

Exercise nutrition in cystic fibrosis

Cystic Fibrosis Trust is grateful to the dietitians from the British Dietetic Association Cystic Fibrosis Specialist Group who prepared the information in this leaflet.

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Patient Information Forum



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Introduction

Exercise has many benefits in cystic fibrosis (CF), including:

- increasing lung muscle strength
- helping to clear mucus from your lungs
- slowing the rate of decline in lung function, or in some cases improving lung function
- increasing overall muscle mass (positively impacting weight)
- improving appetite (and therefore potentially weight)
- strengthening bones
- releasing endorphins, helping to make you feel better and give you an improved sense of well being
- new research is also indicating that exercise can improve blood sugar control

To achieve maximum benefit from exercise, it is important you have a discussion with your physiotherapist. Together, you can work around your expectations and goals.

You also have to consider the extra demands exercise puts on your body. What you eat and drink is very important to achieving the maximum benefit from exercise. By making good food choices, you will be giving your body the extra energy and nutrients it needs during exercise. This will help your training and aid recovery.

Your dietary requirements around exercise will be unique, as they depend on a number of factors. These include your overall health, lung function, nutritional requirements and the level and nature of the physical activity.

This leaflet can only provide general guidance, so make sure you talk to your dietitian.



Nutrient intake

The majority of people with CF have higher energy needs than people who do not have cystic fibrosis. Regular exercise increases your energy needs further. It is therefore important to adjust your diet to prevent weight loss.

Carbohydrate

The science

Whenever you exercise you need fuel to give you energy. This energy comes from carbohydrate (and partly fat) in your diet. Carbohydrate is stored in the liver and muscle as glycogen, which is used during exercise. When you run out of glycogen you will start to feel tired, unable to perform at your best and lose weight.

Examples

- Starchy foods are excellent sources of 'complex' carbohydrate. Examples include bread, rice, pasta, potato, cereals, noodles and couscous. These take time to be absorbed due to their glycaemic index, and release energy slowly.
- Sugary foods can provide additional calories to meet the needs of exercise, and replace the energy you have burned off. They can be taken in addition to starchy foods. Examples include muffins, smoothies, milkshakes, cereal bars, pancakes, puddings, biscuits and chocolate. These foods give you an instant source of energy, as they are quickly absorbed by the body.

Practical tips

When should I have carbohydrate around exercise? Make sure carbohydrates are in all your meals and snacks. This will top up your body's stores of glycogen throughout the day for daily tasks and exercise (see the timeline at the end of this leaflet for more details.)

How much more carbohydrate do I need for exercise? The amount of carbohydrate you need depends on the duration of your exercise, so increase carbohydrate portion size in your meals and as snacks accordingly. If you are taking part in an endurance event (greater than two hours), special sports foods such as energy bars and carbohydrate gels may be useful, but discuss these with your dietitian.

Fat

The science

Fat is a necessary component of a healthy diet. Fats provide energy, essential elements of cell membranes, and facilitation of the absorption of fat soluble vitamins. Fat is converted into energy slower than carbohydrate. Therefore it is not suitable as a 'fuel' for exercise.

Examples

- Cheese, cakes, some meats, cream, butter, oil, pastry, avocado.

Practical tips

How much fat do I need? Fat is an important source of energy and nutrients. The amount you need is individual, please speak to your dietitian. Aim to have healthy fats in your diet such as extra virgin olive oil, oily fish, nuts and seeds'.

Protein

The science

The main role of protein in the body is for growth, repair and maintenance of body cells and tissues, such as muscle. You gain muscle through a combination of exercise and diet. It is the exercise training that brings about the adaptations in the muscle, not the amount of protein consumed.

For exercise, the body does not require solely protein-based foods. It still requires carbohydrate for energy (as described in the carbohydrate section). The focus should be on nutrient-rich snacks that contain a balance of carbohydrate and protein (see examples below). If you concentrate on a high-protein intake without enough carbohydrate, your body will use the protein for energy instead of to build muscle.

Examples

- High-protein foods include lean meat, poultry, fish, eggs, pulses (lentils, chickpeas, kidney beans), nuts (almonds, walnuts, pistachios, cashews), Quorn™, tofu, soya mince, yoghurt (Greek), milk and cheeses (cottage, Swiss and some processed cheese, eg Babybel® and Cheestrings®).

Practical tips

Do I need extra protein to build muscle? One of the biggest myths is that eating large amounts of protein equates to big biceps. If you are consuming additional energy sources to meet the needs of exercise, then it is likely you will be consuming enough protein too. See the snack suggestions that give you a good balance of carbohydrate and protein to meet your body's need for energy store replacement and building of muscle.

Are protein supplements necessary? If you are eating a balanced diet and include a good variety of protein sources in meals and snacks, protein shakes and protein supplements are not necessary. Not only are they expensive, but the excess in protein has no benefit and increases the work to your kidneys.

After sports competitions or intense training sessions, high-quality protein powders can be a more convenient and transportable recovery method when there is limited access to food. Remember, if you take enzyme replacement (Creon®) you will need to take this with protein shakes.

A typical protein shake contains around 20g of protein – this equates to half a chicken breast or half a can of tuna.

While eating enough food means you are probably reaching your protein needs, you may be curious about the number of grams of protein you need per day. This can vary depending on your body size and how active you are. Speak with your dietitian to learn more about your individual protein needs.



Snack suggestion	Calories	Protein	Carbohydrate
250g Greek yoghurt with a piece of fruit	380 kcals	15g	30g
Two boiled eggs or two Babybel® or Cheestrings®, with one piece of toast/bread	244-257 kcals	14–18g	20g
Large handful of nuts (eg almonds) and dried fruit (eg apricots)	260 kcals	9g	23g
Two tablespoons of nut butter with two slices of malt loaf	322 kcals	11g	30g
Baked/roasted chickpeas (½ 400g tin) plus fruit and nut bar	323 kcals	13g	34g
Bircher muesli pot	308 kcals	12g	42g
Banana or cereal bar, with a pint of whole milk	439 kcals	20g	40g
Large bowl of cereal with whole milk	340 kcals	16g	37g
½ tin of tuna or ½ chicken breast and mayonnaise, in a roll	360 kcals	28g	25g
Four crackers and four tablespoons of cottage cheese	240 kcals	12g	25g
½ large tin of baked beans with one piece of toast	280 kcals	14g	38g
Homemade smoothie (milk, skimmed milk powder, frozen fruit)	338 kcals	14g	39g
Prescribed 'compact' supplement drink*	300 kcals	12g	37g
Prescribed powdered shake*	588 kcals	12g	68g

***Ask your dietitian about these options.**

Vitamins

Most people with CF are prescribed additional fat-soluble vitamins and recommended a balanced diet of nutrients, regardless of exercise. Current evidence indicates that you do not need to take any other additional vitamins if you are exercising. In fact, excessive vitamin intake can be harmful.



Sodium

The science

People with CF tend to lose more salt in their sweat than those who do not have the condition. Therefore, if you are exercising and sweating more, it may be necessary for you to take additional salt supplements.

Low sodium can contribute to thicker sputum, which is more difficult to expectorate and may contribute to bowel issues (distal intestinal obstructive syndrome).

Practical tips

What should I watch out for to prompt me to take extra salt (sodium chloride)?

1. If it is warmer,
2. if you exercise for a prolonged period, or
3. if it is a higher intensity. Ask your dietitian, physiotherapist or doctors about a prescription.

Hydration around exercise

Fluids

The science

Most people need 2.5–3 litres of fluid per day to remain fully hydrated. You can lose 0.5–1.5 litres of sweat per hour during exercise, even more in hot weather. See the timeline at the end of the leaflet for recommendations of volumes of water to drink around exercise.

Most exercise results in the body becoming warmer. As the body can only operate efficiently at a narrow temperature range, it takes steps to cool you down by sweating. The sweat then evaporates and cools the body.

Becoming dehydrated can put extra strain on your heart and lungs, as they have to work harder to pump blood around your body. Therefore, not drinking enough can impact your ability to exercise, as well as causing your sputum to become thicker, making airway clearance more difficult. Dehydration can also make your bowels sluggish, resulting in constipation or a bowel blockage.

Examples

- Water is useful to replace fluid losses. Consider adding squash if you prefer some flavour or variety.
- Isotonic drinks (eg Powerade®, Lucozade® and Gatorade®) contain a little salt and carbohydrate (5–8g/100ml). These are electrolyte drinks. They are absorbed as fast as, or faster than, plain water. Therefore, these drinks can help to replace sodium losses and fuel for the muscles. This means they can be especially useful if exercising for more than one hour (ie when energy and sweat losses are greater). Drinking a flavoured sports drink has been shown to encourage drinking and therefore reduce the effects of dehydration. A homemade isotonic sports drink is 200ml squash (not low calorie or no added sugar), 800ml water and a large pinch of salt.

Tea and coffee contain caffeine, which can act as a diuretic and stimulate urine production. You should be careful not to drink too much tea or coffee to avoid dehydration.

Practical tips

How will I know if I am dehydrated?

Signs of dehydration include fatigue, dry mouth, thirst, headaches, feeling irritable, flushed skin, dark urine, weakness, dizziness, cramp and profuse sweating. Check the colour of your urine – if it is dark in colour, it suggests that you are dehydrated and need to drink more when you are exercising.

Remember, drink before you feel thirsty! Thirst is a poor indicator of hydration, especially in CF – by the time you are thirsty you are already dehydrated. You cannot stop your body from losing fluid, but you can prevent it from becoming dehydrated! Remember to drink plenty and always start exercise feeling fully hydrated.

What about hypertonic and hypotonic drinks?

Hypotonic drinks (eg Gatorade G2® and Powerade Zero®) contain a low amount of carbohydrate (less than 3g/100ml) and maybe a small amount of salt. They quench thirst and provide fluid but do not provide a significant amount for energy. They may be more useful during low intensity exercise (lasting less than an hour).

Hypertonic drinks (eg fruit juice, canned drinks and energy drinks) contain large amounts of carbohydrate (more than 10g/100ml). They are absorbed more slowly than plain water, so do not provide an effective way to rehydrate. They could be used as a way to top up your carbohydrate intake.

Your energy, protein, salt and fluid requirements are dependent on the intensity, duration and frequency of exercise. Remember to consider this in your food and fluid choices. This will allow you to train harder, go faster and recover quicker from exercise!



Specialised products

Creatine

This is a naturally occurring compound found in meat and fish. Most of the body's stores of creatine are found in muscle. Research in athletes has shown creatine to have short-term benefits in repeated bouts of maximal exercise such as sprinting. Current research in CF is looking at the potential benefits of creatine supplementation to improve muscle strength. Anecdotally, there are risks reported with dehydration and renal problems. If you're thinking about taking creatine supplements, speak to your dietitian.

Other supplements

Many sports supplements claim to improve muscle strength and performance, but lack any specific evidence to back up these statements. Some products may contain impurities, which could potentially interfere with other medications and have a harmful effect on the liver. Most people do not need to take sports supplements if they are eating a balanced diet. Always consult with your dietitian and pharmacist before taking any sports supplements. Consider using Informed Sport's certified product list/search engine. This shows products which have been tested for a broad range of substances that are banned from sport: www.informed-sport.com/certified-product-brands

Diabetes

If you have cystic fibrosis diabetes (CFD) you should discuss your exercise plans with your dietitian and/or diabetes team. They will help you to understand the effects of exercise on blood sugar levels and will provide more specific advice.



Timeline for food and fluid during exercise

Two to three hours before exercise	
Well-balanced meal (this allows enough time for digestion and ensure glycogen supplies are topped up).	500–600ml of water or squash.
30 mins–1 hour before exercise	
Light carbohydrate snack to replenish energy levels, eg banana, cereal bar, sandwich.	150–350ml fluid.
During exercise	
You will only need to take additional carbohydrate if exercising for more than two hours.	Drink small amounts frequently, ideally 150–200ml every 15–20 minutes. This could be an isotonic fluid.
0–30 mins after exercise	
A nutrient-rich snack (suggestions on page 5). This is the most effective time to refuel. It is important to replenish your energy stores, rehydrate and restore muscle protein. Remember to go for portable options if this is more suitable.	
Two hours after exercise	
Follow with a full meal, including a balance of nutrients.	Continue drinking frequently, aiming to consume 3–4.5 litres by the end of the day to account for the fluid losses during exercise. Increase this further if it is warm and exercise was of a high intensity or long duration.



Further information

Find more information resources about living with cystic fibrosis at cysticfibrosis.org.uk/information.

Our Helpline is open 10am – 4pm Monday to Friday. It's available to anyone looking for information or support with any part of cystic fibrosis, a listening ear, or just to talk things through.

How to reach us:

- Call **0300 373 1000** or **020 3795 2184**
- Email helpline@cysticfibrosis.org.uk
- Chat with us on **Facebook, Twitter or Instagram**
- Message us on WhatsApp on **07361 582053**

Visit cysticfibrosis.org.uk/helpline for more information.

We welcome your feedback on our resources.

You can also ask for this resource in large print or as a text file.
Email infoteam@cysticfibrosis.org.uk.

Cystic Fibrosis Trust
33 Creechurch Lane
London
EC3A 5EB

020 3795 1555

cysticfibrosis.org.uk

This leaflet has been designed to be given out by a CF dietitian, along with their advice. If you downloaded or requested it directly from Cystic Fibrosis Trust we would advise you to discuss this information with your CF dietitian.

The information in this leaflet is based on clinical best practice and a consensus of opinion by dietitians within the British Dietetic Association Cystic Fibrosis Specialist Group. For detailed guidance on CF nutrition, please see the **Consensus document on nutritional management of cystic fibrosis**. Our consensus documents as well as other publications about cystic fibrosis can be found at cysticfibrosis.org.uk/publications or they can be ordered through our Helpline.

The information in this leaflet is general, please discuss it with your dietitian for a more personalised look at the topic.

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The information in this resource does not replace any advice from your doctor or CF team. It is important that you seek your team's advice whenever you want to change your treatment.

Cystic Fibrosis Trust

Cystic Fibrosis Trust is the charity uniting people to stop cystic fibrosis. Our community will improve care, speak out, support each other and fund vital research as we race towards effective treatments for all.

We won't stop until everyone can live without the limits of cystic fibrosis.

cysticfibrosis.org.uk

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