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The evidence used in the preparation of this leaflet is available on request. Please email: patient.information@salisbury.nhs.uk if you would like a reference list.

Author: Katharine Wilcocks
 Role: Physiotherapist
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Anterior Cruciate Ligament Reconstruction Surgery (1 of 15)

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Amesbury Ward
Tel: 01722 336262 Ext. 3105

Introduction

This booklet has been written to help you understand Anterior Cruciate Ligament (ACL) Reconstruction surgery. It is for people who have decided to have re-constructive surgery after discussing the options, benefits and possible risks with their consultant.

Please keep this booklet for information before, during and after your hospital stay.

Remember you can change your mind at any time and that the decision to have or not to have this operation is yours. You have the right to seek a second opinion.

Students of all professions may be involved in your care. Please speak to a senior member of staff if you do not wish a student to be part of your care.

The Anterior Cruciate Ligament – What is it? Where is it? What does it do?

The Anterior Cruciate Ligament (ACL) lies deep within the knee joint.

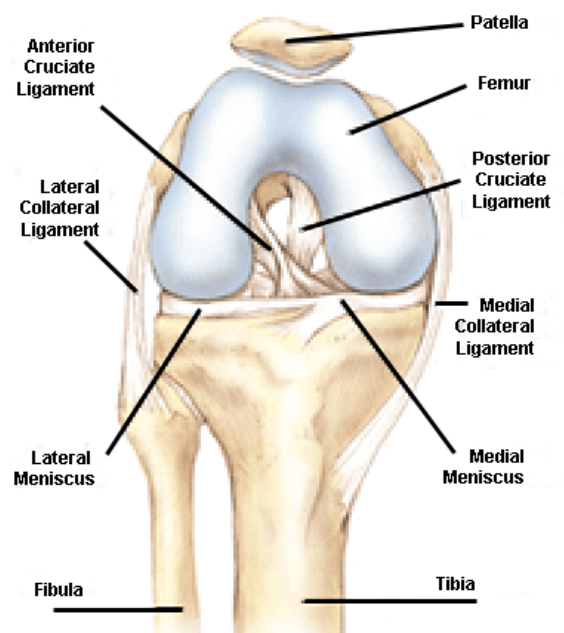
The ACL is one of the four main ligaments that stabilise the knee.

The ACL attaches the shin bone (tibia) to the thigh bone (femur).

It crosses with the Posterior Cruciate Ligament (PCL) inside the knee joint. The other main ligaments are the Lateral and the Medial Collateral ligaments.

The ACL prevents the tibia from moving forwards on the femur. It also helps prevent too much twisting movement at the knee joint.

The ACL is important for balance. It contains nerves that send messages to the brain about the exact position of the knee joint. This is called proprioception.



Lower limb muscles

There are two main muscle groups that control and support your knee:

- Quadriceps – muscles on the front of the thigh that straighten the knee.
- Hamstrings – muscles on the back of the thigh that bend the knee. The hamstrings are also important for proprioception at the knee joint.

How can the injury happen?

The ACL can be injured during contact or a non-contact twisting movement, usually due to deceleration and change of direction, or in collision sports, by direct contact to the knee from opponents. Sometimes other injuries occur at the same time e.g. Meniscal or cartilage tears or collateral ligament injuries.

Common ACL injury signs & symptoms:

- snapping sensation deep within the knee.
- knee pain.
- knee instability.
- swollen knee immediately.

Diagnostic tests

When you injured your knee, your doctor or physiotherapist will have examined it to find out what other areas of the knee have been damaged. There are several tests used to do this.

Some people will also have had a Magnetic Resonance Imaging (MRI) Scan or a knee arthroscopy (an operation to look inside the knee joint) before the ACL rupture is diagnosed.

Treatment

Once your ACL rupture has been diagnosed, you should discuss the best treatment options with your orthopaedic surgeon.

Not everybody needs to have their ACL reconstructed. Depending on their lifestyle, some people regain enough stability around the knee by building up their muscles. To achieve this you will be referred for physiotherapy.

If your ACL is going to be reconstructed you might also be referred for physiotherapy before your operation to:

- build up your muscle strength in a safe way
- improve your balance and co-ordination.

ACL reconstruction is usually not performed until several weeks after the injury as this allows the inflamed and irritated knee to 'cool down'. Swelling decreases, inflammation subsides, and the range of movement improves. If this is allowed to happen before ACL reconstruction, the post-operative function of the joint improves. There are studies to support this course of action.

It is important to realise that the rehabilitation process may take up to one year. It is your responsibility to follow the advice and programme to make the most of your operation. Failure to do so may result in a less than satisfactory result.

Reconstruction

The ACL can be reconstructed by replacing it with a section of muscle tendon. This tendon, called the graft, can come from one of two sources:

- the patella tendon of the quadriceps muscle at the front of the knee;
- the tendon from one or more of the hamstring muscles at the back of the knee.

The graft is taken through small incisions (cuts) and shaped to form a new 'ligament'.

Tunnels are made in the tibia and femur at the points where the ACL is attached. The area is cleaned and the remains of the old ACL removed.

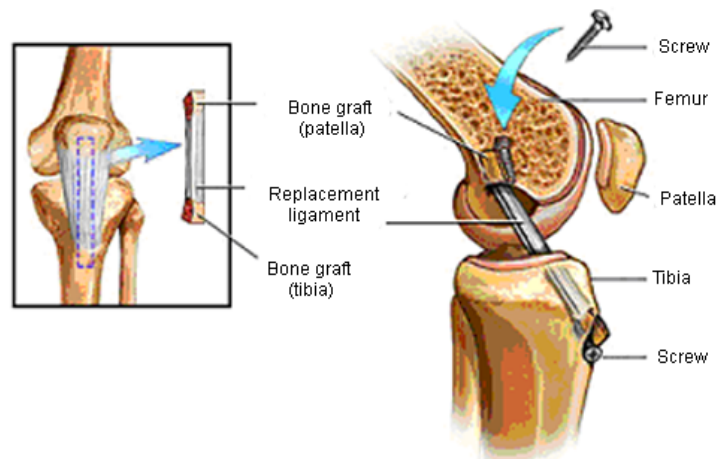
The graft is secured into the tunnels using metal screws or biodegradable pins.

The graft is tightened to ensure that it stabilises the knee but also allows a good functional range of movement.

Post-operative rehabilitation is the same for both types of graft and it has not been shown that there is a significant difference in results.

Your orthopaedic surgeon will discuss with you which graft is appropriate for you.

Patella tendon graft



Risks and complications of surgery

All surgery carries a small risk of complications. These complications can affect the heart, lungs or circulatory system because of the anaesthetic. These occur less often in people under the age of 50.

Other complications:

- blood clots in the legs or DVT (deep vein thrombosis). This is less than 1% risk.
- infection - 1% risk for deep infection and 10% for superficial.
- haematoma (bleeding into the tissues) – this may slow recovery as it leads to scarring within the joint which can lead to stiffness.
- injury to a nerve – this is very rare and only if a hamstring graft is used.

The reconstructed ligament will never be quite as good as the original and therefore the risk of further damage to the knee in the future, or re-rupture of the tendon, is a possibility.

It is very important that you understand that this operation is only treating the damage to the ACL. It will not help any problems with cartilage or other ligament injuries.

Pain around the front of the knee can also be a problem in 10 – 20% of patients, restricting kneeling. This can usually be avoided by following the rehabilitation programme and the advice given.

To avoid complications you may be asked to:

- take antibiotics at the time of surgery and immediately afterwards.
- use AV pressure pump boots to aid circulation; this is used on your foot. It is a bit like a fabric slipper with a Velcro cuff and is quite painless. Every minute it will inflate and gently squeeze your foot, then deflate.

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- use anti-embolic compression stockings to prevent DVT.
- mobilise – you will be given advice about exercises and when to mobilise after surgery and it is important to follow your rehabilitation programme.
- high-risk patients may be given anti-coagulant drugs (medication that helps to prevent the clots from forming) for a few weeks after surgery to prevent a DVT.

If you have any health problems such as any heart, diabetic or lung problems, your risk of developing complications may be increased.

Every effort is made to keep these risks to a minimum.

Recovery following your operation is split into phases:

1. Phase 0: Pre-operative preparation/operative period
2. Phase 1: Initial post-op phase - 1 day to 1 week after operation
3. Phase 2: Post-operative rehabilitation

Phase 0. Pre-operative preparation/operative period

Planning for your operation

Health

You need to be as healthy as possible for major surgery to aid a quick recovery. You can improve your general health by:

- trying to give up smoking completely. Smoking delays wound healing.
- cutting down on the amount of alcohol you consume. Please let us know if you have a problem or would like some help achieving this.
- eating a well balanced diet. This will help to improve your skin condition and help wound healing.
- maintaining the correct weight for your height.
- making sure your skin is unbroken and free from sores and open areas. This will reduce the possibility of infection both before your operation and after. An infection anywhere in your body will stop you from having your operation.
- walking and exercising within the limit of your discomfort and ability.

Home and help

It is important that you plan now for after your operation.

Things you need to do and think about:

- if you live alone, think about someone staying with you, or you staying with someone, for the first couple of days after you go home from hospital, which will be 1-2 days after surgery.
- think about help with the housework and shopping
- you will not be able to drive for at least 4-6 weeks after your operation, so think about organising transport, especially for physiotherapy appointments

- if your stairs are difficult, think about how you will manage these. (You will practice doing stairs before your discharge)
- you may need help to look after your children or pets
- think about having a phone by your bed. It is also a good idea to have a cordless or mobile phone that you can carry in your pocket
- when you go home with crutches, you will be unable to carry drinks or meals from room to room. If there is room in your kitchen, have a table and high seat near the work surface
- remove loose rugs, trailing electrical flex or anything else that could cause you to trip, slip or fall.

Before your hospital stay

After you and your surgeon have decided that you need an operation, you will be asked to attend a Pre-operative Assessment Clinic (POAC). You will have several tests. These include:

- blood tests
- ECG (heart trace)
- urine specimen
- MRSA (Methyl Resistant Staphylococcus Aureus) swabs.

These tests will give the staff information about you. You will see a nurse and/or a doctor who will make sure you are fit for surgery. This appointment will also be another opportunity for you to discuss the operation and all that is involved and to ask any questions. If for any reason you are not fit for surgery, your operation will be postponed until you have received treatment.

Coming into hospital

Things you need to do:

- make sure you have read your admission letter so that you come in on the right day and at the right time. It will also tell you when to stop eating and drinking. You will need to phone the ward on the day of your admission to check there is a bed available for you
- do not bring any towels or face cloths in with you. They will be provided for you by the hospital. This is to help reduce the risk of possible infections
- bring an overnight bag with everything you need for a stay of 1 - 2 days in hospital (shorts and T-shirt, night attire, dressing gown, toiletries etc)
- bring sensible footwear i.e. trainers or sensible slippers with proper non-slip soles (not flip-flops, backless or fluffy mules!)
- bring in all the tablets you are currently taking and a list of when and how many you take. You will be sent a 'Green Bag' to put all your regular medicines in. Alternatively this bag might be given to you in the Pre-admission Clinic. They will be kept in this bag all the time you are in hospital and given back to you when you go home
- bring books and magazines to read
- leave jewellery and large amounts of money at home.

Day of surgery

A member of the surgical team and the anaesthetist will see you before surgery.

Consent

We must by law obtain your written consent to any operation beforehand. Staff will explain all the risks, benefits and alternatives before they ask you to sign a consent form. If you are unsure about any aspect of the treatment proposed, please do not hesitate to speak with a senior member of staff again.

The operation

To reduce the risk of being sick, you will not be allowed to eat or drink before surgery. You will be told when you should stop eating and drinking.

The surgery is usually performed under general anaesthetic and takes approximately 1–1 ½ hours.

Phase 1. Initial post-op phase - 1 day to 1 week after operation

After your operation

After surgery you will have a dressing or dressings on your knee. Where these are will depend on the type of graft that is used and therefore where the incisions (cuts) are made.

If the anaesthetist used a type of local anaesthetic in your leg, called a nerve block, your leg will feel numb and weak for a few hours after the operation.

Nursing staff will make regular checks of your temperature and pulse. Anti-inflammatory drugs and pain relief will be given to you to help keep you comfortable.

Other equipment that may be used during your stay includes:

- a wrap-around compressive cold pack , called a Cryo-cuff, which is used to reduce pain and swelling in your knee
- a continuous passive motion machine (CPM). This is used to move your knee for you while you are in bed
- crutches which are used to help you walk.

On the first day after surgery

- your dressings will be changed
- you will have an X-ray
- a Cryo-cuff or ice pack may be applied
- a physiotherapist will teach you exercises
- a physiotherapist will help you to get out of bed and start walking with crutches
- if you are comfortable and have good function in your knee you will be able to go home.

Post-op exercises

The exercises are to improve:

- circulation;
- flexion (bending);
- extension (straightening).

It is important that you are able to straighten your operated leg as much as your other leg as soon as possible. **Do not sit with a cushion or pillow under your knee**, as this will stop you achieving this.

Walking

You will be given crutches to help you walk and taught how to use them. You will be told how long you have to use these for. You may put as much weight on your leg as you are allowed to. Putting weight on your leg will not affect the reconstruction but standing and walking for too long may cause your knee to swell. This may slow your recovery. If swelling is a problem, reduce the amount of walking and standing you are doing and rest with your leg up.

Leaving hospital

You will probably be discharged home on the first or second day after your operation. This will depend on your progress.

By the time you leave hospital you should try to:

- have full extension - the same as your other leg
- have good flexion, which is improving with exercise
- be safe walking with crutches, including up and down stairs
- understand your home instructions and exercises
- know how to apply an ice pack safely.

Your discharge may be delayed if you are not able to do these things.

When you are discharged the nursing staff will give you:

- medication as required;
- a letter for your GP;
- written instructions about further appointments, removal of stitches;

Your physiotherapist will refer you to your local physiotherapy department for ACL reconstruction rehabilitation. This may be a group or an individual session.

After discharge – the first week

It is important not to spend too much time on your feet initially and to gradually increase your activity. It is normal to feel discomfort in your knee, especially when exercising and to feel aching in your knee for up to 30 minutes afterwards. As a guide, if you have increased sharp pain for

more than 30 minutes after exercise, you may be overdoing it. If this is the case, stop and seek advice from either your physiotherapist or GP. Keep your operated leg up as much as possible when you are resting.

Swelling happens easily and quickly and can delay your recovery. Be guided in your activity by the amount of pain and swelling in your knee.

Protect your graft now and for the next six weeks by **avoiding activities** that will cause a shearing force in your knee such as straightening your leg with your foot in the air or sitting in a chair and lifting your foot off the floor.

Do:

- rest with your leg supported up above horizontal
- keep your wounds dry
- keep walking to a minimum initially and gradually increase it
- use an ice pack on your knee four times a day for 15 minutes
- do your exercises correctly and regularly, 3 – 4 times per day
- attend your physiotherapy appointments.

You can call the ward and ask to speak to the physiotherapists if you have any problems or questions.

Signs of possible problems

- continued high temperature. It is normal to have a slightly raised temperature after surgery. It is usually higher in the evening and returns to normal by morning
- increased knee pain that is not helped by medication
- increased knee or calf swelling that does not go down when the leg is elevated
- stomach upset after taking medication
- increased wound ooze.

If you have any of these problems contact your GP immediately.

Pain around the front of the knee can also be a problem in 10 – 20% of patients. This can usually be avoided by following the rehabilitation programme and the advice given.

Phase 2. - Post-operative rehabilitation

Pain at the front of the knee is fairly common when the patella tendon is used. This will reduce over time but may take up to a year to resolve completely. Kneeling can be uncomfortable so use a cushion or pad if required.

The area around the front of the knee can also be numb as the nerves that supply the skin can be affected. This usually improves over time but can last for some months and in a few cases is permanent.

If the hamstring tendon is used some patients experience soreness at the back of the leg, especially on exercise.

Rehabilitation after your operation

Over the next few months you will follow a graduated exercise programme devised by your physiotherapist.

To avoid damage to the graft, only do the exercises recommended by your physiotherapist or doctor.

You may need to use elbow crutches for up to 6 weeks after the operation to protect your knee. This helps to avoid unexpected strains when you are walking. Your physiotherapist may recommend that you do some of your exercises without them. Once you are able to walk without limping you can normally stop using crutches.

6 to 12 weeks after your operation your knee will feel stronger but the graft will still be quite weak. It is very important you only do the exercises that have been recommended.

4 weeks to 6 months after operation onwards

In some cases the graft fails or strengthens, resulting in a lax knee. It is important not to over stress the knee, particularly in the first 12 weeks

Most people have a good functional result from ACL reconstruction but it is important to remember that a tendon has replaced your ligament. The tendon will respond differently to stresses at the knee joint and cannot guide movements at the knee to the same degree of accuracy as the ligament it replaces.

You can return to normal activities, including sport, after your operation. You should, however, follow the advice of your physiotherapist and doctor. Higher levels of sporting activity might cause slightly more wear and tear on the knee joint cartilage. Competitive sports should be avoided for approximately 9 months. Your rehabilitation programme is designed to reduce these side effects.

Guidelines for returning to normal activities

Driving	4-6 weeks, or when your doctor says you are fit to drive again. You must be able to do an emergency stop. It is advisable to check with your insurance company before driving again.
Swimming	Only do straight leg kick for the first 6 weeks. Breaststroke kick can start at 12 weeks.

These are guidelines only! You should discuss your return to sport with your doctor and physiotherapist.

Return to work

This will depend on your job. For example, an office worker sitting for most of the day could return at around 3 – 6 weeks.

A manual worker would not be able to return before 3 – 6 months.

Exercises – guidelines and approximate time scales

Initial post-op

Circulatory exercises – paddle your feet up and down and circle them round in both directions. Clench your buttock muscles together and hold for a count of three and then relax. Do these 10 times every waking hour.



Static Quads – sit or lie with your leg straight out in front of you. Tighten your thigh muscles and push your knee down firmly against the bed. Hold and repeat for 5 seconds. Repeat 10 times.



Static Hams – sit on the bed or floor with your knee bent slightly. Hold that position and push your heel into the bed. Hold for 5 seconds. Repeat 10 times.



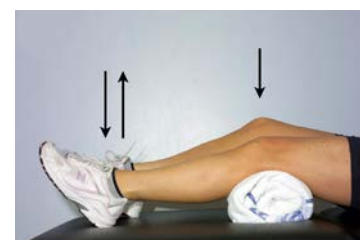
Inner Range Quads – sit on the bed with your foot against the head or foot of the bed and your knee slightly bent. Keeping your foot in contact, straighten your knee to push your foot into the bed end.



Knee Flexion – sitting on the bed or floor, slide your heel up towards your bottom to bend your knee and then straighten it again. Repeat 10 times.



Thigh co-contraction – this involves contracting the front thigh muscles (quadriceps) and back thigh muscles (hamstrings) at the same time. With knee bent over a pillow push the heel down on to the floor. Keeping the pressure on the heel, push the knee into the pillow. No knee movement should occur. Hold each contraction for 5-10 seconds. Repeat 10 times.



Knee flexion in standing – stand on your good leg and bend your knee by bringing your heel up towards your bottom. Lower the foot slowly back to a straight position. Repeat 10 times.



Patella Mobilisations (1) – stand or sit with your leg straight (as shown). Cup your kneecap with your hands as shown. Push your kneecap outwards, then push towards the opposite knee. Repeat 10 times.

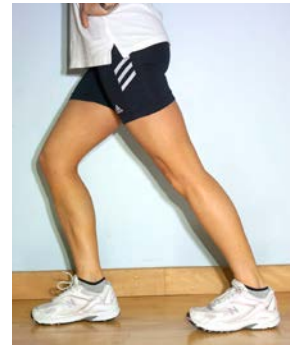


Patella Mobilisations (2) – sit, with your knee bent (as shown). Place your hand on the top of your kneecap. Push it down towards your feet. Repeat 10 times.



1 week to 6 weeks

Calf stretch – stand and place the leg to be stretched behind the other leg, with your feet parallel and the back heel flat on the floor (as shown). Keep the back knee straight and bend the front knee until you feel a stretch in the back of your calf. Hold for 30 seconds. Repeat 3 times on each leg.



Hamstring stretch – stand with the leg to be stretched out in front of you on the floor or on a stool. Keep your knee straight. Lean forwards until you feel a stretch at the back of your thigh. Hold for 30 seconds. Repeat 3 times each leg.



Straight leg raise – lie on your front with or without a weight on your ankle. Keeping your knee straight, lift your leg up in the air and lower slowly. Repeat 10 times.



Leg raise in side lying – lie on your side with your operated leg uppermost, with or without a weight around your ankle. Lift your leg up using the outer muscles of the thigh. Lower slowly and repeat 10 times. Change sides and lift your operated leg up using the inner muscles of your thigh. Repeat 10 times.



Bridging – lie on your back with your knees bent. Tilt your pelvis back and then lift your bottom right up. Repeat 10 times.



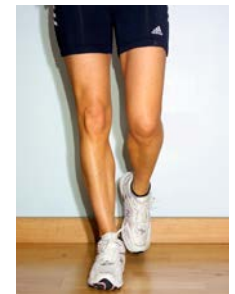
Cross leg holds – sit down with both knees bent to 90°. With your feet crossed, pull one leg against the other. Repeat 10 times. Change legs and repeat 10 times.



Sit to stand – sit with your good leg forward. Slowly stand up. Repeat 10 times. Start off on a high chair and gradually decrease the height over a period of time to increase the difficulty. To progress this further, try to stand up using only your operated leg. Then try it with your eyes closed.

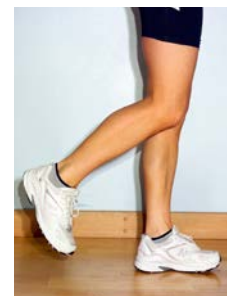


Mini squats – stand with your feet shoulder-width apart and bend forward slightly at the waist. Bend your knees until they are over your toes, then straighten your knees. Repeat 10 times.

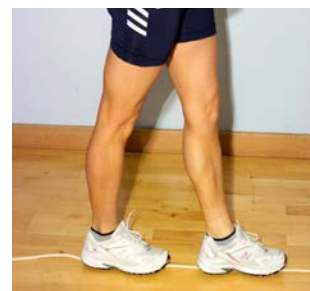


One leg balance – stand on your operated leg with your knee fully straight and locked, keeping your balance for 30 seconds.

Hamstring catches – stand on your good leg. Bring your other heel to your bottom. Start to lower your leg slightly. Quickly contract your muscles to bend your knee again. Don't let your knee go into a fully straight position. Repeat 10 times.



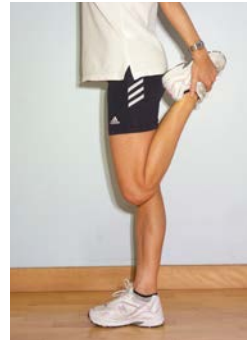
Rope walking – lay a (skipping) rope on the floor and walk along the top of it keeping your balance.



Hamstring and calf stretches – repeat as above to stretch your muscles.

6 to 16 weeks

Quads stretch – in a standing position, bend one knee and hold on to your ankle behind you. Pull your heel slowly towards your buttock until you feel a stretch down the front of your thigh. Hold for approximately 30 seconds. Repeat 3 times each leg.



Hamstring and calf stretches – as previously mentioned.

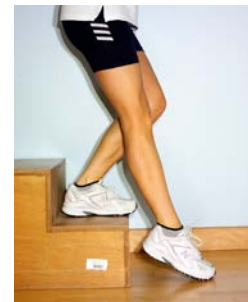
Gentle jogging - as directed by your therapist.

Skipping – with a skipping rope as able.

Slow step-ups – using a stair or step, slowly step up facing the step, controlling the movement. Lead with alternate legs. Repeat 10 times each leg.



Slow step-downs – facing away from the step, slowly step down controlling the movement. Lead with alternate legs. Repeat 10 times each leg.



Swimming – as directed by your therapist.

Cycling – as directed by your therapist.

Gym work – your physiotherapist may refer you to a gym to continue with your rehabilitation. This will depend on your progress.

Stretches– repeat as previously mentioned to stretch your muscles.

16 weeks to 6 months

You are mainly responsible for achieving this. Remember to include calf, hamstring and quads stretches (as shown by your physiotherapist) before exercising. Walk briskly in large circles – change direction, slowly at first but turning faster as you improve. Walk quickly in a figure of 8 – again change direction. Increase your speed to jogging then running. Don't forget to warm up and cool down with some of the easier exercises previously shown.

You should now be ready to return gradually to some more strenuous activity such as running, hopping and turning. You should be doing activities that will prepare you for returning to your chosen sport. Your surgeon or therapist will be able to advise you on this.

6 months onwards

Return to sport as per guidelines on page 22 and as your progress allows.

Thank you for taking the time to read this. We hope it has been helpful and we wish you a successful recovery.

Useful contact numbers

Physiotherapy Outpatients
01722 336262 Ext. 4425

Physiotherapy, Orthopaedic Inpatients
01722 336262 Ext. 3111 or Bleep 2007

Fracture Clinic, Orthopaedic Outpatients
01722 336262 Ext. 4176

Amesbury Ward, Orthopaedic Inpatients
01722 336262 Ext. 3105

Mr David Cox's Secretary
01722 336262 Ext. 3538

Mr Gurd Shergill's Secretary
01722 336262 Ext. 3536

1st edition produced by Clare Neville-Jones, Vicky Downey and Jill Hibberd, physiotherapists

2nd Edition produced by Kate Zeineh Clinical Specialist Physiotherapist, Inpatient Orthopaedics and Lisa Ferguson, Highly Specialist Physiotherapist, Outpatients, Mr David Cox and Mr Gurd Shergill, Consultant Orthopaedic Surgeons.

3rd Edition produced by Katharine Wilcocks Clinical Specialist Physiotherapist, Jonathon Northcott, Sneior Physiotherapist Outpatients. Mr David Cox and Mr Gurd Shergill, Consultant Orthopaedic Surgeons.