motion exercises 3-4 times per day.

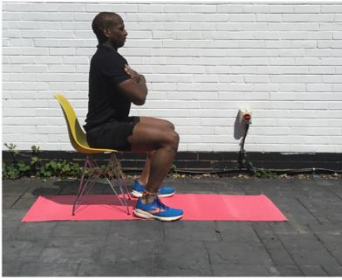
All the exercises in this phase are more challenging so you will not need to do them every day. You should aim to do 2-3 exercises from each section (lower limb strength, balance and core exercises). We advise that you have at least two days off each week from your exercise programme for recovery. Below is an example of what a typical week might look like.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Lower body Muscle strengthening	Balance exercises and aerobic fitness exercise	Day off	Core and balance exercises	Lower body Muscle strengthening	Day off	Balance exercises and aerobic fitness exercise

Lower limb muscle strength

- **Squats**

1. Sit in a chair with your feet hip width apart and slightly turned outwards.
2. Stand up slowly taking equal weight through both legs.
3. Pause for a moment at the top of the movement.
4. Then bend your knees and hips as you lower your body down to the chair.
5. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



- **Split squats**

1. Start in a lunge position with your front leg forwards and the rear leg backwards. Maintain an upright posture and look straight ahead.
2. Bend both knees at the same time as you lower towards the floor. You should feel tension in your thigh muscles as you move up and down from the start to the finish position.
3. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



- **Single leg hip thrusts**

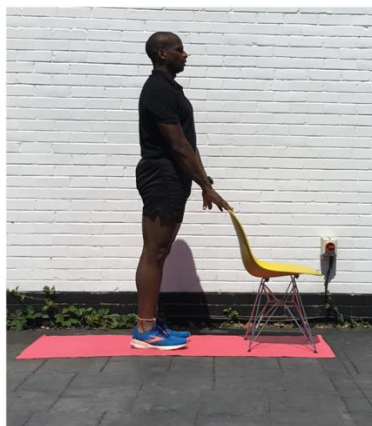
1. Lie on your back with your knees bent and feet flat on the floor.
2. Lift the uninjured leg a few inches off the floor.
3. Now push through the heel of the injured leg and lift both hips off the floor.
4. Squeeze your buttock and stomach muscles as your hips lift off the floor.
5. Lower your hip towards the floor to finish the exercise.
6. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



- **Calf rises**

1. Stand with your feet hip width apart and feet flat on the floor.

2. Holding on to a chair shift your weight on to your toes and lift your heels off the ground.
3. Under control lower both legs to the ground.
4. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



A progression for this exercise when you are feeling more confident is to try the following:

One leg Calf raise

5. Stand with your feet hip width apart and with the injured leg only on the ground.
6. Hold the chair with both hands shift your weight on to your toes and lift your heel of the injured leg of the ground. Under control lower your heel to the ground.
7. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



• One leg calf raises with weights

1. Stand with your feet hip width apart and with the injured leg only on the ground.
2. Hold the chair with both hands shift your weight on to your toes and lift your heel of the injured leg of the ground while holding a 1-5 kg weight.
3. Under control lower your heel to the ground.
4. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



Core strength exercise

The core muscles are made up of the abdominal muscles, the hip muscles and the back muscles. These muscles play an important role supporting the knee during sports and heavy physical exercise. This is why we recommend that you do some core strengthening exercises as a part of your physiotherapy and physical training before your operation.

- **The Modified Plank**

1. Support your upper body on your forearms and your hips on your knees.
2. Pull your stomach in and keep it tight will you try to hold a straight line from your head to your hips. Hold this position for between 10- 30 seconds.
3. If your knee is uncomfortable it may help to place a folded towel or small cushion under the knee.
4. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



A progression for this exercise when you are feeling more confident is to try the following:

6. Do this exercise while lifting the injured leg off the floor. Hold this position for between 10- 30 seconds.
7. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



8. The full plank:
9. Support your upper body on your forearms and your hips with your feet.
10. Pull your stomach in and keep it tight will you try to hold a straight line from your head to your feet. Hold this position for between 10- 30 seconds.

11. Undertake this exercise 8 to 12 times and repeat the set of repetitions 2 to 3 times.



- **Rotational Crunches**

1. Lie on your back with your knees bent and feet flat on the floor.
2. Tighten your stomach muscles and curl your head and trunk towards the opposite leg while reaching with your arms.
3. Return to the start position and complete a repetition to the opposite side.
4. Undertake this exercise 4 to 8 times and repeat the set of repetitions 2 to 3 times.



- **Modified Side plank**

1. Lie on your side and support your upper body on your forearm and your hips with the side of your knee.
2. Pull your stomach in and keep it tight. Try to hold a straight line from your head to your hips.
3. Hold this position for between 10- 30 seconds and then repeat on the other side.
4. Undertake 3 to 5 repetitions on each side and repeat each set of repetitions 2 to 3 times.



A progression for this exercise when you are feeling more confident is to try the following:

- **Full side plank**

1. Lie on your side and support your upper body on your forearm and your hips with your feet.
2. Spread out your feet to help with balance. Pull your stomach in and keep it tight.
3. Try to hold a straight line from your head to your feet.
4. Hold this position for between 10- 30 seconds and then repeat on the other side.

5. Undertake 3 to 5 repetitions on each side and repeat each set of repetitions 2 to 3 times.



- **Side lying hip squeezes**

1. Lie on your side with your head supported with a pillow
2. Bend the bottom leg while keeping the top leg straight.
3. Lift the top leg upwards until the buttock muscles feel tight.
4. Then lower to the starting position and repeat.
5. Undertake 8 to 10 repetitions and repeat each set of repetitions 2 to 3 times.



Balance exercises

Balance is an important skill you should learn to help your recovery after surgery. After an ACL injury, the stability in the knee is often affected making it difficult to balance. This is why you should try to improve your balance as much you can before your operation. These exercises start with easy tasks and then get gradually harder. You should only move on to the harder exercises when you are confident with the easier exercises.

Static balance - standing on one leg

1. Stand on your injured leg with your knee slightly bent.
2. Keep your eyes open and try to stay still.
3. Hold this position for between 10-30 seconds and repeat 3 to 4 times.

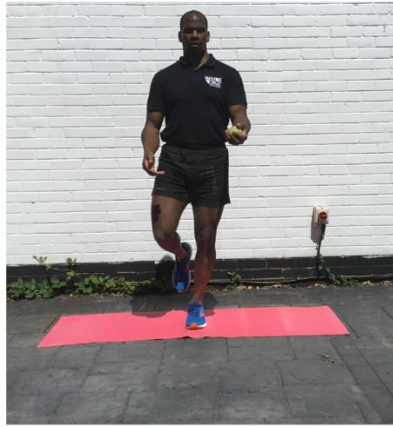


A progression for this exercise when you are feeling more confident is to try the following:

- **Static balance - standing on one leg on a pillow**
 1. Stand on your injured leg with your knee slightly bent on a pillow.
 2. Keep your eyes open and try to stay still.
 3. Hold this position for between 10-30 seconds and repeat 3 to 4 times.



- **Static balance - standing on one leg catching a ball**
 1. Stand on your injured leg and your knee slightly bent. Keep your eyes open and try to stay on the same spot while throwing and catching a ball.
 2. Do this exercise for between 10-30 seconds and repeat 3 to 4 times.



- **Standing reaches on one leg**

1. Stand up tall and bend the knee of the injured leg.
2. Aim to stay on the same spot and reach forwards in front of you with the uninjured leg and tap the floor.
3. Then return the uninjured leg to the start position and reach out to the side.
4. Return the uninjured leg to the start again.
5. Finally reach behind you with the uninjured leg. It is ok to use your arms for balance if it helps you to feel more stable.
6. Undertake 2 to 4 repetitions in each direction and repeat each set of repetitions 2 to 3 times.



A progression for this exercise when you are feeling more confident is to try the following:

1. Do this exercise standing on a pillow.
2. Aim to stay on the same spot as you reach forwards, backwards and to the side.
3. Undertake 2 to 4 repetitions in each direction and repeat each set of repetitions 2 or 3 times.



Aerobic fitness exercise

Aerobic fitness is important for your general health and wellbeing. It is important that you start to build up your fitness doing small amounts of aerobic exercise several times per week.

We recommend that you take part in between 20-30 mins of moderate exercise 2-3 times per week. This is in addition to the mobility strengthening and balance and stretching exercises advised. The effort level should be moderate. This means that you should not get so out of breath that you are unable to have a conversation with a friend while exercising.

Types of exercise includes:

- Power Walking
- Cycling
- Using a cross trainer

Low impact exercises, such as swimming for fitness <https://www.nhs.uk/live-well/exercise/swimming-for-fitness/> and cycling <https://www.cyclinguk.org/>. These types of activities will improve your muscle strength without placing too much weight on your knee.

You should avoid any sports or activities that involve twisting, turning or jumping.

Read more about [Easy exercises - NHS \(www.nhs.uk\)](http://www.nhs.uk) and [Physiotherapy - NHS \(www.nhs.uk\)](http://www.nhs.uk)

What should I do if my knee gets worse?

If you develop any of the following symptoms which fail to settle with rest over a few days:

- Swelling
- Increasing pain
- Inability to straighten your knee
- Your knee becomes more unstable

You should contact your consultant's secretary, surgical care practitioner, your physiotherapist or GP practice.

Where can I find additional information?

[Knee ligament surgery - NHS \(www.nhs.uk\)](http://www.nhs.uk)