

Physiotherapy following transplantation and mechanical assist circulatory devices

A patient's guide

Physiotherapy team

The physiotherapy team at Royal Papworth Hospital consists of qualified physiotherapists and assistant practitioners with experience of transplantation and mechanical assist devices. We are here to support and motivate you to achieve your potential.

This patient guide is for patients who have had a heart, lung, both heart and lung transplant, or a mechanical assist device.

As soon as appropriate after your surgery, you will be seen by the physiotherapy team. It is important, especially in the early stages, that we reduce the risk of chest infections, blood clots and pressure ulcers, as well as minimising the loss of muscle strength and physical function.

The physiotherapy team will work with you to build your strength so that you can sit out of bed and begin walking. You may have had a long period of illness and it may take some time to improve your level of fitness. The physiotherapy team will work with you daily to improve your strength, stamina and co-ordination through exercise. They will support you in your transition from hospital to home and into the future.

Physiotherapy breathing exercises

You will be asked to do your breathing exercises by both the nurse and the physiotherapist. These are important to get your lungs fully functioning again following surgery and to minimise the risk of a chest infection.

You will be asked to take a set of deep breaths in and then out regularly. You may be given a piece of equipment called an incentive spirometer to help measure the size of your breath in and monitor your progress.

You will also be asked to cough, which may cause you some discomfort with your wound. You will be taught how to support your wound which can help to ease some of the discomfort.

If you are in pain it is very important that you tell your nurse. It is better for us to control your pain so that you can take a deep breath and cough without significant discomfort.

Circulatory exercises

Whilst you are in bed or sitting in a chair it is important that you keep your arms and legs moving to maintain good circulation, minimise the risk of getting blood clots and prevent pressure ulcers.

These exercises involve simple movements like:

- Wiggling your toes
- Pointing your toes down then up
- Bending your knees one at a time
- Sliding your legs to one side then back to the middle when in bed
- Tightening your leg and bottom muscles
- Making a fist
- Stretching your hands open
- Bending your elbows raising one arm at a time above your head.

Do not be afraid of moving. Your nurse and physiotherapist will let you know if there is anything you should not do. Certain wounds need to be treated more cautiously and with more care.

If you are not able to do these exercises by yourself the nurse and physiotherapist will assist you with these movements. The physiotherapist may get you exercising in bed on a pedalling machine which will help to improve your circulation and strength.

Changing position in bed

It is important not to lie in the same position for too long in bed as you may develop pressure sores. Your nurse will assist you to reposition regularly and make sure you are as comfortable as possible. Sometimes you may need to change position to help your lungs. If you feel some discomfort on repositioning try to support your wound to reduce this.

Sitting, standing and walking

As soon as appropriate the physiotherapy team will help you to sit over the edge of the bed, and to begin standing and walking. The exercises will progress as you improve. You may be given a seated cycling programme to do to help build your strength before you are able to stand, or in addition to other exercises.

Your exercise sessions will be tailored to your needs. You will start exercising early after your operation. The physiotherapist will set goals with you and help to keep you motivated.

Monitoring

When you are exercising your physiotherapist will monitor you appropriately.

Examples of monitoring:

- Oxygen levels
- Blood pressure
- Heart rate
- Flow rates
- Perceived exertion scale

Following some surgery it is not always appropriate to use conventional monitoring techniques.

Perceived exertion scale

Your physiotherapist will introduce you to the perceived exertion scale. This scale allows you to tell us how hard you feel you are working so we can adjust the exercise appropriately. It is a 15 point scale, detailed below:

Scale	Guide to effort	Description	Example
6	20% effort		
7	30% effort	Very, very light	Rest
8	40% effort		
9	50% effort	Very light	Gentle walking, warm up, cool down.
10	55% effort		
11	60% effort	Fairly light	
12	65% effort		
13	70% effort	Somewhat hard	Steady pace
14	75% effort		
15	80% effort	Hard	
16	85% effort		
17	90% effort	Very hard	
18	95% effort		
19	100% effort	Very, very hard	
20	Exhaustion		

When you are doing a warm-up you should be working at around 9 on the scale (50% effort).

When you are exercising you should aim to work around 13 on the scale (70% effort), but no higher.

If you feel you are working too hard, try to slow down the exercise or reduce the number of repetitions rather than stopping abruptly. Aim to get back to a steady, comfortable pace and then cool down slowly.

To cool down you should try to come back to around 7 to 9 on the scale (30-50% effort) gradually. You can do this by gentle cycling, walking and stretching.

Warm-up exercises

We recommend you do a 10 minute warm-up programme to allow your body to adjust to the increased level of activity. These exercises could include:

Standing or sitting programme

You can perform these exercises when sitting or standing, depending on your ability. You may like to have a stable chair or surface in front of you to help you balance.

Each exercise should be continued for one minute each. These exercises will also help your balance and co-ordination.

Warm-up exercises

1	Marching on the spot	Start with a gentle march.
2	Toe tapping	Step your right foot forward and tap the floor with your toe. Repeat with your left leg.
3	Marching on the spot	Aim to lift your feet a little higher.
4	Heel taps	Step your right foot forward and tap your heel into the floor. Use alternate legs.
5	Marching on the spot	Aim to lift your feet a little higher.
6	Side taps	Tap your right foot out to the side then back to the middle. Repeat with your left leg.
7	Marching on the spot	You can add in a gentle arm swing.
8	Side-step	Step your right foot out to the right, then back to the middle. Repeat with your left leg.
9	Marching on the spot	Keep swinging your arms.
10	Knee dips	Bend your knees a small amount then stand straight again.

Walking programme

Gentle walking at a steady pace - set off slowly and on the flat, then allow yourself to gradually increase your speed, working up to 50% effort.

Cycling programme

Gentle cycling at a low resistance and low RPM (repetitions per minute) - aim to work at a maximum of 50% effort.

Exercises

These can include many things and as you progress you will be able to do more and more.

Walking and stairs

Whilst in hospital your physiotherapist will start you walking on the ward and aim to get you as independent as possible. When you are ready, you will practise a flight of stairs. By this stage you may be ready to go home if the doctors are satisfied with your overall progress.

You can record your activity on the walking programme chart.

Gym sessions

We may ask you to start exercising on a static bicycle on the ward. You can record your activity on the cycling programme chart.

We may also take you to our gym. Your physiotherapist will tell you what time the sessions will be. They are usually at the same time Monday to Friday. In the gym we can start you off on an exercise regime tailored to your needs. We have bikes, a treadmill, gym balls, steps...plenty to keep you challenged!

We can usually let a relative or friend come to the gym with you to see your progress - just check with us first!

We recommend that you wear sensible shoes when using exercise equipment. You may like to wear shorts or tracksuit bottoms and a T-shirt, rather than pyjamas and slippers. If you would like to do so, please bring a drink, but water is available. If you have a mechanical assist device, make sure you bring your spare console and a spare battery.

Never use exercise equipment on the ward without supervision unless you have been instructed to do so.

All gym sessions will be supervised.

Cool down exercises

You should aim to do about a ten minute cool down to allow your heart rate to settle back down and your muscles to relax slowly. You could do some gentle cycling, a slow walk or repeat the warm up exercises at a lower intensity.

You can find some stretching exercises on the following page.

Stretches

1	Turn your head to the left then back to the middle slowly. Repeat to the right.	You should feel a stretch in your neck.
2	Look up to the sky then back to the middle. Repeat looking down to the ground.	You should feel a stretch in your neck.
3	Take your left ear towards your left shoulder. Repeat to the right.	You should feel a stretch in your neck.
4	Shrug your shoulders up and backwards slowly.	You should feel a stretch in your neck.
5	Cross your arms across your chest and rotate your body round to the right and then to the left.	You should feel a stretch across your back.
6	Slowly bend forwards in the middle and slide your hands down your legs.	You should feel a stretch down your back and possibly the back of your legs.
7	Put your right leg out in front of you and pull your toes up towards your knee. Repeat with your left leg.	You should feel a stretch down the back of your thigh and calf.
8	Holding on to a stable surface with one hand, bend your right knee backwards towards your bottom. Repeat with your left leg.	You should feel a stretch along the front of your thigh.
9	Slide your right arm down the right side of your body towards your knee, keeping your back straight. Repeat with your left arm.	You should feel a stretch down your side.
10	Raise your arm in front of you as high as you can. Repeat with the other arm.	You should feel a stretch around your shoulder.
11	Raise your arm out to the side as high as you can. Repeat with the other arm.	You should feel a stretch around your shoulder.

Do's and don'ts

Following your surgery your chest bones and incision need time to heal - in most patients this takes about three months, but the period may depend on whether you have had more than one operation on your chest. Your physiotherapist will go through the precautions you should follow, which will depend on your incision and healing.

We would like you to do some exercise every day. It is important that you remember these points:

- Warm up before you exercise.
- Try and maintain a higher level of exercise for several minutes to ensure maximum benefit.
- Cool down after exercise.
- If you have had a heart or heart and lung transplant it is especially important that you warm up. This is because your new heart does not have a nerve supply, so the body's previous initial mechanism to increase your heart rate no longer works. Instead, an increase in your heart rate will become dependent upon hormones called catecholamines that circulate in your bloodstream. These hormones begin to be produced in the first eight minutes of exercise and help to speed up your heart to meet the increased needs of your body. You need to give your body time to create these hormones before increasing your levels of activity.
- At the end of activity it can take another 10-15 minutes for these hormones to be broken down by the body. This explains why your heart rate takes longer to settle than normal.
- It is vital that you warm up and cool down for about 10 minutes before and after exercise. This gives your body a chance to prepare for and recover from exercise.

When not to exercise

If you have an episode of rejection following your transplant, we would advise you to stop exercising until you have finished your anti-rejection treatment. It is important to keep moving but you shouldn't push yourself.

If you have an infection you may not feel well enough to exercise. We recommend that you try some gentle exercise instead and when you are well enough you can start increasing your activity levels again.

After any period when you need to stop exercising, it is important to gradually ease yourself back into your routine as you may have lost some fitness and you could injure yourself.

If you have any concerns about how much exercise you should be doing, please do contact your physiotherapist.

Things to look out for

If you are more breathless at rest or when doing an exercise that you previously found OK, then you should let the transplant team know.

If your mechanical assist device alarms when you are exercising, or you experience low flow levels, you should contact your specialist nurse for advice.

You might feel some aches and pains in your muscles following exercise. This is quite normal and should resolve in a few days and occur less frequently as you become more active and fitter.

If you have been unwell for some time your body may take a while to adjust to your new exercise regime. Be careful when exercising as pushing yourself too hard or using equipment incorrectly could cause you injury. If you do injure yourself and it doesn't settle with some rest, make an appointment to see your GP. Don't wait until your next clinic appointment!

Going home

When you are ready to go home the physiotherapy team will discuss an exercise plan with you. Depending on how you are progressing and the type of surgery you have had, you may be referred to an exercise class, such as cardiac rehabilitation, or a gym. The physiotherapy team will discuss the various options with you but if you have any questions, just ask!

Questions?

If you need any advice on exercise whilst you are an inpatient, just ask your physiotherapist. If you would like to talk to us once you have gone home you can call us, or alternatively arrange to see us at your next clinic appointment. Please call in advance to make sure that we are free to come and see you!

You can call and leave a message on **01223 638215** and we will get back to you as soon as possible.

Walking and cycling programmes

You can start filling in your walking and cycling programme in hospital, or if you prefer, you can start when you get home. It will enable you to see your progress and keep track of your activity levels.

When you are home, aim to start walking a comfortable distance that you know you can manage. Gradually over subsequent days try and go a bit further. When you are able to manage a few miles comfortably, try increasing your speed or add in some inclines.

You should not be using a pedal bicycle for 12 weeks to allow your wound time to heal. However, you can use a static bike if you have one. Start with a low resistance and gradually build up the time you are cycling. Aim to increase the time you are cycling before increasing the resistance.

It's alright to be a bit short of breath when you are exercising. You should still be able to talk whilst you walk or cycle. If you are getting so breathless that you cannot speak, you are pushing yourself too hard and should slow down. Remember to use your perceived exertion scale. You shouldn't feel exhausted after exercising but you should feel you have done some exercise.

Try to exercise five times a week if you can. Walking is an inexpensive activity that will help to improve the fitness of your heart and lungs, as well as prevent osteoporosis and keep your weight down.

Walking programme

Record the distance you have walked. You could use a pedometer if you have one.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 8								
Week 9								
Week 10								
Week 11								
Week 12								

Cycling programme

You can measure the time you are cycling (T), the resistance (R) and also the distance you travel (D)

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Week 1	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 2	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 3	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 4	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 5	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 6	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 7	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 8	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 9	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 10	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 11	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:
Week 12	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:	T: R: D:

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