

Breathe and be out of breath

A HANDBOOK ON EXERCISING SAFELY FOR PEOPLE
WITH RESPIRATORY DISEASE

2nd revised
edition

The Organisation for Respiratory Health in Finland promotes respiratory health and good life for people suffering from respiratory diseases.

 Hengityслиitto

This handbook provides information on respiratory physiology and various breathing techniques as well as exercise tips for people of all ages and fitness levels. The exercise tips are designed particularly for people with a respiratory disease, so they are safe and easy to try alone or together with others.

Breathing is often taken for granted and seen as an automatic function. People usually only pay attention to it when they experience trouble with it. You can and should pay attention to breathing, even if you have no issues with it. You can practice your own lungs to function as efficiently and safely as possible, even if your lung function is restricted. Practicing breathing techniques helps in taking care of your health, and it can also serve as a means of calming your mind when you are stressed, for example.

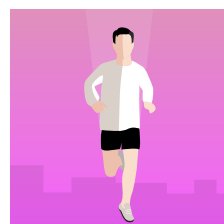
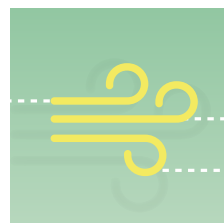
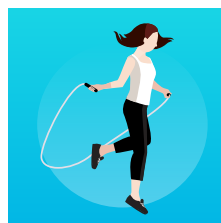
Did you know that:

- » We draw air into our lungs almost 20,000 times a day.
- » When breathing normally at rest, an adult takes 12 to 16 breaths per minute.
- » The respiratory rate of an adult under severe exertion can be up to 35–60 times per minute.
- » One in five Finns suffers from a respiratory disorder at some point of their life or has been diagnosed with a respiratory disease.

Breathing is needed for all bodily functions, so it is worth concentrating on. We are adaptive beings, so our breathing also adapts to different conditions. In addition to respiratory disease, breathing is influenced by stress, posture, poor breathing technique and thoughts and emotions, among other things.

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1 Respiratory physiology

1.1 What happens when we breathe – oxygen transport in the body

Humans need oxygen to enable their bodies to use nutrition as a fuel for cells. Oxygen is used to burn nutrients for energy at the cellular level, and carbon dioxide and metabolic wastes are produced as waste from the process.

During inhalation, oxygen-rich air is from outside the body is transported into the pulmonary alveoli in the lungs. From there, the oxygen continues toward the heart via pulmonary circulation. The heart then pumps the oxygenated blood to other parts of the body. During strenuous exercise, as much as 2/3 of our bloodstream can be circulating in our muscles. Carbon dioxide-rich blood returns through the heart to the alveoli, and carbon dioxide is removed from the lungs during exhalation.

Air that is clean, humid and warm is the most suitable for breathing, since it does not irritate the mucous membranes

of the respiratory tract. During inhalation, the nose also filters out impurities from the air. The air is also warmed and humidified in the nostrils. During physical exertion, we also support our respiration by breathing through the mouth to get the oxygen we need.

1.2 Difficulties in breathing

Problems with breathing and oxygen transport are often first detected during physical exercise when the oxygen and energy consumption of muscles increases. Many respiratory diseases make it difficult to breath without effort. This may be due to bronchial obstruction and contraction, inflammation of the mucous membranes and the resulting excess mucus, a reduction in the amount of lung tissue, an increase in the residual volume of air in the lungs, or the lungs being prevented from fully extending.

Difficulty in breathing does not directly imply a respiratory disease. Instead, it can also be due to smoking, stress and pain, or a curable respiratory infection, for example.



The most common causes for difficulties in breathing include:

CAUSE	DESCRIPTION OF DIFFICULTY
Bronchial obstruction and contraction (e.g. asthma, COPD)	<ul style="list-style-type: none"> » Bronchial obstruction hinders the flow of air into the lungs. » With chronic obstructive pulmonary disease, an inflammation of the mucous membrane in the bronchi and the excess mucus also hinder the airflow.
Excess mucus (e.g. bronchiectasis)	<ul style="list-style-type: none"> » The excess of mucus obstructs the bronchi and hinders the flow of air into the lungs. It also predisposes to bacterial infection, which further hinders airflow.
Shortness of breath caused by exertion (e.g. poorly controlled asthma, severe asthma)	<ul style="list-style-type: none"> » During physical exercise smaller airways may contract, which reduces airflow. This leads to a feeling of shortness of breath or that there is not enough oxygen while inhaling. The problem, however, is in the difficulty with exhaling. » Exercise in cold and windy weather may cause bronchial tubes and airways to contract and produce mucus. This causes difficulties in breathing particularly for those with respiratory diseases that cause their bronchial tubes to be irritated and obstructed.
Stiffening of lung tissue (e.g. pulmonary fibrosis)	<ul style="list-style-type: none"> » Stiffening of the lung tissue is felt as difficulties with inhalation.
Difficulty in the movement of diaphragm (e.g. due to excess weight)	<ul style="list-style-type: none"> » Abdominal obesity can prevent the diaphragm from moving correctly. This means the diaphragm must work harder to push the organs and the fat tissue surrounding them downwards during inhalation. With poor diaphragm movement, the accessory muscles of respiration are also needed in breathing. » If a person is severely overweight, breathing is too superficial, which causes oxygen levels in the blood to be lower than normal. » In severe respiratory diseases, even a full stomach can cause respiratory issues, since the diaphragm must work harder during inhalation.
The structure of the pulmonary alveoli changes.	<ul style="list-style-type: none"> » COPD destroys pulmonary alveoli, which makes respiratory gas exchange more difficult. » In diseases affecting lung tissue, such as pulmonary fibrosis, the infection creates scar tissue, which makes the walls of the pulmonary alveoli thicken. This makes it more difficult to transfer oxygen into the pulmonary circulation.
Pharyngeal narrowing (e.g. sleep apnoea)	<ul style="list-style-type: none"> » The lower pressure caused during inhalation due to pharyngeal narrowing may temporarily block the upper respiratory tract partially or completely during sleep. » Loose tissue in the pharynx repeatedly obstructs the airways during sleep, causing breaks in breathing lasting up to several dozen seconds. Interrupted sleep causes, among other things, daytime fatigue.
Pain, nervousness, stress and fear	<ul style="list-style-type: none"> » The balance of breathing is disturbed, which is felt as accelerated breathing, holding your breath or superficial breathing. » Breathing is quick and lacks breaks between inhalation and exhalation. This can lead to a lack of oxygen in the body and, at worst, trigger hyperventilation.

1.3 The respiratory system

The airways consist of the **upper respiratory tract** (nasal cavity, pharynx, larynx), which, in addition to breathing, participates in swallowing, sound production and coughing, as well as the **lower respiratory tract** (trachea, bronchi, bronchioles, pulmonary alveoli), which forms the lung tissue.

Breathing also requires several **muscles of respiration**, i.e. the diaphragm, external intercostals, the accessory muscles of respiration in our neck and shoulders and abdominal muscles.

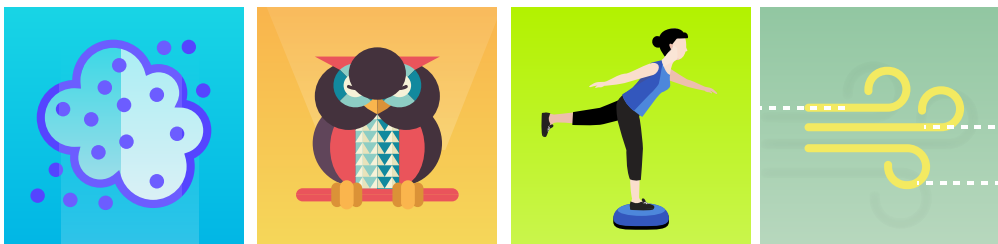
The diaphragm is our most important respiratory muscle. Resembling an umbrella, the diaphragm is a thin arch between the thoracic cavity and the abdominal cavity. It attaches to the lowest ribs, the sternum and the thoracic vertebrae. The diaphragm is activated during inhalation and acts like a bellows. Diaphragmatic breathing activates the deep muscles that support the back and helps maintain a healthy back. The diaphragm is also needed for many activities that require a bit of force, such as coughing, laughing and vomiting.

The muscles of the neck and shoulder area function as accessory muscles of respiration, since they assist in inhalation during exercise or when breathing is otherwise difficult. They also help increase pulmonary ventilation (see page 6).

The external intercostals are needed in expanding the chest during inhalation. They lift the ribs upwards.

The internal intercostals pull the ribs downwards during active exhalation, returning the chest to its resting position.

The abdominal muscles enhance active exhalation by pushing the abdominal organs and the diaphragm upwards. This happens when we blow air, for example.



2 Phases of breathing

Good breathing technique helps the human mind and body adapt to everyday challenges. Good breathing technique ensures that pulmonary ventilation is consistent throughout the lungs. This improves oxygen supply as well as the removal of carbon dioxide and mucus. Good breathing is signalled by a constant flow of air.

Normal breathing has 3 phases: inhalation, exhalation and a small pause before the next inhalation. In practice, exhalation should be half as long as inhalation. Factors affecting the frequency of breathing include effort, nervousness and pain.

The ratio of inhalation and exhalation of an adult is 1:1.5–2, where the duration of inhalation is 1 and the duration of exhalation is 1.5–2, i.e. at least one and a half times longer than inhalation.

When breathing normally at rest, an adult takes 12 to 16 breaths per minute. Under intense exertion, the breathing rate can increase significantly and become more than 35 times per minute.

Inhalation

Inhalation is the active stage of breathing. During inhalation, the highest point of the diaphragm can be pressed downwards by up to 10 centimetres. This can be seen on the outside of our bodies, as our upper abdomen rises. The lungs are filled up to the lower parts. The external intercostals lift the ribs upwards, and this

movement is visible as the chest expands to the sides and the front.

Inhalation through the nose is sufficient at rest, while sitting and during easy everyday chores. More oxygen is required under strain, which means that we start to breathe through the mouth (cf. chapter 1.1).

Did you know that:

- » The blood vessels of the nasal mucous membranes warm up the air during inhalation (from 0 °C to around 35 °C).
- » The nasal mucous membrane covering the inside of the nose and the sinuses increases the air's humidity to more than 90% during inhalation.
- » Impurities inhaled with air are captured by the mucous membrane and the cilia during inhalation.

Exhalation

Exhalation is the passive phase of breathing, during which the muscles used for inhalation relax. The flexible structure of the lung tissue restores the chest to its resting position, and the diaphragm relaxes against the thoracic cavity. Exhalation is followed by a short, almost unnoticeable pause, during which all the respiratory muscles are relaxed.

While breathing at rest, the accessory muscles of respiration in the neck and shoulder area remain relaxed and inhalation can only be seen as a small rise of the upper abdomen and an expansion of the chest.

3 Breathing exercises

You can influence your own breathing and well-being by doing breathing exercises and by learning how to relax your breathing. Everyone should learn to recognize their own breathing habits and the things that affect it.

A good goal is to balance your own breathing, making breathing relaxed and continuous. This helps the breathing to support the well-being of your body and mind and helps you in adapting to everyday challenges. With a balanced breathing technique, pulmonary ventilation is consistent throughout the lung, which enhances the respiratory gas exchange.

Everyone's breathing can sometimes become unbalanced. In unbalanced breathing, breathing can account for up to 20–40% of your total energy consumption, when normally it uses about 2%. With severe respiratory diseases, breathing can consume a lot of energy, which in turn reduces the physical and mental resources that remain for other activities.

Those with respiratory disorders can use breathing exercises and physical exercise to boost the removal of mucus from the airways (bronchi and bronchioles), since they increase air flow and the movement of the cilia, making mucus loosen and rise upwards more easily.

Various relaxation exercises and exercise that combines breathing with movement (e.g. pilates and yoga) support balanced breathing. The following exercises will help you be more aware of your own breathing.

Good posture

Good posture helps with increasing the effectiveness of breathing. Many posture mistakes affecting your torso or the neck and shoulder area prevent your chest from properly expanding during inhalation. It is a good idea to start breathing exercises by ensuring your posture is good by looking at it from the side and front in the mirror.



Fixing your posture mistakes

COMMON POSTURE MISTAKES	FIX
rounded shoulders	re-align your shoulders with your ears and relax them so they drop to their resting position
rounded back	straighten your upper back
poking your chin	tuck your chin in
flat back, belly pushed forward	inhale and restore the natural curve of your spine and "pull" your bellybutton toward your spine during exhalation.

Diaphragmatic breathing

Diaphragmatic breathing can be practiced while sitting, standing or lying on your back. The easiest way to start breathing exercises is lying on your back with your knees bent and your hand resting on your upper abdomen. You can feel and assist the movement of the diaphragm with your hand. During inhalation, the upper abdomen rises and during exhalation it relaxes under the hand. If you practice while sitting or standing, you can use a mirror to ensure that the muscles in your neck and shoulders remain relaxed.

Exercise 1

Lie down on your back, bend your knees and put one hand on the top of your upper abdomen. Feel your upper abdomen and your hand rise during inhalation and, correspondingly, relax back down during exhalation. Rest your other hand on the side of your body or on your lower abdomen.

Exercise 2

Sit with your lower back straight and lean on your thighs with your arms. Gravity will assist your diaphragm by pulling your organs away from its path.

Chest mobility

Increasing chest mobility can help your lungs to expand further to the sides.

Exercise 3

Lie down on your side, bend your knees and ensure you are properly supported. Place your bottom hand on your upwards-facing ribs and breathe towards that side. During inhalation, your chest should expand making your hand rise, and during exhalation your chest should contract making your hand move downward.

Exercise 4

This exercise can be done both while sitting down or standing up. Put a strap (for example, an non-stretching scarf) around your chest so that it runs from behind your shoulders and under your armpits to the front. Cross the ends of the strap in front of you and grab them from underneath with an underhand grip. During deep inhalation, the chest expands. Give room with the strap. During exhalation, the chest returns to rest in the starting position. You can enhance this by tightening the strap, i.e. by pulling your hands gently to the sides.



Pursed lip breathing

Pursed lip breathing improves the functioning of the respiratory muscles and makes exhalation calmer. In this exercise, you breathe out with your lips pursed, which means there is a slight resistance during exhalation. The increased pressure keeps the smaller airways open, making it easier to exhale the air. In addition, pursed lip breathing improves the functioning of the respiratory muscles.

This breathing technique also helps to calm down breathing even while exercising. During exercise, you must find the

amount of exhalation resistance that best suits you. Too much resistance may increase the feeling of shortness of breath.

Stretching and relaxing

The accessory muscles of respiration, i.e. the muscles of the neck and shoulder region, can become overused and stiff if the strain increases and you often feel a shortness of breath. This why it is important to remember to stretch and relax these muscles.



4 Normal and abnormal shortness of breath

Being out of breath is not always a bad thing. Breathlessness is natural and getting out of breath during physical exercise is in fact recommendable, since it is a sign of the exercise being effective. The rule of thumb is that your breathing should start returning to normal when the physical exertion stops. Abnormal shortness of breath is the result of a disturbance in oxygen flow, and can manifest without physical exertion and continues after the physical exertion has ended. It is important for people with respiratory diseases to learn to distinguish between normal and abnormal shortness of breath and to identify the things that cause abnormal shortness of breath.

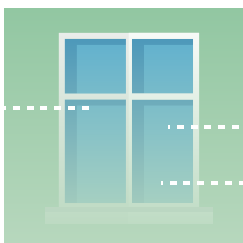
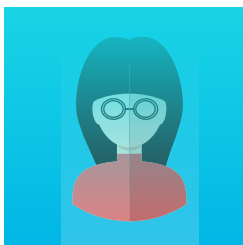
When a respiratory disease is controlled, shortness of breath can be prevented. Shortness of breath must be taken seriously if it starts suddenly and the cause is not clear, or if it manifests as a new symptom. In these cases, you must seek medical care. Otherwise, shortness of breath is treated according to your self-care instructions, often with inhaled medications that open airways. These medicines can also be taken proactively when it is known that physical exertion triggers shortness of breath.

4.1 Shortness of breath on exertion

Physical exertion can cause difficulties with exhalation. Shortness of breath on exertion is diagnosed if the readings of a peak flow meter during or after exercise show a reduction of 15–20% from the rest level during exercise. Shortness of breath on exertion may occur both during exertion and for several hours after the exertion ends.

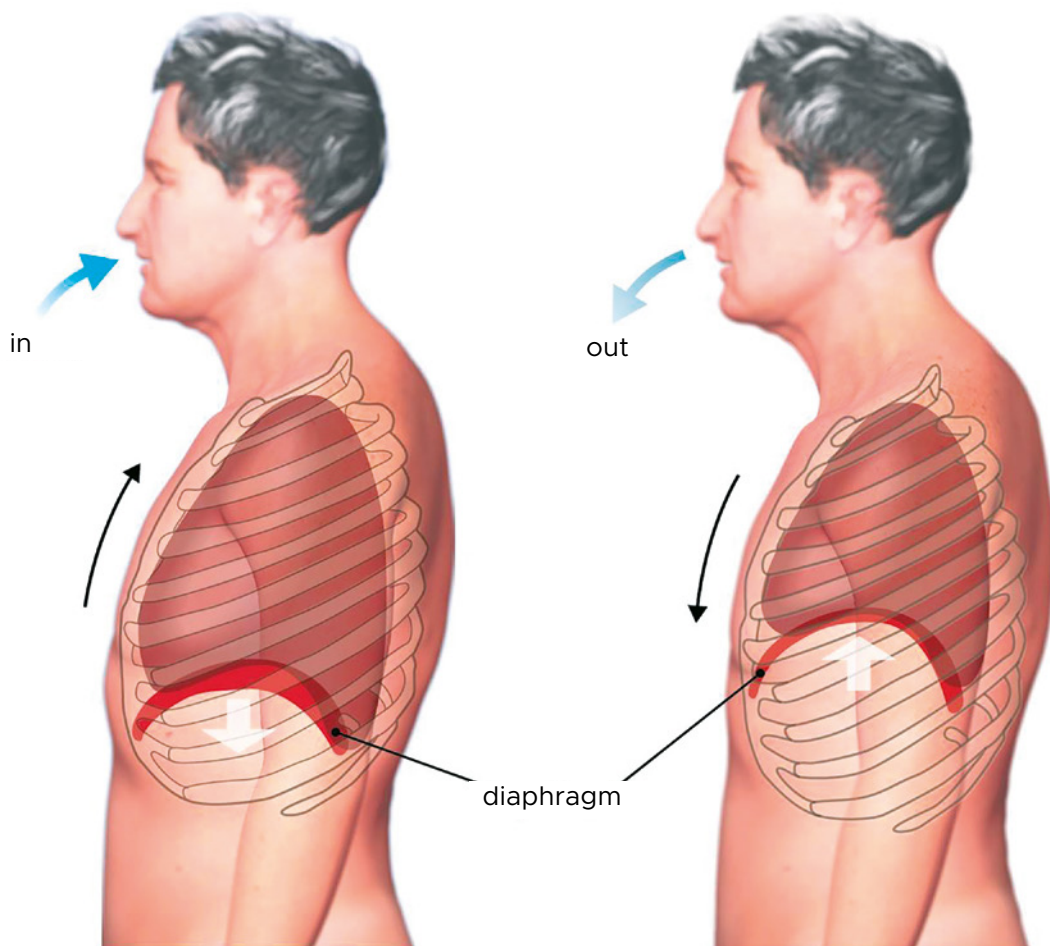
When breathing is rapid, the intensified airflow cools down of the airways and makes them dry. This causes the walls of the respiratory tract to release neurotransmitters, which in turn contract the airways. The most natural way to increase tolerance is to improve physical fitness. The fitter you are, the less frequent and milder your shortness of breath will be.

In people with asthma, shortness of breath during physical exertion often indicates inadequate medication or that you are experiencing a flare-up. When used regularly, medication to treat the inflammation of the mucous membranes of the bronchi prevents shortness of breath on exertion and enables the person with asthma do sports as normal.



Ways to relieve shortness of breath:

- » Stay as calm as possible. Emotions (for example, fear, nervousness, sadness, fatigue) can also increase shortness of breath.
- » Change your position into one that is easy to breathe in.
- » Calm your exhalation with pursed lip breathing.
- » Take your medicines prescribed by a physician. Ensure you take the medicine with the correct technique.
- » Go near an opened window, a table fan or similar.



In other respiratory diseases, shortness of breath may be caused by changes in the pulmonary alveoli and issues in respiratory gas exchange.

4.2 Positions facilitating breathing

Shortness of breath may feel the worst when lying down. Positions that make breathing easier help the diaphragm and reduce the stress on your upper body. Good posture also reduces shortness of breath.

Sit down (for example, on a chair, a rock or a stump) and lean against your

thighs with your forearms. Spread your feet as much as you need to keep your back straight. Do not let your head hang, it should be an extension of your back. Focus on breathing calmly in this position.

Lean forward and support yourself by pressing your hands against a tree trunk or your shopping cart, for example.

Lean your back, for example, against a wall or tree trunk and focus on breathing calmly here.

Sit in a semi-seated position. If you are experiencing a flare-up or you have the flu, it may be easier to sleep in a semi-seated position as well.

5 Excess mucus and removing mucus from the airways

Normally, mucus is removed from the bronchi with the movement of the cilia on their surface. Diaphragmatic breathing enhances the removal of excess mucus from the airways in itself.

The accumulation of mucus in the airways can prevent the passage of respiratory gases in bronchioles. In addition, the mucus predisposes to bacterial infections. Excess mucus can lead to various symptoms such as the need to cough and coughing, wheezing, shortness of breath, respiratory infections and fatigue.

Various means and techniques can be used to remove mucus from the airways. Before removing and draining mucus, it is advisable to take medication prescribed by your physician meant for opening your bronchi. In addition, inhaling warm water vapour and drinking plenty of liquid reduces the thickness of mucus, making the mucus rise up easier when coughing.

⚠ Please note that if water is boiling, the vapour is too hot for inhaling and it may irritate the bronchi.

The objective of excess mucus removal is to:

- » Prevent and reduce the symptoms caused by the mucus.
- » Prevent infection in the respiratory tract caused by treatment-resistant bacteria.
- » Improve air flow and respiratory gas exchange.
- » Improve physical and mental well-being and performance.
- » Reduce flare-ups.

Remember to focus on relaxed and calm breathing before starting the exercises and after them!



BLOWING INTO A BOTTLE TO REMOVE EXCESS MUCUS

The bottle blowing technique helps with effectively removing excess mucus from the airways.

The bottle blowing technique is an effective and easy mucus removal method. When you blow through the tube into the water in the bottle, the pressure in your airways increases. This opens up the airways between bronchioles, allowing air to flow behind the mucus and push it into the larger airways. From the larger airways, excess mucus is easier to remove by coughing or huffing.

Preparation

- » If you are taking medication for keeping your bronchi open, you can take the medicine about 15 minutes before this exercise.
- » Fill the bottle with water up to the mark (10 centimetres). Push the tube through the mouth of the bottle and all the way to the bottom of the bottle.
- » Perform the bottle blowing exercise while sitting at a table with good posture. If necessary, support your elbows on the table.
- » Hold the bottle with one hand and the tube with the other. Remember to keep your shoulders relaxed!
- » Before the blow bottle exercise, take 3–4 calm breaths:
 - Breathe in through your nose and calmly exhale. Breathe in with the upper parts of your lungs. Your upper abdomen should rise when inhaling and relax when exhaling.



Remember that excess mucus may not start moving until 15–30 minutes after exercise.

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Methods and techniques that enhance the removal of mucus (huffing, bottle blowing) are safe if done calmly. If you have a contagious respiratory infection, do the mucus removal exercises in a space where there are no other people. This reduces the risk of infecting others.

How to blow into the bottle

- a) Breathe in through your nose.
 - b) Put the tube in your mouth, lips firmly around the tube.
 - c) Blow out through the tube slightly more intensely and for longer than normal so that the water in the bottle bubbles. Be sure to breathe calmly, even if the exhalation is a little heavier and longer than normal.
- » Repeat steps a) to c) for a total of 10–15 times, after which take a break.
 - » During the break, calm and relax your breathing as you did before the bottle blowing exercise.
 - » If necessary, remove excess mucus by coughing or huffing.
 - » Repeat in sets of 10 to 15 blows at least 2–3 times.
 - » You can also do more sets if you feel that there is still excess mucus in your airways and you have the strength to do more.
 - » You can do the bottle blowing exercise 3–4 times a day.

Cleaning the equipment

- » After the bottle blowing exercise, wash the bottle and the tube with dishwashing detergent.
- » If necessary and particularly if you have an active infection, place the bottle and tube in boiling water for 2–3 minutes (make sure the tube can be cleaned in boiling water).

Talk to your physician about the bottle blowing exercise if:

- » you have a severe respiratory or heart disease.
- » you feel nauseated or dizzy during the exercise.
- » you get heart symptoms.
- » there is blood on the mucus.



You can also learn the bottle blowing technique with a video:

<http://www.hengitysliitto.fi/puhalla-pulloon>

5.1 Bring up mucus from the airways

If coughing requires too much strength, increases shortness of breath or prevents the removal of mucus, you can use the huff coughing or huffing technique. Huffing is gentler for the bronchi and requires less strength. It also brings the mucus up easier.

While huffing, the larynx stays open. When you cough, it closes and opens as you cough. With huffing, the mucus can be effectively brought up into the bronchi and the larynx, from where it is easier to remove with a light cough.

How to huff cough

- » Sit down and calmly fill your lungs with air through the nose.
- » Make sure to fill the lower parts of your lungs as well by placing your hand on your upper abdomen and ensuring that it rises during inhalation.
- » Blow the air out through your mouth with a calm and long exhalation.
- » Fill your lungs with air again, and when you exhale, huff the air away from the bottom of your lungs. This brings the mucus up into your bronchi and larynx. Lightly cough to remove the mucus.



6 Voice and taking care of it

It pays to take care of your voice since respiratory diseases can affect it in many ways:

- » Dryness of the mucous membrane lining the larynx can impair the vibrating ability of the vocal cords.
- » Inhaled medications can dry the mucous membranes on the larynx.
- » Some antihistamines also make mucous membranes dry and thicker.
- » Respiratory allergies can cause the mucous membranes of vocal cords to become infected.
- » Coughing can also strain your voice.

The above symptoms cause voice-related issues, such as hoarseness, voice fatigue, cracking and difficulties in producing sounds when you start speaking.

Air humidity and temperature also affect your voice. The more moist the mucous membranes, the better sound carries, so speaking is easier in humid air. Air impurities and dust (especially road dust) irritate the mucous membranes and cause hoarseness.

Dry mucous membranes are easily damaged and leave the membranes open to microbes. Cold air dries the mucous membranes of the respiratory tract and, among other things, cause the mucous membranes of the nose to be inflamed, causing your nose to run. In addition, very cold air increases the resistance of airflow in the airways and causes shortness of breath, which also make it more difficult to produce sounds.

Tips for taking care of your voice:

- » After inhaling asthma medications, it is advisable to rinse and gargle the medication out of the mouth and especially from the larynx.
- » Moisturising the mucous membranes of the respiratory tract by inhaling water vapour or with a steam inhalator and drinking water help your voice work better.
- » The mucous membranes of the nose can be irrigated, for example, with a neti pot.
- » Various voice exercises can be used to make your voice clear and sufficiently loud.
- » Sing or hum in a relaxed manner. However, avoid too high or low voice levels.
- » Read out loud. Liven up the stories and let your voice convey the moods of the story in moderation.
- » Relax the larynx with low sighing and letting out a sound.
- » Laugh often, as it relaxes breathing and the diaphragm.
- » Yawn. Yawning aloud with your mouth wide open relaxes the vocal system, body and mind.
- » Protect your voice. If your voice is strained, avoid talking in cold, dry and dusty spaces. Protect your throat from the cold and use an air warming respirator in the winter, if necessary.

7. Safe exercise

Being fit makes life easier for people with respiratory diseases, increases the quality of life and improves everyday functional capacity. The most important thing is to do exercise that leaves you out of breath. It is vital for people with respiratory diseases to do versatile exercises. It is an important part of self-care together with medical treatment. Exercise improves stress tolerance and reduces the difficulty and frequency of symptoms brought on by exertion (shortness of breath, excess mucus, wheezing, cough).

People with respiratory diseases can increase their physical fitness based on the same principles as everyone else. The most important thing is to find a fun way to exercise regularly and vigorously. People with respiratory disorders can engage in almost all sports, excluding extreme sports such as scuba diving, mountaineering and skydiving.

Exercise that gets you out of breath is also a good breathing exercise in itself, regardless of the type of your respiratory disease or its severity. Exercise can be used to strengthen the muscles of respiration, ventilate and strengthen all parts of the lungs, remove mucus and maintain lung function.

Please note that people requiring supplementary oxygen during exertion should follow their physician's instructions for the administration of oxygen during exercise (l/minute).

Benefits of regular exercise for people with respiratory diseases:

Less:	Better:
symptoms during exertion	mood and energy levels
shortness of breath	physical condition and performance
mucus	immunity, faster recovery from flare-ups, fewer days spent in a hospital
feeling weak	stress tolerance
flare-ups	posture, chest mobility and pulmonary ventilation

7.1 Incidental and endurance exercise

The best health benefits are achieved when incidental exercise is supplement with endurance exercise a few times per week.

The recommended amount of endurance exercise is a total of 2.5 hours per week, or 1 hour and 15 minutes of high-intensity exercise. In addition, muscle strength and balance exercises should be engaged in at least two times a week.



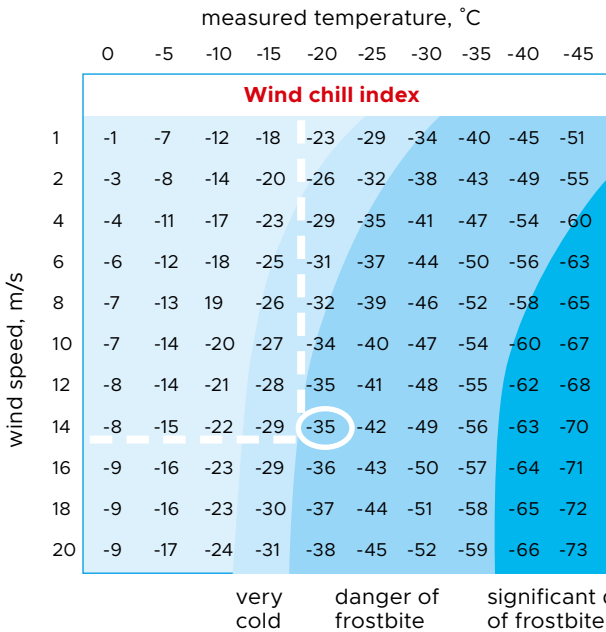
Daily exercise can be carried out in short instalments during the day.

In everyday life, it is good to reduce stationary time, such as sitting, and to favour incidental exercise. Take the stairs instead of using the elevator, or walk to work. With walking, you should aim for 10,000 steps per day. The importance of sleep and a diverse diet for physical health should not be forgotten either.



If you have a respiratory disorder, you should know the following:

- » Balance training is important for everyone over the age of 65.
- » A person with COPD can prolong their life with a number of years by walking just 6,000 steps each day.
- » In sub-zero temperatures, you can use an air warming respirator to heat up inhaled air. Breathing through it increases airflow resistance, so be sure to lower the intensity-level of the exercise to ensure oxygen supply to the body.
- » The degree to which cold air increases the respiratory symptoms varies by person to person. The wind also increases the coldness of air and increases symptoms.



AIR TEMPERATURE AND RESPIRATORY SYMPTOMS

- Between -1 °C and -12 °C**
 - > more mucus is produced
- In -20 °C**
 - > respiratory symptoms are triggered
 - > may trigger an inflammatory reaction
- Between -15 °C and -25 °C**
 - > shortness of breath, coughing, wheezing

Source: Holmer 2002, Stocks et al. 2004

Wind chill index indicates the combined effect of wind and temperature.

Source: Oszczewski & Bluestein, 2005

The seasonal influenza vaccination is worth taking, since all respiratory infections can reduce lung performance.

Warming up before exercise

Exercise includes warming up before and cooling down after the exercise. Warming up prepares the body and lungs for the coming exertion, and prevents symptoms caused by exertion.

Interval training

Exercise that requires you to use your largest muscle groups (walking, Nordic walking, skiing, cycling, swimming, ball sports, aquajogging, dance) are best suited for endurance training, since endurance exercise should increase your heart rate and get you out of breath.

Interval training is well suited to people with respiratory diseases. Interval training refers to alternating short, high-intensity exercises with slower recovery phases. During the slower phases, the body recovers, which means that symptoms have no time to develop. The slow phases should be 3 times longer than the high-intensity phases.

The easier your symptoms trigger from exertion, the shorter the high-intensity phase should be in relation to the slow phases. For example, high-intensity burst of just 10 seconds with a 30-second rest period increases your endurance.

Tip:

People with asthma can monitor symptoms triggered by exertion with a PEF meter. Blow in the meter before and after exercise and discuss with your physician on adjusting your medications if necessary.

7.2 Strength training

Strength training should be engaged in at least 2 times a week. Strength training is important for the functional capacity of a person with a respiratory disease, since it also strengthens bones. It is especially important to increase muscle strength if the respiratory disease causes unintentional weight loss and a loss of muscle strength. Aging and certain medications, such as cortisone tablets, may also decrease muscle health.

Strength training should be targeted at the upper and lower limbs, but muscles improving posture should not be forgotten either. In addition, it is worth practicing the abdominal muscles, which contribute to supporting the muscles of respiration and assist in coughing. Muscle strength can be increased with bodyweight exercises and in the gym with small equipment such as ankle weights.

Strength training is often better tolerated than endurance exercise, as it does not increase the body's need for oxygen as much. Poor muscle strength can increase shortness of breath during exercise.

Tips:

- » Your body needs more oxygen with exercises done while standing up than those done in a seated position.
- » Oxygen consumption is also lower when you only exercise one leg or arm at a time.

7.3 Mobility training

Chest and shoulder mobility has a significant effect on how well you can breathe. A stiff thoracic skeleton makes it difficult for the chest to expand during inhalation and rounded shoulders make posture poorer.

A gymstick is a good tool for mobility training.



1. Standing trunk rotations

- » Place the stick on your shoulders or in front of your chest.
- » Stand with your feet apart at shoulder-width.
- » Keep your knees slightly bent and your hips and your eyes forward.
- » Rotate your torso from side to side.



2. Standing side bends

- » Take a wide grip on the stick.
- » Stand with your feet apart at shoulder-width.
- » Lift the stick up and slowly bend your torso from side to side.
- » Let your sides stretch.
- » Lower the stick and repeat the movement again.



3. Squat

- » Stand with your feet well apart.
- » Place the stick on your shoulders or in front of your chest.
- » Squat as if you are trying to sit on a low chair. Your knees and toes should point in the same direction.
- » Push yourself back up and extend your arms and the stick up as well.
- » When you squat again, pull the stick back on your shoulders or in front of your chest.



4. Leg lift and torso rotation

- » Stand with your feet apart at shoulder-width and take a wide grip from the stick.
- » Lift one leg up.
- » Rotate your torso and touch your hip with the stick.
- » Repeat for the other side.
- » This exercise improves balance and mid-body control.



5. Bent-over row

- » Grip the stick with your hands at shoulder-width.
- » Keep your knees a slightly bent and lean your upper body forward.
- » Lower the stick to the level of your knees.
- » Pull your elbows up next to your sides, squeezing your shoulder blades together.
- » Keep your back straight throughout the movement.



6. Paddling

- » Take a wide grip on the stick.
- » Stand with your feet apart at shoulder-width.
- » Keep your knees slightly bent and your hips and your eyes forward.
- » Put the stick in front of your chest.
- » Make large movements from side to side as if you were paddling.

7.4. Shortness of breath during exercise

Shortness of breath during exercise may be a consequence of an unbalanced breathing technique, bronchoconstriction and excess mucus, changes in the walls of pulmonary alveoli, a weak heart and circulatory system or weak muscles, or it might be due to environmental factors (e.g. wind, pollen and road dust, cold air).

It is possible to prevent shortness of breath during exertion:

- » Remember to properly warm up (10–15 minutes).
- » Exercise in intervals (alternate high-intensity training and rest phases).
- » Take your medicine for keeping your bronchi open 10-15 minutes before training.

- » In sub-zero temperatures and when there is a lot of road dust or pollen, favour indoor exercise and use a particle respirator or an air warming respirator.
- » Dress according to the weather – protect your neck, mouth and nose from the cold and the wind.
- » Exercise in a way that suits you and at the right intensity level: identify your limits, the impact of age and possible other illnesses. Keep in mind that your limits may vary from day to day.
- » Exercise with your loved ones, since it might reduce the fear of symptoms.

When training, remember to keep your respiratory medications with you and easily accessible just in case.

Exercise instructions for people with COPD

Shortness of breath on exertion	Stay active, train safely
I only experience shortness of breath during intense exercise	Exercise regularly for a total of 2.5 hours per week on several days, so that your heart rate increases. Do strength training (large muscle groups) and body control exercises 2 times a week. Rest properly after training.
I only experience shortness of breath when I'm moving fast in a hurry or going uphill	Continue your regular training. Incidental exercise is part of the training. Be sure to engage in it. Being too busy and feeling a need to perform well make shortness of breath worse. If you have inhaled medicines that relieve shortness of breath, use them when necessary.
I have to walk slower than my peers and occasionally stop while walking on flat ground due to shortness of breath	You can still exercise even if moderate-intensity exercise causes you to get out of breath or experience shortness of breath. It will not make the situation worse. It is a sign that you are increasing your endurance. Take breaks, and calm your breathing with a calm exhale (pursed lip breathing) rather than taking quick superficial breaths. If the shortness of breath does not pass, use an inhaled medicine for opening your airways.
I can only walk on flat ground for about 100 meters or a few minutes before I have to stop due to shortness of breath	Shortness of breath still does not stop you from exercising. Take multiple breaks while exercising. Set goals that you can achieve at your own pace. Focus on strength training for the lower and upper limbs. Ask an expert for instructions on how to increase your fitness.
I cannot leave my apartment due to shortness of breath and I get breathless while putting on or taking off clothes	Stay active and do as many of your daily tasks as possible. Take as much time as you need and complete tasks at your own pace. Shortness of breath is not dangerous. It should pass with a few minutes at rest. When calming your breathing, relax and focus on thinking about something other than the shortness of breath.



7.5 Recovery and muscle health

Cooling down and stretching your muscles after exertion for 5–10 minutes helps your body recover. Cooling down removes the lactic acid that accumulates in muscles and reduces the soreness resulting from exertion. Stretching also keeps muscles healthy. Stretch the muscles you used during exercise for about 30–90 seconds after exercise. Longer stretches can be done a couple of hours after exercise. Pay attention especially to stretching the muscles in your chest, neck and shoulders.

Do the stretches in a position that allows you to breathe calmly and freely. Do not hold your breath.

Rest, sleep and a diverse diet support fitness and improve recovery. In addition, a well-slept night ensures that you are have the energy to stay motivated about keeping up a healthy lifestyle. Suitably strenuous and versatile exercise also tires you out and may help you sleep better.

7.6 Nutrition and exercise

Regular meal times and a diverse and healthy diet give people with respiratory diseases more energy to exercise and improve muscle recovery. In addition, protein-rich food helps to maintain muscle mass and in recovering from exertion.

Good nutritional status

- » maintains muscle strength, muscles of respiration included
- » boosts your immune system
- » slows down the progression of the disease
- » reduces flare-ups and the need for treatment
- » maintains good health and functional capacity in everyday life.

Exercise increases energy consumption and helps in weight management. For those who lose weight unintentionally, it is important to ensure that sufficient energy is available during exercise. Everyone should also take care to get enough fluids during exercise.

7.7. Exercise after a flare-up or infection

Just two weeks of immobility reduces physical capacity and muscle strength considerably.

It is important that people with respiratory diseases start exercising as soon as possible after a flare-up and according to their capabilities. It is recommended to increase the intensity-level gradually as functional capability increases.

It is safe to exercise after a flare-up is and it reduces the risk of hospitalisation. If necessary, individual guidance and counselling can be sought from a physiotherapist.



Peer support from the Organisation for Respiratory Health in Finland

One of the key activities of the Organisation for Respiratory Health in Finland and its local organisations around Finland is to offer peer support.

Peer support offers individuals suffering from a certain condition the chance to share their experiences. Together, they can reflect on how their lives, resources and conditions differ from each other and what they have in common. Even more serious topics can be brought up. At its best, peer support is a source of empowerment for both the person receiving support as well as the one offering it.

The illness also affects family members and other loved ones. Many people feel that it is a relief to discuss the condition with other people in the same situations, as you do not have to add to the concerns of family and friends.



Go the website of the Organisation for Respiratory Health in Finland at www.hengityслиitto.fi, and find out which local association is active in your region. Come and join the activities!





The contents of this handbook were designed by Mervi Puolanne, Veera Farin, Marika Kiikala-Siuko and Hanna Salminen.

Expert examination was carried out by Joni Niskanen, specialist in lung diseases and allergology, with the exception of Chapter 5.1. For Chapter 5.1, the expert examination was carried out by a specialist in lung diseases and allergology, Docent Witold Mazur.

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REMEMBER!



The Organisation for Respiratory Health in Finland's sports videos on YouTube and other handbooks.

JOIN YOUR LOCAL ASSOCIATION

The Organisation for Respiratory Health in Finland and its local associations promote respiratory health and good life for people suffering from respiratory diseases.

Become a member

I want to become a secondary member of the local organisation of, I am a member of the local organisation.
(paying the member fee of both associations)

You can also fill out a form online at www.hengitysliitto.fi/liity_jaseneksi.

SURNAME AND GIVEN NAMES (underline the name by which you wish to be referred) >	ADDRESS >
DATE OF BIRTH >	POSTCODE AND CITY/TOWN >
PROFESSION >	PLACE OF DOMICILE >
TELEPHONE >	EMAIL >
FIRST LANGUAGE >	

You can send me information about events and activities by text message and e-mail

I am interested in respiratory diseases (please indicate which):

I am a guardian of the child who is under 15 I am under 15 years old
 I do not have a respiratory disease

There is a member of a local respiratory association in our family:

No Yes NAME >

Your membership fee is depends on your local respiratory organisation. We will send your membership application to the respiratory association of your home municipality. The privacy statement of the membership register is available at: www.hengitysliitto.fi/liity-jaseneksi.

I hereby accept that the information above will be saved in the register of members of which the local association is the data controller and Hengitysliitto ry (The Organisation for Respiratory Health in Finland) is the data processor.

DATE >	SIGNATURE >	GUARDIAN'S SIGNATURE IF YOU ARE UNDER 15 >
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The website and YouTube channel of The Organisation for Respiratory Health in Finland feature a lot of up-to-date information on respiratory health and respiratory diseases, including asthma. Stay updated on our activities and latest news by following us at:

www.hengityслиitto.fi

@Hengityслиitto




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LOCAL ASSOCIATIONS FOR RESPIRATORY HEALTH OFFER MANY BENEFITS FOR THEIR MEMBERS:

- » You can download the mobile membership card from your app store. It helps you keep track of the news, activities and events of your local respiratory association and The Organisation for Respiratory Health in Finland, as well as find peer activities and edit your personal information.
- » Local respiratory associations regularly organise peer groups and sports activities, events, lectures and other types of recreational activities.
- » Come and join the activities as a volunteer peer instructor, sports instructor, expert by experience or an elected representative in the organisation. The Organisation for Respiratory Health in Finland offers training for its volunteers.
- » The member magazine, *Hengitys*, comes out four times a year.
- » You can check the member benefits of your local respiratory organisation and national organisation on their respective websites.

 Fill in the form, cut it out and fold it as along the reverse line to form a letter. Fasten the edges with tape. The postage is paid by The Organisation for Respiratory Health in Finland, so you can drop the letter in a mailbox without a stamp.

Postage paid by
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for Respiratory
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Hengityслиitto ry

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