

Cystic Fibrosis all about physiotherapy

Airway clearance for babies and young children with cystic fibrosis

With thanks to Katie Ferguson and the Association of Chartered Physiotherapists in Cystic Fibrosis (ACPCF) for preparing the information in this leaflet.

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Airway clearance for babies and young children with cystic fibrosis

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Introduction

In this factsheet you will find information about the lungs and how cystic fibrosis (CF) affects them. It covers the importance of exercise and airway clearance in babies and young children.

Looking after your child's lungs should include daily exercise and possibly daily airway clearance. Your child will have regular clinic reviews by a physiotherapist (physio) where they can give advice. Parents will also be taught how to respond to any changes in breathing (respiratory) symptoms and how to increase daily treatments.

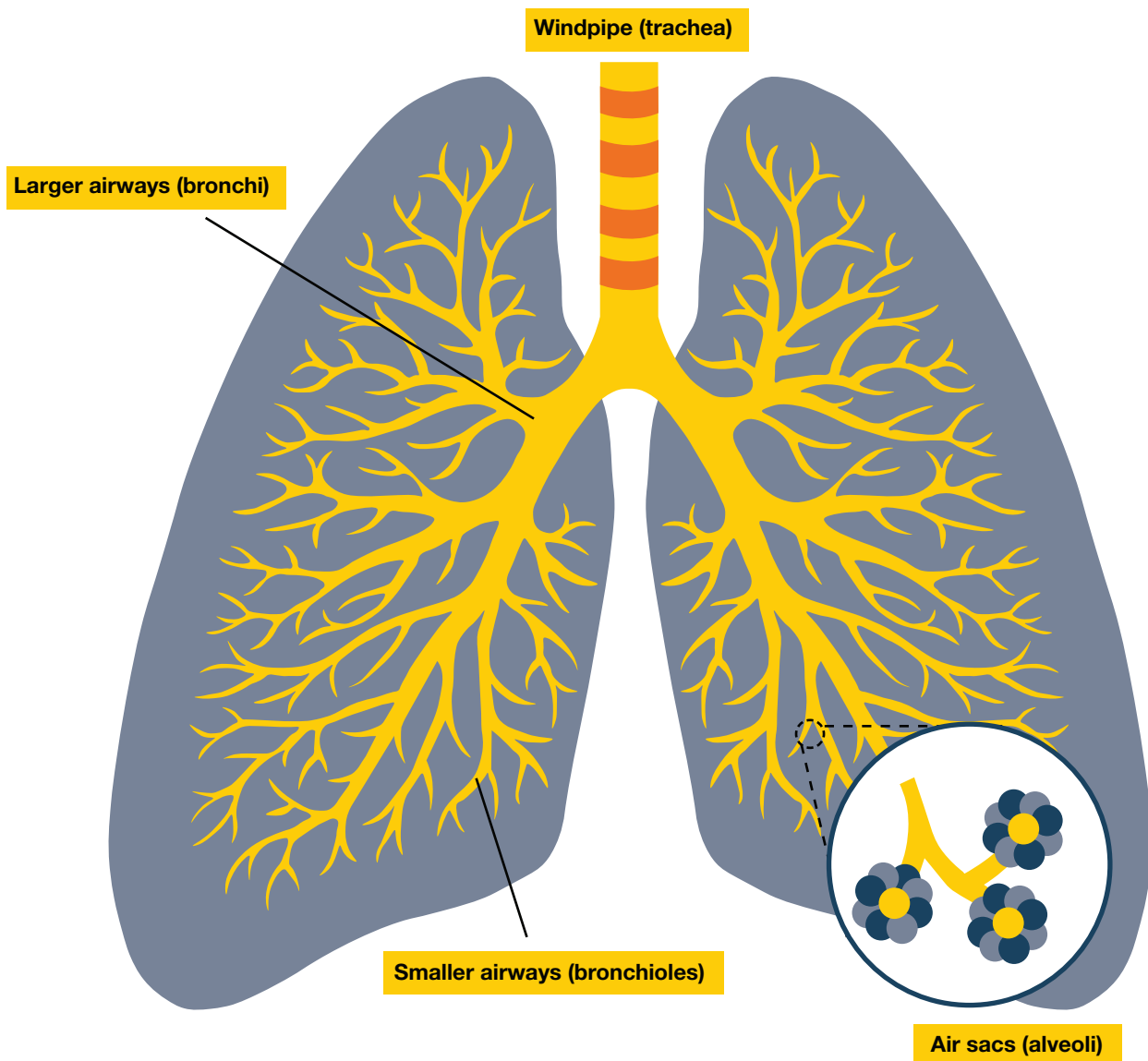
- Exercise is extremely important throughout your child's life. Your child should be encouraged to be as active as possible from an early age.
- The early treatment of any lung infections will help keep the lungs clear and minimise long-term damage. This includes airway clearance.
- Keeping the body strong and flexible, especially the upper body, back and chest, will help breathing and lung function, and maintain good posture.

How the lungs work

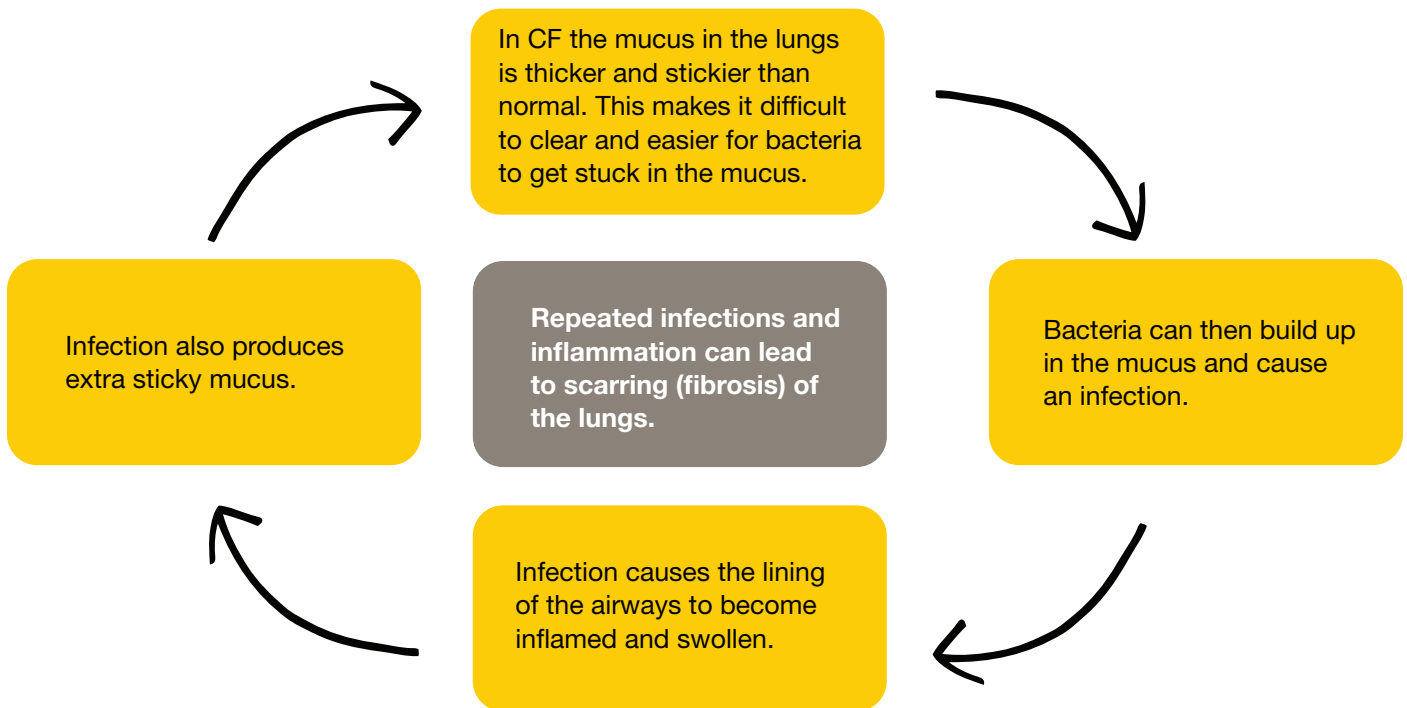
Inside the ribcage there are two lungs that fill with air. Inside each lung there are thousands of air tubes called airways. These airways transport air containing oxygen, from the mouth to little air sacs (alveoli) which are at the end of each airway. This is where the oxygen passes into the blood vessels and goes off around the body where it is needed.

The airways are larger nearer the mouth but divide into smaller and smaller tubes until they reach the air sacs. When we breathe, air is sucked down through the airways to the air sacs.

The lungs are naturally very good at keeping clean. The airways are lined with cells which have tiny hair-like structures on them called cilia. The cilia are covered with a layer of mucus which keeps the airways moist. Any dust, pollen or bacteria that is breathed in will get trapped in the mucus, and the cilia move back and forth together to move the trapped particles up the airways and to the throat and mouth, where they can be coughed out or swallowed.



How are the lungs affected by CF?



How are the lungs of children with CF cared for?

- Regularly checking for lung infections (eg cough swabs)
- Quickly treating infections with antibiotics and other medications
- Doing exercise and airway clearance

Breathing assessment

Most babies with CF do not show any signs of a chest problem, so it is important that you get to know the way your baby normally breathes, so that you can recognise any changes.

It's helpful to get into a habit of looking at your baby's breathing daily. Pick a time when they have no clothes over their neck, chest, back and tummy, perhaps when you are changing a nappy or their clothes in the morning or before bathtime. Make it part of your routine.

To get to know your baby's normal breathing look and listen for these things:

- The way their nostrils and head move as they breathe.
- Whether they breathe through their nose or mouth, and whether you can hear any sounds other than the soft movement of air.
- The colour of your baby's skin and lips.
- The movement of their chest as they breathe.
- How fast or slowly they are breathing (30 to 50 breaths per minute is normal for a baby under one year and 20 to 40 breaths per minute is normal for a baby aged one to two years).
- The feel of their chest as they breathe.
- The way your baby breathes when sleeping and when awake.
- If your baby coughs and whether the cough sounds wet or dry.

Your baby's physiotherapist will teach you to know what is normal for your child. You will learn to spot any changes, so you will know what to do if your child's breathing changes and how to increase physiotherapy treatment.

You know your baby best, so always trust how you are feeling. If you are concerned that your baby's breathing has changed, contact your baby's CF team and talk it through with them.

The person you speak to may ask you about the following signs:

- Is your baby coughing?
- Is your baby breathing faster than normal?
- Do they have a blocked or runny nose?
- Are they calm and settled or do they seem unwell?
- Do they have a high temperature?
- Can you hear any noises when they breathe, like a wheeze?

You can tell them about any other signs you may have noticed.

The CF team will let you know if your baby needs to be seen by them, if you need to do extra physiotherapy or if some medications need to be started.

In an emergency

Seek urgent medical attention if you think your child is very unwell (struggling to breathe). Don't wait for a response from your CF team if it is an emergency. Go to Accident and Emergency (A&E) or call 999. Tell the emergency services your child has CF (they may be able to keep you separate from others with infections or other people with cystic fibrosis). If you do need to use the emergency services, let the CF team know (when you have some time), unless the hospital staff have done this for you.

Benefits of exercise

Exercise is very important if you have cystic fibrosis. It should be encouraged throughout life, starting as a baby.

Exercise, movement and positioning (explained later in this factsheet) can:

- improve air flow to different parts of the lungs and help airway clearance;
- keep the arms, legs and upper body flexible and strong;
- encourage physical development; and
- improve fitness.

Babies take deeper breaths when they exercise and move, and this increases their lung volume and helps to keep their lungs healthy. Deeper breaths also help to clear and move mucus.

Exercise and active play with a toddler help with their physical development. They should be encouraged to play and run around as normal.

As children get older, they should be encouraged to do activities which get them out of breath and to increase their general fitness and endurance.

How much exercise is needed?

The Department of Health and Social Care recommends that toddlers and children should do exercise every day. Physical activity should be spread throughout the day and once your child is moving around, you should encourage them to be as active as possible in a safe and supervised environment. Toddlers who are able to walk on their own are recommended to be active for at least three hours spread throughout the day, and at least one hour of this should be energetic activity.

For all babies, a structured session of exercise should be done every day for at least 15 minutes. For babies with CF this may be done with airway clearance (see page 7).

Your child's physiotherapist can tell you about exercises that your child can do at different ages. The following are some exercises your child's physiotherapist might suggest.

Exercise at different ages

Younger babies

Babies that are unable to sit up without support should be given time after finishing a feed before doing an exercise session. This is so their feed has been digested. We suggest an hour if possible and ideally when your baby is not crying and is happy.

Breathing in different positions

Putting your baby in different positions changes the air flow to different parts of the lungs.

- Spread a blanket on the floor with lots of toys or use an activity gym.
- Play with or sing to your baby while they are in different positions.
- Put your baby in different positions (left, right side, back or tummy).
- Lay your baby on an exercise ball, putting a towel or blanket under them for comfort. Lying your baby on their side gives their upper body a stretch. Make sure you support them on the ball.

Tummy time

Tummy time is very important for all infants and should be done daily. When your baby is awake, aim for them to spend at least ten minutes on their tummy each day. This can be broken into a few sessions throughout the day.

When your baby is small, you can place a small rolled towel or blanket under your baby's arms to help them lift their chest.

Important: Your baby should always be supervised when they are on their front and they should not be left on their tummy when sleeping.



Active play

A baby can do active play on their back. Make good eye contact to check your baby is enjoying this. You can repeat actions as long they are happy. Here are some examples:

1. Stretch both arms together above their head. Bring one arm up and one arm down and then swap
2. Bend and straighten their legs. Bring one knee to their chest and then the other.
3. Mix step 1 and 2 together. Bring one arm up and bring one knee to their chest and then swap.



Ball exercises

Here is a ball exercise for younger babies. Remember to ask your child's physiotherapist to show you how to do this safely.

- Sit on an exercise ball.
- Facing the same way, sit your baby on your lap and lean their back up against you for support. **Make sure you support their head.**
- Place your hands around their chest. They should not be sitting in a slumped position.
- **Gently bounce up and down** in this position on the ball.

As your child gets older and stronger, exercises on the ball can become more advanced. For example:

- Lie them directly on the ball, or hold them in a sitting position.
- Move them from side to side and forwards and backwards to exercise their upper body muscles.



Once your baby has received all of their routine immunisations, they can take part in water-based activities such as 'parent and baby' swimming sessions.



Older babies

As your baby develops, their upper body, arms and legs get stronger, and they will begin to move around on their own. You can encourage them to sit, roll, crawl, walk, squat, climb stairs on all fours and play with push and pull toys. Encourage any other movements they are doing.

Once they are able to run, they should be encouraged to get out of breath and enjoy outdoor activities.

You might like to look for groups to join where babies and toddlers can exercise and move about in a safe environment, such as soft play centres, parent and child gym sessions and baby yoga classes.

Airway clearance

Airway clearance is also known as chest physiotherapy (physio). It helps to keep the lungs clear of mucus. There are different ways of doing this, and it will depend on your child's age.

It is important to learn how to do airway clearance and to monitor your child's chest and increase airway clearance treatment if your child needs it. (More information about doing a breathing assessment on page 4).

You might not need to do airway clearance every day, but there will be times when daily sessions will be required. One or two daily sessions may be suggested so that your child develops a routine and is used to it, and so that you are familiar with the technique. As children become older and more able to carry out effective breathing exercises, daily airway clearance can help prevent the build-up of mucus and may be suggested.

Some commonly used airway clearance techniques are described below. **This is a brief summary and does not give full details of each technique.**

Your child's physiotherapist will show you the best techniques for your child.

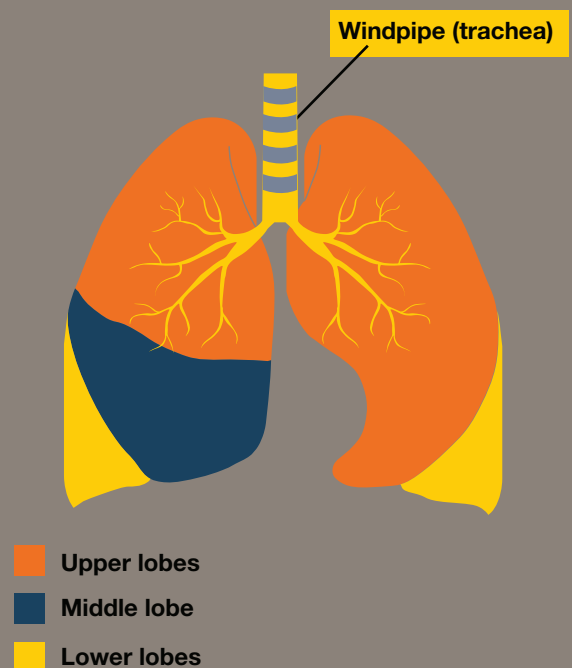
Positioning for airflow and airway clearance

Lungs have different areas within them called lobes.

Placing your baby in different positions improves airflow in different areas of the lungs. This is also thought to help move mucus into larger airways so that it can be cleared from the lungs or coughed out.

Tips:

- Don't do physiotherapy immediately after a feed, as this can lead to reflux or your baby being sick.
- Don't tip your baby's head lower than their hips, as this can lead to reflux or your baby being sick.
- Place your baby on a pillow on your lap to do a treatment, supporting their head.



Percussion (patting)

Percussion is used to help move mucus in the lungs. It is usually done in different positions. To do percussion, the chest is patted firmly and rhythmically with a cupped hand, fingers or a soft cup (only if it has been provided by your child's physiotherapist). You can use a layer of clothing or a towel to cushion the skin. Your child's physiotherapist will show you the best treatment positions for your baby. They will also suggest times to fit it into your baby's routine.



Lying on their back to treat the upper lobes



Lying on their tummy to treat the upper part of the lower lobes



Lying on their left side to treat the middle and lower lobes on the right



Lying on their right side to treat the lobes in the bottom of the left lung



Sitting supported to treat the upper lobes

Infant or baby PEP

PEP stands for Positive Expiratory Pressure. A soft mask is placed on your baby's face. As your baby breathes through the mask, a small pressure is made as they breathe out. This pressure holds open the tubes in the lungs and helps to push mucus up and out of their lungs.

Baby PEP is often done sitting on an adult's knee, on an exercise ball. Combining PEP with gentle bouncing can help to calm and settle your baby.

Your baby's physiotherapist will show you how to do this safely and effectively.

There are many other physiotherapy techniques which you can do as your child gets older (some may not be suitable for a baby). These include:

- blowing games;
- PEP given through a mask or mouthpiece;
- oscillating PEP (Flutter® and Acapella®); and
- autogenic drainage (AD) with assisted autogenic drainage (AAD).

Leaflets for some of these techniques are available from our Helpline by calling 0300 373 1000 or 020 3795 2184 or emailing helpline@cysticfibrosis.org.uk and can be found online at cysticfibrosis.org.uk/physioleaflets.

All children are different and their needs will change over time. Your child's physiotherapist will always monitor their airway clearance and will show you how to make changes to suit your child.

Important advice for using an exercise ball

It is important to use a ball that is the correct size for your height, for stability and to avoid injury.



45cm gym ball

Suitable for height 5'0"
(152cm) or shorter



55cm gym ball

Suitable for height
5'1"-5'6" (155-167cm)



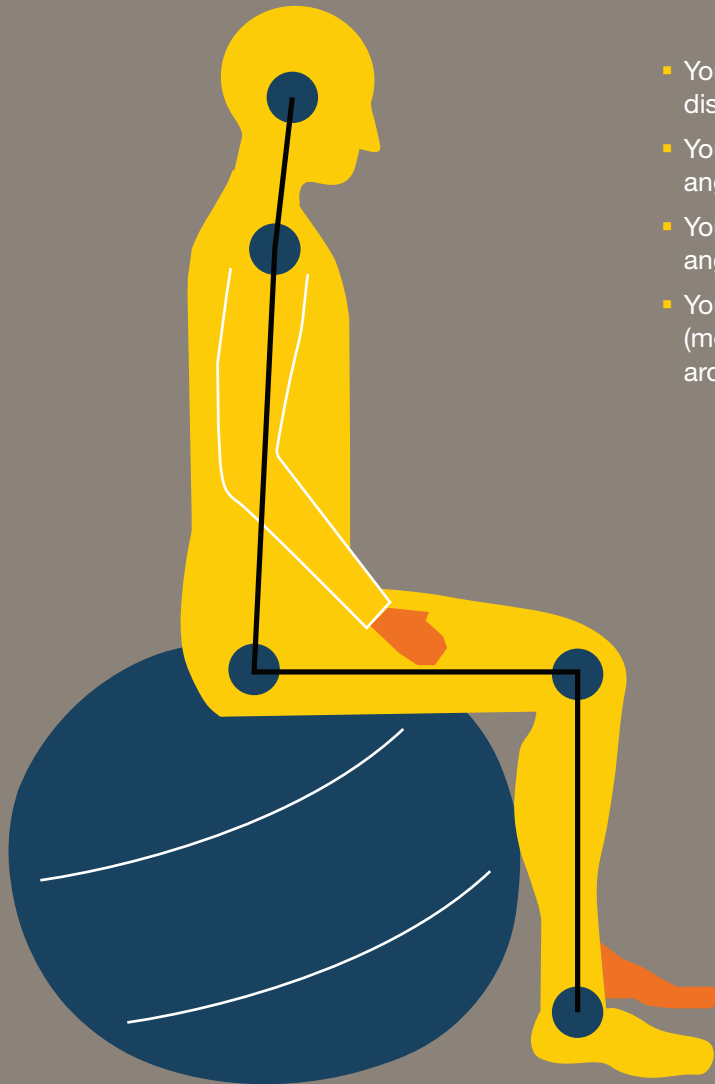
65cm gym ball

Suitable for height
5'7"-6'1" (170-185cm)



75cm gym ball

Suitable for height 6'2"
(188cm) or taller



- Your feet should be flat on the floor and hip distance apart.
- Your hips, knees and ankles should be at a right angle (90 degrees).
- Your thighs should be parallel to the floor (not angled downward).
- Your spine should be in a neutral position (meaning that your lower back should not be arched too far forward or backward).

Correct posture sitting on an exercise ball

Airway clearance plan

This airway clearance plan is also available from our Helpline by calling 0300 373 1000 or 020 3795 2184 or emailing helpline@cysticfibrosis.org.uk and can be found online at cysticfibrosis.org.uk/physioleaflets.

Time	Action
Morning	<p>Before airway clearance:</p> <p>Airway clearance:</p> <p>After airway clearance:</p>
Afternoon/evening	<p>Before airway clearance:</p> <p>Airway clearance:</p> <p>After airway clearance:</p>

<p>Cleaning information:</p>	
<p>Additional information:</p>	

This leaflet should only be used if it has been given to you by your child's physiotherapist, who will have decided if this is a suitable treatment for your child. Do not use this leaflet without first consulting with your child's physiotherapist.

The information on this leaflet is based on clinical best practice and consensus of opinion by physiotherapists within the Association for Chartered Physiotherapists in Cystic Fibrosis (ACPCF). For a detailed review of the evidence for these techniques, please review the 'Standards of Care and Good Clinical Practice for the Physiotherapy Management of Cystic Fibrosis', fourth edition, 2020. To view our consensus documents, please visit cysticfibrosis.org.uk/consensus.

The Cystic Fibrosis Trust provides information about CF through our factsheets, leaflets and other publications. All of our publications can be downloaded from our website or ordered from our Helpline.

Our Helpline can help you with a range of issues, no matter how big or small. Our trained staff can provide a listening ear, practical advice, welfare and benefits information or direct you to other sources of support. The Helpline is open Monday to Friday, 9am–5pm, and can be contacted on 0300 373 1000 or by emailing helpline@cysticfibrosis.org.uk.

For more information about the Association of Chartered Physiotherapists in Cystic Fibrosis, please contact ACPCFmembership@gmail.com.