



British Heart
Foundation

I've pushed
on with

Peripheral

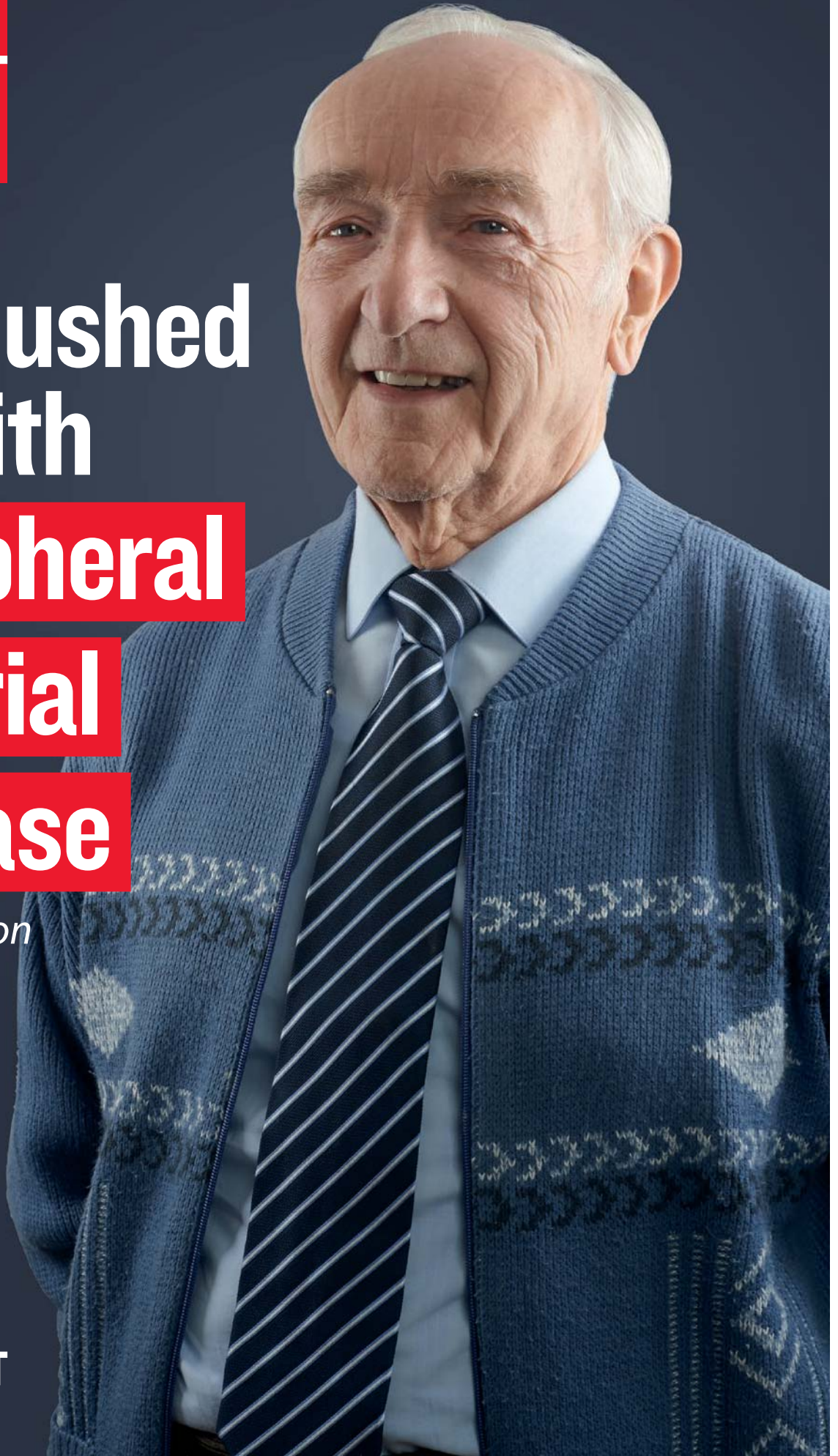
arterial

disease

Walter Ashton

**FIGHT
FOR EVERY
HEARTBEAT**

bhf.org.uk



ABOUT THE BRITISH HEART FOUNDATION

As the nation's heart charity, we have been funding cutting-edge research that has made a big difference to people's lives.

But the landscape of cardiovascular disease is changing. More people survive a heart attack than ever before, and that means more people are now living with long-term heart conditions and need our help.

Our research is powered by your support. Every pound raised, every minute of your time and every donation to our shops will help make a difference to people's lives.

If you would like to make a donation, please:

- call our donation hotline on **0300 330 3322**
- visit **bhf.org.uk/donate** or
- post it to us at BHF Customer Services, Lyndon Place, 2096 Coventry Road, Birmingham B26 3YU.

For more information, see **bhf.org.uk**

CONTENTS

About this booklet	02
What is peripheral arterial disease?	03
What are the symptoms of peripheral arterial disease?	08
Will my peripheral arterial disease get worse?	11
What causes peripheral arterial disease?	15
What tests will I need?	20
What can I do to help myself?	26
What treatment might I have?	37
Abdominal aortic aneurysm	49
Heart attack? The symptoms ... and what to do	56
Stroke? The symptoms ... and what to do	58
For more information	59
Index	65
Have your say	67

This booklet is for people with peripheral arterial disease, and for their family and friends. It explains:

- what peripheral arterial disease is
- the signs and symptoms
- what causes it
- the tests you might have
- what types of treatment are available, and
- what you can do to help yourself.

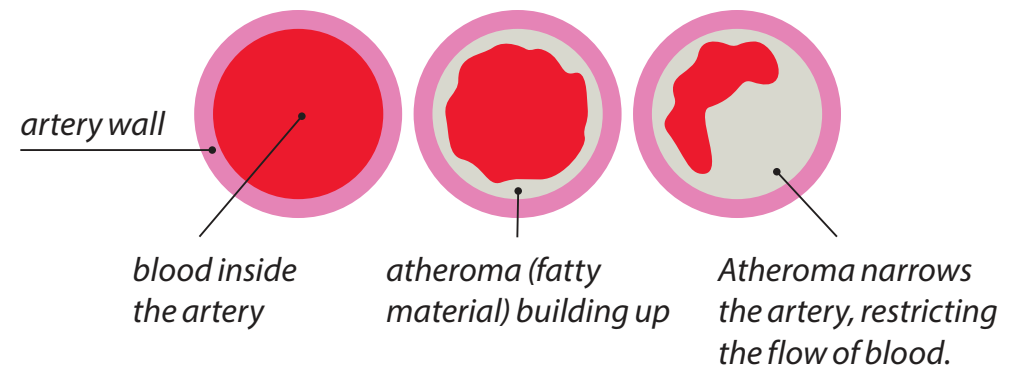
This booklet does not replace the advice that your doctor or the other health professionals looking after you may give you, but it should help you to understand what they tell you.

Peripheral arterial disease is a condition that affects the arteries that carry blood to your limbs, most commonly your legs. Arteries are the blood vessels that take essential nutrients and oxygen-rich blood from your heart to all parts of your body.

Peripheral arterial disease is also called **PAD**, or **peripheral vascular disease** or **PVD**.

Peripheral arterial disease happens when your arteries become narrowed by a gradual build-up of fatty material within their walls. This condition is called **atherosclerosis** and the fatty material is called **atheroma**.

How atheroma builds up



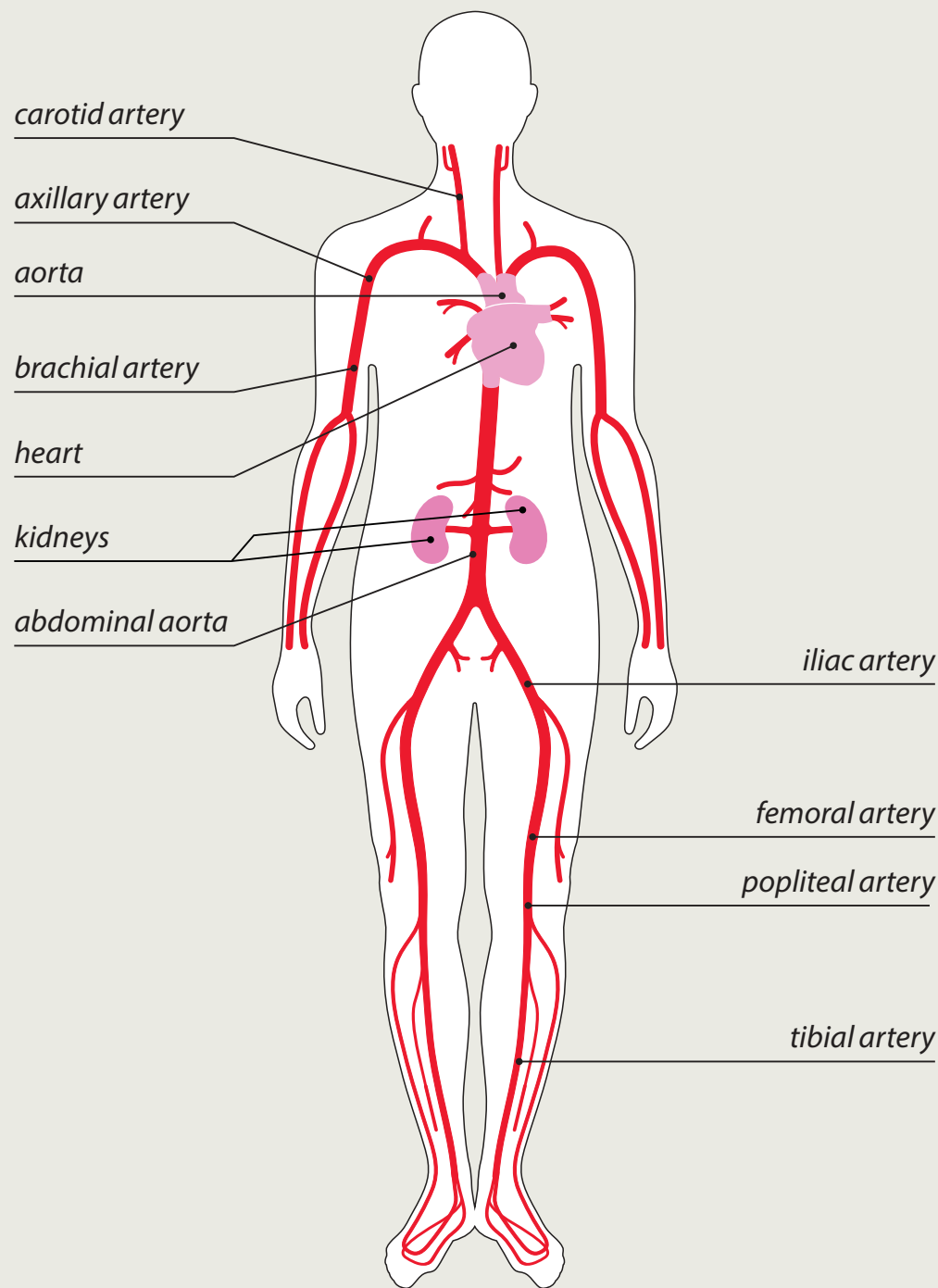
In time, the affected arteries may become so narrow that they cannot deliver enough oxygen-rich blood to your legs. This can cause pain or discomfort in your leg when you are walking.

If the atheroma becomes unstable, a piece may break off and may lead to a clot suddenly blocking your artery. The affected limb is likely to have no pulse, and will look pale and feel painful, cold and numb. The symptoms can come on very suddenly. This can lead to serious circulation problems that will need urgent treatment. We explain more about this on page 39.

Peripheral arterial disease may affect arteries in any part of your body, but the ones that are particularly affected are:

- the femoral, popliteal and tibial arteries – in your legs
 - the iliac arteries – near your pelvis, and
 - the abdominal aorta – in your tummy area.
- Peripheral arterial disease in your abdominal area can affect the blood supply to organs such as your bowel and kidneys.

The main arteries



Other health risks for people with peripheral arterial disease

Risk of a heart attack or stroke

Peripheral arterial disease comes under the general term of **cardiovascular disease**, or diseases of the heart and circulation. Other types of cardiovascular disease are coronary heart disease (which includes angina and heart attack), and stroke.

Many people who have peripheral arterial disease are also likely to have a build-up of atheroma and narrowed arteries in other parts of their body. So they have a much higher risk of having a heart attack or a stroke.

If there is atheroma in your **coronary arteries** (the arteries on the surface of your heart), this may lead to **angina** – a pain or discomfort in your chest. If the narrowed coronary artery becomes blocked by a blood clot, this can cut off the supply of blood and oxygen to part of your heart muscle and cause a **heart attack**. For information about the symptoms of a heart attack, see page 56.

If there is narrowing in your **carotid arteries** – the arteries in the neck that supply blood to your brain – it can interfere with the flow of blood to your brain and increase your risk of having a **stroke**.

So, if you have peripheral arterial disease, your doctor will also want to assess your risk of having a heart attack or stroke and will probably prescribe you medicines to reduce your risk.

Risk of an abdominal aortic aneurysm

People with peripheral arterial disease are also more at risk of getting an **abdominal aortic aneurysm**. This is when a balloon-like swelling or bulge develops in a section of the aorta – the main blood vessel that carries blood from your heart to the rest of your body (see the illustration on page 05). An abdominal aortic aneurysm can be life-threatening. We explain more about this on page 49.

WHAT ARE THE SYMPTOMS OF PERIPHERAL ARTERIAL DISEASE?

The symptoms of peripheral arterial disease happen because not enough blood and oxygen are getting to your legs and feet, and sometimes to other parts of your body.

The most common symptom is **pain or discomfort in your calf muscles, thighs or buttocks** when you are walking or exercising. This is called **intermittent claudication**. It might feel like a cramp-like pain, ache, tiredness or heaviness. The pain is often worse if you are walking uphill or upstairs, or walking briskly. You can usually relieve the pain by slowing down or stopping walking for a few minutes. This reduces the amount of oxygen that your leg muscles need.

Other symptoms of peripheral arterial disease are:

- shiny skin
- brittle toenails
- hair loss on your legs and feet
- leg ulcers, and
- having a very weak or undetectable pulse in your leg.

Many people with peripheral arterial disease don't get any symptoms at all, and may not even know that they have the disease. That's why, if you have any risk factors for peripheral arterial disease, you should speak to your doctor. We explain what the risk factors are on page 15.

Smoking is one of the major causes of peripheral arterial disease and is likely to make it much worse.

Unfortunately, there is no cure for peripheral arterial disease. However, there is a lot you can do to help to relieve your symptoms and to prevent the condition from getting worse. Taking your prescribed medicines and following a healthy lifestyle are vital (see pages 26-39).

The rate at which the arteries become narrower varies from person to person and depends on your lifestyle. Many people find that their peripheral arterial disease remains stable and their symptoms don't get any worse. However, others find that their condition does get worse over time.

Your condition is more likely to get worse:

- if you continue to smoke
- if you have high blood pressure, or
- if you have diabetes and your blood glucose level is uncontrolled.

Signs that your condition has become more severe include:

- if the pain starts to get worse than usual when you walk, or if it starts after walking a shorter distance than before
- if you get constant pain or rest pain – which means pain while you are resting (see the next page for more on this)
- if there is a difference in colour and temperature between your two feet, or
- if there are wounds or ulcers on your foot or leg which won't heal, or which heal very slowly.

If your symptoms get worse, or if you start getting new symptoms, see your doctor immediately. He or she may want to refer you to a vascular specialist (a doctor who specialises in treating blood vessels), or to a nurse specialist if there is one in your area.

Rest pain

If your peripheral arterial disease gets worse, it may cause rest pain (pain while you are resting). This will become continuous and severe, and may prevent you from sleeping or may wake you at night. Some people say it feels worse in their feet.

To help relieve the pain, it may help to hang your legs over the edge of the bed or walk around. This will help to pull blood into your leg.

Rest pain is usually a sign that the disease is getting worse. So, if you start getting rest pain, it is very important to tell your doctor.

Gangrene

A small number of people with peripheral arterial disease may develop gangrene. This is when some body tissue dies due to a poor blood supply. The skin may turn black and ooze fluid or pus. Gangrene is very serious, as there is a risk that the infection may spread throughout the body.

If you develop gangrene, you will get an urgent referral to a vascular surgeon who will arrange urgent investigation and treatment if necessary – such as

angioplasty or surgery (see pages 40 and 42). The dead tissue also needs to be removed. If a whole body part such as a toe is affected, it may need to be amputated (removed).

Many people with peripheral arterial disease in the leg worry about losing their leg. However, if you make the lifestyle changes described in this booklet and take the medicines your doctor prescribes for you, a leg amputation is only very rarely needed.

There are several 'risk factors' for peripheral arterial disease. (A 'risk factor' is something that increases the risk of getting a disease.) The risk factors for peripheral arterial disease are the same as those for having a heart attack or stroke. The main ones are shown below.

- **Smoking.**
- **High blood pressure.**
- **High blood cholesterol.**
- **Physical inactivity.**
- **Being overweight or obese.**
- **Having diabetes.**
- **Having a family history of peripheral arterial disease or any cardiovascular disease.** This means if your father, mother, brother or sister developed cardiovascular disease at a young age (under 65 for women, and under 55 for men).
- **Your sex.** Peripheral arterial disease is more common in men than in women at younger ages,

but as women get older, just as many women as men develop the condition.

- **Your age.** Peripheral arterial disease is common in people over the age of 70. Symptoms usually start between the ages of 50 and 70.
- **Ethnic background.** Certain ethnic groups have a different level of risk. For example, if you are of South Asian or African Caribbean background, there is an increased risk of developing diabetes, which in turn increases the risk of peripheral arterial disease.

The following factors may also increase your risk of developing cardiovascular disease, including peripheral arterial disease.

- **Poverty.** People on lower incomes are more exposed to the risk factors for cardiovascular disease, and it can be more difficult for them to make healthy lifestyle choices.
- How you deal with **stress**.
- Drinking too much **alcohol**.

The more risk factors you have, the greater your chance of developing peripheral arterial disease.

Addressing the risk factors at an early stage can help to prevent peripheral arterial disease, or stop it from getting worse. We explain more about what you can do to help yourself on pages 26-33.

Having a health check

If you're between 40 and 74 and you live in England, you are entitled to a free **NHS health check**. The health check is carried out by your GP or practice nurse. A health check is an assessment to find out your risk of cardiovascular disease (which includes peripheral arterial disease as well as angina, heart attack and stroke).

Based on the results of your health check, your GP or nurse will advise you on what you can do to keep your heart and circulation healthy. Your GP will also consider whether you need to take medicine to protect your heart and circulation.

WALTER'S STORY

Walter, now 83, was diagnosed with peripheral arterial disease when he was in his 60s.

"I started getting pains in my right leg, and found I couldn't manage the 25-mile hikes I used to be able to do. I could only manage two miles before the pains would kick in. I was diagnosed with intermittent claudication – one of the most common symptoms of peripheral arterial disease.

For the next five years or so my condition got worse, and eventually I could only manage about 100 yards before the pains started. I had an angiogram of my leg, but unfortunately they couldn't put a stent in.

I've pushed on and over the years I've tried different medicines to ease the pain, with some success. I still try to do as much exercise as I can."



Your doctor will want to check for the signs and symptoms of peripheral arterial disease that we listed on page 08. You'll probably also have some blood tests to check:

- your general health
- your cholesterol level, and
- your blood glucose level (to see if you have diabetes).

You may also have some of the following tests.

Ankle brachial index (ABI)

This is also called **ankle brachial pressure index (ABPI)**.

This test compares the blood pressure in your ankle with the blood pressure in your arm.

The person doing the test will put a blood pressure cuff around your lower leg, just above the ankle, and one on your arm, and take some blood pressure readings. They will also put some gel on the skin over the two main arteries in your foot and use an ultrasound machine to listen to the blood flow.

They then divide the highest ankle blood pressure by the highest arm pressure to give your result as a ratio. A ratio of 1.0 is normal, but a result below 0.9 means that you have peripheral arterial disease. However, many people who have a low reading don't have any symptoms.

You may also be asked to climb the stairs or walk on a treadmill and have your blood pressure taken before and afterwards. This is to measure the effect exercise has on the blood flow to your legs.

Duplex ultrasound

This test uses sound waves to show an ultrasound picture of an artery and the amount of blood flowing through it. Gel is applied to an area of your skin, and a probe is placed over it. A duplex ultrasound helps to tell where in your arteries the narrowing or blockage is and how much it is narrowed. This test can help to decide which treatment would be most suitable for you.

The next three tests – a CTA, an MRA and an angiogram – can be used:

- to look inside your arteries
- to look at blood flow, and
- to see where your peripheral arterial disease is and how severe it is.

Computerised tomography angiogram (CTA)

This is a sophisticated type of X-ray, which can produce detailed 3D pictures of your arteries.

A dye is injected into a vein in your arm. Some people are allergic to the dye so, if you suffer from allergies, tell the staff before you have this test. You will need to lie on a narrow table, which moves through a scanner. This test exposes you to a small amount of radiation.

Magnetic resonance angiogram (MRA)

This scan uses a magnetic field to create 3D images of your arteries, and measures the flow of blood.

A dye is injected into a vein in your arm. If you suffer from allergies, tell the staff before you have this test.

You will need to lie down on a table in a narrow tunnel, around which there is a large magnet. Short bursts of magnetic fields and radio waves from the scanner allow pictures of your arteries to be created. This test does not expose you to any radiation.

You may not be able to have an MRA if you have any metal implants such as a pacemaker, unless you have a particular type of pacemaker that is not affected by an MRI scanner.

Angiogram

An angiogram uses X-rays to examine the arteries in your legs. It can show whether your arteries are narrowed and, if so, how narrow they have become.

You will have a local anaesthetic to numb the area. A catheter (a thin, flexible tube) is then passed into an artery, usually in your groin, but sometimes into an artery in your wrist. A dye is then passed through the catheter and a series of X-rays are taken. The dye will show up the blood flow in your arteries, and any narrowed areas or blockages.

It is normal to have some bruising around your groin or wrist area afterwards, and you may feel tender in that area for a few days.

An angiogram is considered a relatively safe test and serious complications are rare. Your doctor will only recommend the test if he or she feels the benefits outweigh the risks. This test does expose you to some radiation.

If your doctor is concerned that you may have narrowing in your coronary arteries, you may have a **coronary angiogram**. This is an angiogram of your coronary arteries – the arteries on the surface of your heart that provide the heart muscle with oxygen-rich blood.

Electrocardiogram (ECG)

An electrocardiogram – or ECG for short – is a simple test that records the electrical activity of your heart. This test doesn't help to diagnose peripheral arterial disease. However, people with peripheral arterial disease have a higher risk of coronary heart disease, and an ECG provides useful information about the general condition of your heart.

You may also have an **exercise ECG** (sometimes called a **stress test**). This is an ECG that is recorded while you are walking on a treadmill or cycling on an exercise bike. This test looks at how your heart works when you are more active.

There are lots of things you can do to help your symptoms and prevent your peripheral arterial disease from getting worse. Living a healthy lifestyle can:

- help to treat the pain in your legs
- help keep all your arteries healthy, and
- reduce your risk of having a heart attack or stroke.

The following are all very important.

- **If you smoke, stop smoking. Smoking is one of the major causes of peripheral arterial disease, and is likely to make it much worse.** If you are a smoker, stopping smoking is the single most important step you can take to help stop your peripheral arterial disease from getting worse, and to reduce your risk of having a heart attack or a stroke.
- **Keep active.** Regular physical activity is one of the best treatments for peripheral arterial disease. For more on this, see page 29.
- **Keep your blood pressure and cholesterol under control.** It is important to get these checked regularly at your GP's surgery.

- **Eat a healthy, balanced diet.**
- **Only drink alcohol within the recommended sensible limits.**
- **Keep to a healthy weight and body shape.**
- **Control your blood glucose level.** If you have diabetes, doing regular physical activity, eating a healthy, balanced diet and controlling your weight and body shape, will all help to control your blood glucose. If you haven't been diagnosed with diabetes, doing all the things above will help reduce your risk of developing it.



For more information about all the above, see our booklet **Cardiac rehabilitation**, and our other booklets and resources (see page 59).

Regular physical activity is one of the best treatments for peripheral arterial disease.

Keeping active

How walking can help you

Regular physical activity is one of the best treatments for peripheral arterial disease. Some people worry about doing activity such as walking because they know it brings on leg pain. However, in the long term it can help to reduce your symptoms and can increase how far you are able to walk – which can help improve your quality of life.

Walking helps by improving the blood flow and increasing the amount of oxygen that your leg muscles take up. This means that you will get less pain and be able to walk further.

Regular walking can also help to encourage new blood vessels to grow around the narrowed or blocked artery, which will also improve the blood flow.

Building up your walking

It is important to build up your activity gradually. Gradually build up how far you walk, with the eventual aim of walking for 30 minutes a day on at least five days a week. It may take you quite a few weeks or even a few months to build up to this level.

And it may be some weeks before you notice any signs of your symptoms improving.

You may need to take short breaks during your walks. Pick a route that has plenty of resting places such as benches or walls, in case you need to stop.

Walk through any discomfort as far as you can manage, as this will help you to increase your pain-free walking distances. If the pain becomes intense, stop and rest, and wait for the pain to go away before carrying on again.

Other activities

Think about other forms of physical activity, particularly if walking is too difficult for you. Swimming, cycling, yoga and pilates are all good. Some people find it helps to have equipment at home, such as an exercise bike.

Your nurse or doctor will suggest some simple exercises you can do at home. They may also be able to refer you to special exercise classes or walking programmes for people with peripheral arterial disease. These may be run at the hospital or at a community or leisure centre.

Whatever sort of activity you do ...

- Check with your GP or practice nurse before you start doing regular physical activity. Ask how much you can do and how to increase it. Also ask what types of activity are suitable and safe for you to do.
- Try to do some activity every day. Regular, moderate-intensity activity is better than occasional bursts of vigorous activity.
- Look after your feet and try to avoid injuring them while exercising. See the next page.
- If you feel very breathless, dizzy or unwell, or if you get chest pain, stop exercising. Take your GTN spray if your doctor has prescribed this for you. If the symptoms don't go away after resting or using your GTN spray, you should call an ambulance.

Taking care of your feet

If you have peripheral arterial disease, and particularly if you have diabetes, you are at risk of getting ulcers or wounds on your lower legs and feet. It's important to look after your feet, because damaged skin or injuries don't heal easily or quickly. The following will all help.

- Choose comfortable, well-fitting shoes that give you good support.
- Avoid walking barefoot.
- Take care to avoid stones in your shoes.
- Avoid banging your feet on sharp corners or objects.
- Try to wash your feet each day, and dry them well afterwards.
- Avoid very hot or very cold temperatures. For example, don't have very hot baths.
- Take care when cutting your toenails. If you find it difficult to cut them, you may need to see a podiatrist or chiropodist. Tell them that you have peripheral arterial disease.

- If you notice any changes to one or both of your feet, or if you have injured your feet or developed an ulcer, tell your doctor.

Why it is so important to make lifestyle changes

In this section we have described the lifestyle changes you can make to help relieve your symptoms, and help prevent your peripheral arterial disease from getting worse. Without making these lifestyle changes, people with peripheral arterial disease are at a greater risk of having one or both of their legs amputated, heart attack, stroke and premature death.

BRIAN'S STORY

Brian Ashton, who's now 47, has coronary heart disease. He had a heart attack eight years ago and has had a triple bypass operation. In 2008 he went to see his GP about the pains in his left leg.

"An ultrasound scan showed I had a large blockage in the artery in my leg. Within a few weeks I had an angioplasty and three stents were put in, to improve the blood flow. I still get pain in my left leg, but I can manage around 200 metres on a good day. When the pain comes on, it does ease with rest, but it comes back again. It's a tough battle.

My consultant thinks I have some small vein damage, which he can't do much about. He's now keeping an eye on my right leg, which is now starting to become painful too.

I live in a bungalow in the next village to my mum. If I'm ill, she comes and stays with me. I don't think too far ahead. I deal with things as they happen!"



Treatment for peripheral arterial disease aims to relieve your symptoms and reduce your risk of having a heart attack or a stroke.

The aim of your treatment is:

- to help relieve symptoms such as leg pain
- to slow down the build-up of atheroma (fatty material) in the arteries in your legs and the rest of your body, and
- to reduce your risk of heart attack and stroke.

Below we describe some of the treatments that may be suitable for you.

Medicines

Medicine to help treat leg pain

For most people, regular physical activity is the most effective treatment for improving the symptoms of leg pain. However, if you have very severe symptoms, you may need to take medicine.

If your leg pain is particularly severe, your doctor may prescribe **naftidrofuryl oxalate** for you. This medicine is often used for people who prefer not to have surgery. Or your doctor may prescribe it for you if you have done a supervised exercise programme but your condition has still not improved enough.

Aspirin

You may need to take aspirin, or another anti-platelet medicine, to reduce the risk of a clot forming in an artery. This will also help to protect you from having a heart attack or stroke.

Cholesterol-lowering medicine

It is likely that your doctor will prescribe medicine to reduce your cholesterol level. This will help prevent your disease from getting worse, and help to reduce your risk of having a heart attack or stroke. Even if you don't have a high cholesterol level, it is likely that you will still benefit from taking these medicines. The main type of medicine used to reduce cholesterol levels is called a **statin**. There is some evidence to suggest that statins may also help with the symptoms of peripheral arterial disease, and can help to relieve pain when walking.

Medicines to lower blood pressure

If you have high blood pressure, your doctor may prescribe medicines to help control it.

Medicine for diabetes

If you have diabetes, your doctor may prescribe medicine to help control your blood glucose.

Medicine to help you stop smoking

If you smoke, you may be prescribed medicines to help you stop smoking.



For more information on medicines, see our booklet **Medicines for my heart**.

Other treatments

If you find that your symptoms are getting worse, or your quality of life is becoming seriously affected, your doctor may talk to you about the possibility of having an **angioplasty** or **bypass surgery** to treat the narrowing or blockage in an artery. Or, if you have severe peripheral arterial disease in your carotid arteries (the arteries in your neck), you may be offered a **carotid endarterectomy** or **carotid stenting**. We explain more about all these treatments on the next pages.

Angioplasty

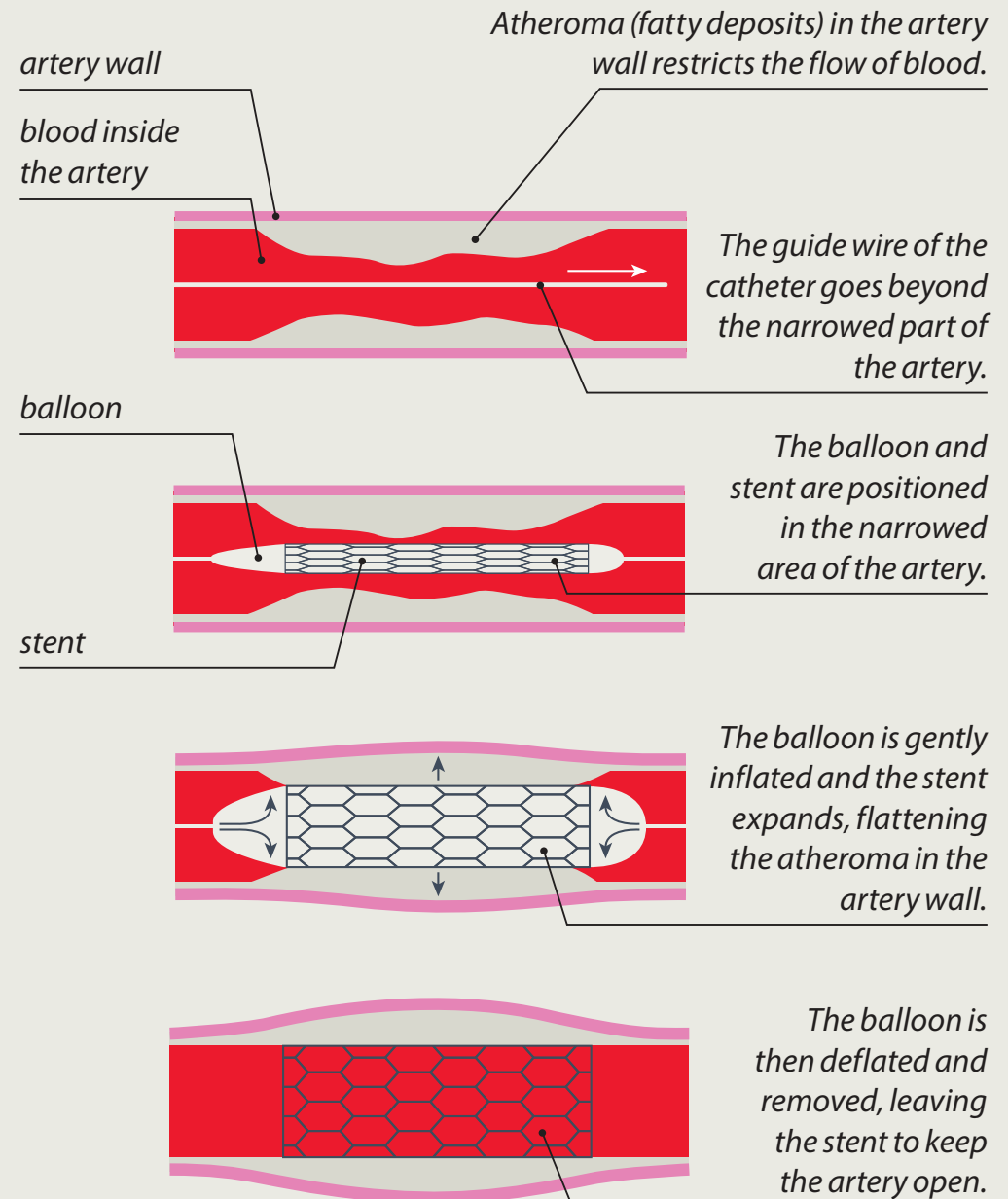
An angioplasty is a procedure that widens a narrowed artery. It aims to improve the blood flow through the artery, to help to relieve your symptoms.

The beginning of the procedure – when the catheter (a thin, flexible tube) is inserted into your groin – is the same as for having an angiogram (see page 23). At the tip of the catheter there is a small balloon. (See the illustration on the next page.) Once the catheter is in place, the balloon is inflated so that it squashes the fatty tissue that is causing the narrowing. As a result, this widens the narrowing so the blood can flow through it more freely. The balloon is then deflated and removed from the artery.

Sometimes a small wire mesh tube, called a **stent**, is used to hold the artery open. The stent is left in place in the part of the artery that has been widened.

Some people will need to stay in hospital overnight after the procedure, but others will have it done as a day case.

Angioplasty with a stent



There are some risks attached to having an angioplasty. On average, 3 out of every 100 people who have an angioplasty to open a narrowed artery in their leg have a complication, such as bleeding, or needing further surgery, or amputation. Your doctor or nurse will discuss your risks with you.

Bypass surgery

Bypass surgery is an operation to bypass a blockage in the artery in your leg. This should improve the blood supply to your leg. Bypass surgery is usually only carried out if the circulation to your leg is severely affected and if angioplasty has been unsuccessful or is not possible.

Bypass surgery is a big operation, done under a general or local anaesthetic. It involves staying in hospital for around 7 to 10 days, or sometimes longer.

The aim of bypass surgery is to bypass – or ‘get around’ – the narrowed sections of your artery, using a ‘bypass graft’. The bypass graft may be a vein taken from your leg or arm or, rarely, an artificial hollow tube. The graft is attached to the artery above the blockage and ends at a point in the artery beyond

the blockage. This provides a new path for the blood to travel through and should improve the blood supply to your legs and feet. After the surgery, you will be given regular painkillers for a few days or weeks to help control your pain. The wounds will heal and fade after a few months.

When you go home, it’s important to get back to your usual activities gradually. You may be advised not to do any heavy housework for a few weeks. It’s good to do regular short walks after the operation. It can take a few months to make a full recovery.

The success of the operation can depend on several factors, which vary from person to person. The most important factor is to stop smoking. Before you have your surgery, your surgeon will talk to you about your chances of having a fully successful bypass.



For more information on particular operations and recovery afterwards, see the Circulation Foundation website circulationfoundation.org.uk

Angioplasty or bypass surgery?

Overall, people who have bypass surgery are more likely to remain free from symptoms for a slightly longer time – sometimes a few years longer – than those who have an angioplasty. However, the advantage of an angioplasty is that it is not a major operation, recovery is quicker, and it has fewer complications than bypass surgery. You can discuss with your doctor which procedure is better for you.

After your angioplasty or bypass surgery

Having treatment such as angioplasty or bypass surgery helps to improve your blood supply, but it is not a cure for peripheral arterial disease. So, after having an angioplasty or surgery, it is possible that your arteries may become narrowed again in the future. To help prevent this from happening, having a healthy lifestyle is vital.

It is particularly important to stop smoking if you have had an angioplasty or bypass surgery. If you smoke, there is a much higher chance that your arteries will become narrowed or blocked again.

Carotid endarterectomy

If you have severe peripheral arterial disease in your carotid arteries (the arteries in your neck), you may be offered a carotid endarterectomy. This can help to reduce the risk of having a stroke.

A carotid endarterectomy involves a surgeon removing the atheroma that is causing the blockage within your carotid artery. It can be done under general or local anaesthetic. The surgeon makes a cut in the side of your neck, and then clamps and opens your artery. The atheroma is carefully removed, and the artery is closed using a patch of special material.

When you go home, try to do some activity every day, building up gradually. You will soon be able to return to all your usual activities.

There are some risks involved in having this procedure. See the next page.

Carotid stenting

Another procedure you may be offered if you have severe peripheral arterial disease in your carotid arteries is carotid stenting.

This involves making a cut, usually in your groin, and passing a small catheter (a thin, flexible tube) up into your chest and then to the artery in your neck. Once the catheter has reached the blockage, a stent (a small wire mesh tube) is inserted. The stent helps to keep the narrowed artery open and allows your blood to flow normally. It also holds back the material that is causing the blockage and stops it breaking off and causing a stroke.

Carotid endarterectomy or carotid stenting?

Which procedure you are offered will depend on the cause of the blockage in your carotid artery, and whether you have had an operation on the artery before.

There is a risk involved in having both these procedures. Fewer than 5 in every 100 people who have a carotid endarterectomy or carotid stenting have a stroke during the procedure. Fewer than 1 person in every 100 dies during the procedure. You can discuss with your doctor your own risk of this happening. If the risk is too high, your doctor won't recommend that you have the operation.

Amputation

Many people with peripheral arterial disease worry about whether they will need to have a part of their leg amputated, but in fact very few people will need this. If your peripheral arterial disease gets worse – for example, if you develop rest pain or gangrene – your risk of needing an amputation will be higher. The risk of having a leg amputated is also higher if you are a smoker.

Amputation is the very last resort and will only be done if other treatments have not improved the blood flow.

Afterwards, you will see a physiotherapist to help you regain your strength and improve your mobility. And you will see an occupational therapist for advice on how to manage your everyday activities.



For more information about amputation and recovery afterwards, see the Circulation Foundation website circulationfoundation.org.uk

Peripheral arterial disease increases your risk of abdominal aortic aneurysm.

What is an abdominal aortic aneurysm?

The aorta is the main artery that carries blood away from your heart to the rest of your body. (See the illustration on page 05.) An **aortic aneurysm** is a balloon-like swelling or bulge that develops in a section of the aorta, because of a weakness in the wall of the aorta.

Having atheroma in your arteries increases the risk of developing an aneurysm. The fatty deposits can make the artery wall weak, causing it to bulge. Aneurysms are most common in men, people with high blood pressure, and those over the age of 65.

Most aortic aneurysms are found in the abdominal area of the aorta, but they can also happen in other areas such as the chest. An **abdominal aortic aneurysm** – or **AAA** for short – often doesn't cause any symptoms and is usually picked up by chance on a scan (See the illustration on page 51.) But sometimes an AAA can put pressure on the spine, which may cause pain in your lower back.

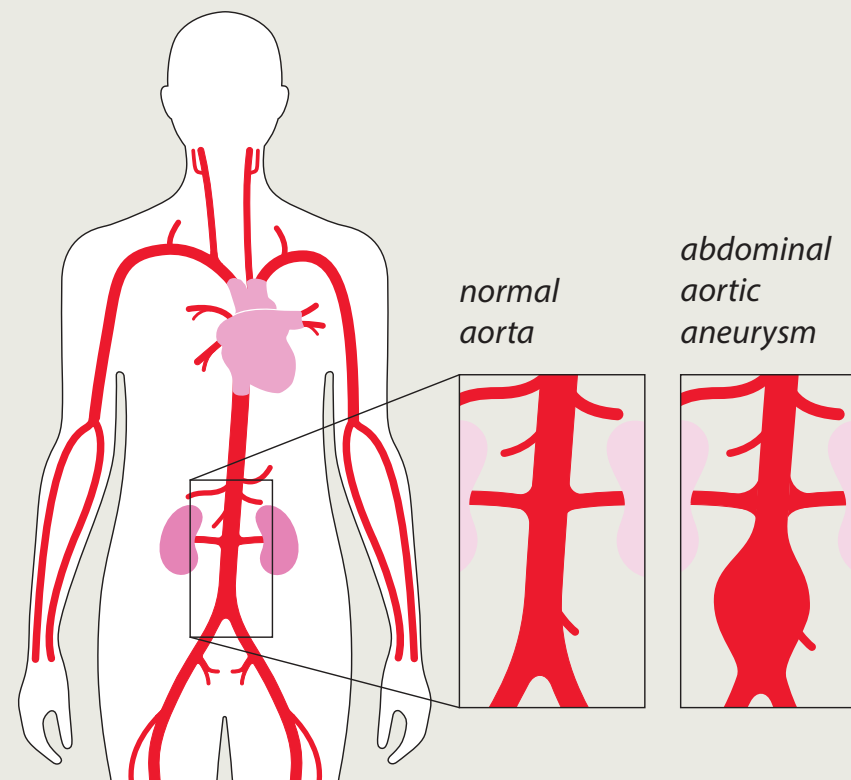
If the aneurysm gets big, it could burst and cause internal bleeding. This is a life-threatening condition that needs emergency surgery. If the aneurysm

bursts, you are likely to have sudden severe pain in your abdomen, back or lower back area. You might also feel cold, clammy, sweaty, faint and breathless. Some people collapse. If you get any of these symptoms, either you or someone else should call 999 immediately.

Most aneurysms are small, but they can grow. If you have one, you will need regular scans to check the size of it. The chance of an aneurysm bursting depends on how big it is. The bigger the aneurysm is, the bigger the risk. If it grows to more than 5.5 centimetres, you will need to see a vascular surgeon to talk about whether you need to have a procedure to repair it.

Because most people who have an AAA don't have symptoms, an NHS screening programme has been introduced in the UK. Men aged over 65 are offered an ultrasound test to see if they may have an AAA. For more information about this, ask at your GP surgery, or see the website: [gov.uk/topic/population-screening-programmes/abdominal-aortic-aneurysm](https://www.gov.uk/topic/population-screening-programmes/abdominal-aortic-aneurysm)

Abdominal aortic aneurysm



How to reduce the risk of an abdominal aortic aneurysm (AAA)

The same things that reduce your risk of peripheral arterial disease also reduce your risk of having an AAA (see page 26). You will probably also need to take medicines such as those listed on page 38, to help protect your heart and circulation.

Treatment

There are two main treatments available for an abdominal aortic aneurysm:

- **surgical repair** or
- **endovascular repair (EVAR).**

You can discuss with your vascular surgeon which procedure is better for you. This will depend on the results of your tests, the shape and size of your aneurysm and blood vessel, and your general health.

Surgical repair

This involves replacing the affected part of your aorta with an artificial tube (a graft). It is a big operation and you will need a general anaesthetic, so you will be asleep for the whole procedure.

If you need an operation, your surgeon will arrange for you to have some tests beforehand to assess your heart and lung function, including a heart scan.

During the operation, the surgeon will make a cut down the middle of or across your tummy, clamp the aorta and iliac artery, open the weakened section of the aorta and insert the graft. The graft then acts

as an artificial blood vessel and the blood flows through the graft inside your aorta instead of through the aneurysm. These grafts usually last for around 25 years.

Most people who have this operation need to stay in hospital for over a week. You will feel very tired after the operation, and it can take some weeks to make a full recovery.

Endovascular repair (EVAR)

Some people are suitable for having a procedure called an endovascular repair – or EVAR. This is a type of keyhole surgery, which involves making a smaller cut than in traditional surgery.

Before having the procedure, you will need to have tests to check your fitness, including a heart scan and tests to assess your heart and lung function.

People having this procedure usually have a local anaesthetic injected in their groin, or a small injection in their spine. Some people may need a general anaesthetic.

The surgeon makes a cut in the artery in the groin. A catheter (a thin, flexible tube) is then passed up through the artery to where the aneurysm is. A stent-graft (a small metal tube covered with a mesh) is fed up through the catheter and placed inside the weakened part of the artery. The catheter is then taken out, and the stent-graft is left in place. The blood then flows through the stent-graft, and the aorta is protected from further pressure.

You should be able to get up and walk around the next day. Most people are able to go home two or three days after the procedure. You will need to have follow-up scans – a CT scan and an ultrasound – to make sure that the stent-graft stays in the correct position.



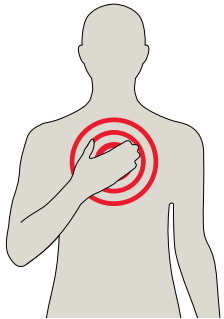
For more information about AAA, the treatment for it, and the complications of surgical repair or EVAR, see the Circulation Foundation website circulationfoundation.org.uk

**Taking your medicines
and following a healthy
lifestyle can help
prevent your peripheral
arterial disease from
getting worse.**

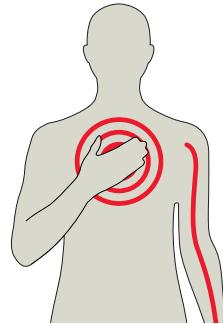
HEART ATTACK? THE SYMPTOMS ... AND WHAT TO DO

A heart attack is when a part of the heart muscle suddenly loses its blood supply. This is usually due to coronary heart disease.

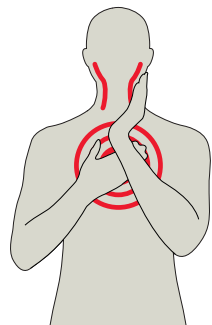
The symptoms of a heart attack



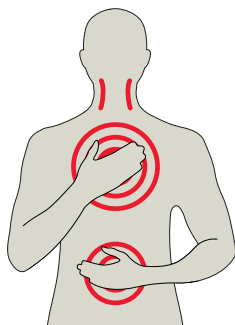
Pain or discomfort in the chest that doesn't go away.



The pain may spread to the left or right arm ...



... or may spread to the neck and jaw.



You may feel sick or short of breath.

Think quick ... act fast. Call 999 immediately.

ACT FAST...

What to do if you think someone is having a heart attack

- 1** Send someone to call 999 for an ambulance immediately.

If you are alone, go and call 999 immediately and then come straight back to the person.
- 2** Get the person to sit in a comfortable position, stay with them and keep them calm.
- 3** Give the person an adult aspirin tablet (300mg) if one is easily available, unless they're allergic to aspirin or they've been told not to take it.

If you don't have an aspirin next to you, or if you don't know if the person is allergic to aspirin, just get them to stay resting until the ambulance arrives.

STROKE? THE SYMPTOMS ... AND WHAT TO DO

If you suspect that you or someone else is having a stroke, you need to act **FAST**. To remember the signs of a stroke and what to do, think 'FAST':

Facial weakness – Can you smile? Has your mouth or eye drooped?

Arm weakness – Can you raise both arms?

Speech problems – Can you speak clearly and can you understand what others are saying?

Time to call 

If these symptoms disappear within 24 hours, it may have been a transient ischaemic attack or TIA (sometimes called a mini stroke). A TIA is a warning sign that you are at a very high risk of having a stroke – so it is vital that you don't ignore these symptoms. **If you get these symptoms or see them in someone else, call 999 immediately.**

For more information, contact the Stroke Association on **0303 3033 100** or visit **www.stroke.org.uk**

FOR MORE INFORMATION

British Heart Foundation website
bhf.org.uk

For up-to-date information on cardiovascular disease, the BHF and its services.

Genetic Information Service
0300 456 8383

(A similar cost to 01 or 02 numbers.)
For information and support on inherited heart conditions.

Online community
community.bhf.org.uk
Share your experiences, stories, tips and ideas with other people like you in our online community.

Heart Helpline
0300 330 3311
(A similar cost to 01 or 02 numbers.)
For information and support about your heart condition and keeping your heart healthy.

Twitter
@TheBHF
Get our latest news and views directly into your Twitter feed.

Facebook
facebook.com/bhf
Join the conversation and get our latest news and updates on Facebook.

Booklets and DVDs

To order our booklets or DVDs:

- call the BHF Orderline on **0300 200 2222**
- email orderline@bhf.org.uk or
- visit bhf.org.uk/publications

You can also download many of our publications from our website.

Our resources and services are free of charge, but we rely on donations to continue our vital work. If you'd like to make a donation, please call our donation hotline on **0300 330 3322** or visit our website at bhf.org.uk/donate

Heart Information Series

This booklet is part of the *Heart Information Series*.

The booklets in this series are:

- Angina
- Atrial fibrillation (AF)
- Blood pressure
- Cardiac rehabilitation
- Caring for someone with a heart condition
- Coronary angioplasty
- Diabetes and your heart
- Heart attack
- Heart failure
- Heart rhythms
- Heart surgery
- Heart transplant
- Heart valve disease
- Implantable cardioverter defibrillators (ICDs)
- Keep your heart healthy
- Living with a pacemaker
- Medicines for my heart
- Peripheral arterial disease
- Reducing my blood cholesterol
- Returning to work
- Tests

Our services

For more information about any of our services, contact the BHF on **0300 330 3322** or visit **bhf.org.uk**

Nation of life savers

The BHF has a vision to create a nation of life savers. As part of that vision, we're doing everything we can to make sure the UK public know CPR and can use public access defibrillators. Join the fight for every heartbeat and help us save the lives of thousands of people across the UK every year. Find out more at **bhf.org.uk/cpr**

- **Heartstart** is a free, two-hour course where you can learn CPR and other emergency life saving skills.
- Our **Call Push Rescue** training kit is available free to eligible secondary schools, and for a small fee to workplaces and community groups. It has everything you need to learn CPR, including a training DVD.

Heart Matters

Heart Matters is the BHF's free, personalised service offering information to help you lead a heart-healthy lifestyle. Join today and enjoy the benefits, including *Heart Matters* magazine and access to online tools. Call the **Heart Matters Helpline** on **0300 330 3300**, or join online at **bhf.org.uk/heartmatters**

Heart Support Groups

Local Heart Support Groups give you the chance to talk about your own experience with other heart patients and their carers. They may also include exercise classes, talks by guest speakers, and social get-togethers. To find out if there is a Heart Support Group in your area, contact the **Heart Helpline** on **0300 330 3311**.

Help shape the BHF – Heart Voices

Heart Voices is a growing network of heart patients who use their experiences to make sure our work meets the needs of patients. By signing up, you'll get the chance to shape the BHF by getting involved with anything from helping us to make new resources to informing our research. Visit **bhf.org.uk/heartvoices** for more information and to sign up.

For more information on peripheral arterial disease

Circulation Foundation

Phone: 020 7205 7151

Website: circulationfoundation.org.uk

For information on vascular disease (diseases of the arteries and veins).

Information for the public:

Lower limb peripheral arterial disease

Available from nice.org.uk

Information on the care and treatment options for people with lower limb peripheral arterial disease that should be available in the NHS in England and Wales.

Produced by the National Institute for Health and Care Excellence (NICE).

For information on stroke

Stroke Association

Stroke Helpline: 0303 3033 100

Textphone: 18001 0303 3033 100

Website: stroke.org.uk

AAA	49
abdominal aortic aneurysm	07, 49
activity	15, 26, 29
alcohol	27
amputation	14, 47
aneurysm	49
angina	06
angiogram	23
angioplasty	39, 40, 44
ankle brachial index	20
aortic aneurysm	49
arteries	03, 05
atheroma	03
blood pressure	15, 26, 38
bypass surgery	42
cardiovascular disease	06, 15
carotid endarterectomy	45, 46
carotid stenting	45
causes of peripheral arterial disease	15
cholesterol	15, 26, 38
claudication	08
computerised tomography angiogram	22
coronary heart disease	06
CTA	22
diabetes	15, 27, 39
duplex ultrasound	21
eating	27
ECG	24

electrocardiogram	24
endovascular repair	53
EVAR	53
exercise	15, 26, 29
family history	15
feet	32
gangrene	13
health check	17
heart attack	06, 56
leg pain	08, 37
medicines	37
MRA	22
overweight	15, 27
pain (leg pain)	08, 37
physical activity	15, 26, 29
rest pain	13
risk factors for peripheral arterial disease	15
scan	22, 49, 50, 52, 53
smoking	15, 26, 39
stent	40, 46, 54
stroke	06, 58
symptoms of peripheral arterial disease	08
tests	20
treatment: for abdominal aortic aneurysm	52
for peripheral arterial disease	37
ulcers	08, 12, 32
walking	08, 29
weight	15, 27

We would welcome your comments to help us produce the best information for you. Why not let us know what you think? Contact us through our website [bhf.org.uk/contact](https://www.bhf.org.uk/contact). Or, write to us at:

BHF Customer Services
 Lyndon Place
 2096 Coventry Road
 Birmingham B26 3YU.

ACKNOWLEDGEMENTS

The British Heart Foundation would like to thank all the doctors, nurses and other health professionals who helped to develop the booklets in the *Heart Information Series*, and all the patients who commented on the text and design.

Particular thanks for his work on this booklet are due to:

- **Professor Julian Scott**, Professor of Vascular Surgery, Leeds Teaching Hospitals NHS Trust.

THANK YOU

This booklet is part of the *Heart Information Series*. We distributed 2 million booklets from this series last year. Without your hard work and support the British Heart Foundation wouldn't be able to provide this vital information for people with heart conditions.

Donate to the fight at **bhf.org.uk/donate**, or text **FIGHT** to **70080** to donate £3 to fund our life saving research.



**British Heart
Foundation**

For over 50 years our research has saved lives.

We've broken new ground, revolutionised treatments
and transformed care.

But heart and circulatory disease still kills one in four
people in the UK.

That's why we need you.

With your support, your time, your donations,
our research will beat heart disease for good.

**FIGHT
FOR EVERY
HEARTBEAT**

bhf.org.uk

© British Heart Foundation 2018, a registered charity in England
and Wales (225971) and Scotland (SC039426).

HIS16/0318