

Patient information from the BMJ Group

Multiple sclerosis

In this section

[What is it?](#)

[What are the symptoms?](#)

[How is it diagnosed?](#)

[How common is it?](#)

[What treatments work?](#)

[What will happen?](#)

[Questions to ask](#)

Multiple sclerosis

It can be frightening to find out you have multiple sclerosis (MS). MS can be a serious disease, but treatments can improve your symptoms, slow down the disease, and help you keep getting the most out of life.

We've brought together the best research about MS and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is multiple sclerosis?

If you have multiple sclerosis (MS), the nerves in your brain and spinal cord slowly lose their coating. Over time, these nerves get damaged and may stop working properly. This can affect you in all sorts of ways.

For example, MS can affect the way you move your body. You may at times find it hard to reach out for something or to walk properly.

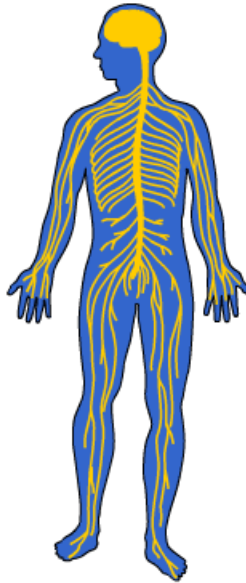
Key points for people with MS

- Some people with MS are hardly affected at all. But the disease is more serious for other people.
- The symptoms are different for everyone. The most common symptoms are feeling very tired and weak and having numb or 'tingling' areas.
- You may have flare-ups (called relapses) when your symptoms get worse and other periods when you feel fine.
- MS affects everyone differently. Just because you have this disease, it doesn't mean you'll be very disabled or need a wheelchair.
- There's no cure for MS, but drugs like interferon beta can reduce relapses, slow down the disease, and help you stay active.

Multiple sclerosis

Your central nervous system

To understand what happens when you get MS and how it's treated, it helps to know a bit about your central nervous system (or CNS for short).



Your brain sends messages to nerves throughout your body.

Your CNS has two main parts: ^[1]

- Your brain controls everything your body does. For example, your brain lets you move your arm to pick up your coffee, speak, recognise your family, think, and remember things.
- Your spinal cord is the main highway of your CNS. It's the big bundle of nerves that runs down your back from your brain. It sits inside the bones of your spine.

Your brain and spinal cord are made up of billions of nerve cells that share information. The information moves from one nerve cell to another as chemical signals.

Groups of nerve cells have specific jobs. For example, some let you think, learn, remember, and plan. Others let you see and hear. And others manage the millions of actions that keep your body working.

Many of the nerves in your brain and spinal cord have a coating called myelin. Myelin is made mainly of fat. It's important because it helps signals travel quickly and smoothly along your nerves.

What happens in MS?

Here's what happens if you have MS. ^[2] ^[3]

Multiple sclerosis

- Your **immune system** normally helps protect you by fighting off **infections**. But if you have MS, your immune system makes a mistake. It attacks the myelin coating around the nerves in your brain and spinal cord.
- This causes **inflammation**, and the myelin coating may be damaged or even destroyed.
- If this happens, signals travelling along your nerves can slow down, get blocked, speed up, or get mixed up.
- This can affect how different parts of your body work. For example, your brain may send a message to your hand to pick up a cup. But if the signal gets mixed up, your hand may not move the way you want it to. Or the movement may be too weak or jerky for you to pick up the cup.
- MS can cause many different symptoms. This is because the symptoms you get depends on where in your brain and spinal cord the inflammation happens. (For more information, see [What are the symptoms of multiple sclerosis?](#))
- The inflammation from MS can come and go. But if it keeps coming back, your nerves may get permanently damaged.

Scientists don't know exactly what causes MS. But a lot of research is going on to try to find out.

Types of MS

There are four main types of MS:

- Relapsing-remitting MS: You get bouts of symptoms called relapses. These last for at least 24 hours, and usually for a few weeks.
- Secondary progressive MS: Some of your symptoms stay after a relapse and get worse over time.
- Primary progressive MS: Your symptoms never really go away from the start. They slowly get worse but may vary over time.
- Progressive relapsing MS: This type is very rare. Your symptoms steadily get worse from the start. On top of that, you also get relapses, when your symptoms suddenly get much worse.

Most people with MS get the relapsing-remitting type, then go on to have the secondary progressive type. ^[3] (To learn more, see [Types of multiple sclerosis](#).)

Multiple sclerosis

Multiple sclerosis: why me?

Certain things increase your chances of getting MS. Doctors call these things risk factors. Having a risk factor doesn't mean you'll get MS for certain. It just means you're more likely to get it than someone who doesn't have the risk factor. These are the main risk factors for MS.

Your family and your genes

You're more likely to get MS if other people in your family have it, especially a brother or sister. ^[3] If you have a close relative with MS, you have about a 2 in 100 to 3 in 100 chance of getting it yourself.

There isn't any single **gene** that causes MS. Instead, some people probably get a mix of genes from their parents that increases their risk. ^[3] This means you may be more likely to get MS if you have these genes. But other things also need to happen for you to get it.

Infections

Infections probably don't cause MS on their own. But some doctors think they might trigger the disease if you have genes that make you more likely to get MS. ^[4]

Here are some of the infections that might be related to MS, especially if you get one of these as a teenager: ^[3]

- Measles
- Herpes
- Chickenpox
- Rubella
- Glandular fever, also called mononucleosis (an infection with the Epstein-Barr virus)
- Some types of flu
- Chlamydia .

These infections can trigger your **immune system**, which may go on to attack your nerves by mistake. ^[4]

Where you live

MS is more common in colder countries that are farther from the equator.

Multiple sclerosis

- In the UK, MS is more common in north-east Scotland and the Orkney and Shetland Islands than in the rest of the country. ^[5]
- Below the equator, MS is more common in the southern part of Australia than further north. ^[6]
- It is also more common in northern Europe (for example, Norway, Sweden, and Finland) than in southern Europe (for example, Greece, Spain, and Portugal). ^[5]

No one knows why this is. But your chance of getting MS seems to depend on where you lived as a child. So if you move from a colder country to a warmer one after the age of about 15, it doesn't lower your risk of getting MS.

Types of multiple sclerosis

There are four main types of multiple sclerosis (MS). ^[3]

- About 85 in 100 people with MS have a type called relapsing-remitting MS when they are first diagnosed.
- Most people with the relapsing-remitting type go on to have secondary progressive MS within 25 years.
- About 10 in 100 people with MS have primary progressive MS.
- A type of MS called progressive relapsing MS is very rare.

Relapsing-remitting MS

If you have this type, you get bouts of symptoms called relapses. These last for at least 24 hours, but they usually last for a few weeks. You may hear this called 'benign' MS.

In the early stages of MS, your symptoms may clear up completely after a relapse. This is called a **remission**. You may stay in remission for months or even years. Relapsing-remitting MS is the most common type of MS when it's first diagnosed. But this type can turn into the secondary progressive type over time.

Secondary progressive MS

About half of people with relapsing-remitting MS get secondary progressive MS 10 to 15 years after getting their first symptoms. ^[3] In this type, some of your symptoms stay after a relapse and get worse over time.

Multiple sclerosis

Primary progressive MS

If you have this type of MS, your symptoms never really go away from the start. You don't have any remissions. Instead, your symptoms slowly get worse. But they may vary over time. ^[7]

Progressive relapsing MS

This type of MS is rare. Your symptoms steadily get worse from the start. On top of that, you also get relapses, when your symptoms suddenly get much worse. You may or may not recover to how you were before the relapse.

What are the symptoms of multiple sclerosis?

You can get many different symptoms from multiple sclerosis (MS): ^[3]

- [Tiredness and weakness](#)
- [Numbness and odd sensations](#)
- [Problems moving parts of your body](#)
- [Dim or blurred vision](#)
- [Dizziness and vertigo](#)
- [Muscle spasms](#)
- [Bladder problems](#)
- [Sexual problems](#)
- [Bowel problems](#)
- [Emotional upset](#)
- [Feelings of confusion](#) .

Everyone who has MS is affected differently.

- You might get only some of these symptoms or you might get most of them.
- Usually you'll have just a few at a time.
- You might have certain symptoms at one time and others at a different time.

Multiple sclerosis

- Your symptoms can be mild or severe. They might be so mild that you don't notice them, especially at first.
- Your symptoms can last just a day or two, or for weeks on end.

The pattern of your symptoms depends a lot on the type of MS you have. (For more, see [Types of multiple sclerosis](#) .)

- If you have relapsing-remitting MS, your symptoms will come and go.
- If you have progressive MS, you may have more symptoms and they may get better, but they probably won't go away completely.

Researchers now know that a single episode of nerve problems lasting for more than 24 hours can be a lead up to multiple sclerosis.^[8] This is known as clinically isolated syndrome (or CIS for short). Your optic nerve might become inflamed (optic neuritis) for a short time. Or you may get inflammation of your spinal cord (transverse myelitis) or a brainstem lesion. Between 3 in 10 and 7 in 10 people who have a single episode of nerve inflammation may go on to have multiple sclerosis.

You don't have to just put up with your symptoms. A lot can be done to help you feel better, so be sure to tell your doctor if you're having any symptoms.

How do doctors diagnose multiple sclerosis?

There isn't any simple test that says you have multiple sclerosis (MS). Because MS symptoms can come and go, it can take time to be sure you have the right diagnosis.

MS is a serious disease. Doctors don't want to tell you that you have it if you don't, or tell you everything is OK only to find that you have MS after all. Unless your diagnosis is very clear, doctors will often wait to see if your symptoms come back before referring you to a specialist and doing a lot of tests.

Seeing your GP

The doctor you will probably see first is your GP. Here is what they are likely to do.

- Your GP will probably [ask you questions](#) to find out more about your symptoms and if they fit with MS.
- Your GP will [give you an examination](#) to see if there are any signs of damage to your nerves.

If your GP thinks you could have MS, they should refer you to a doctor who specialises in diseases of the brain and spinal cord (a neurologist).^[2]

Multiple sclerosis

If your symptoms are mild and could be caused by something else, your GP may wait to see if your symptoms come back before referring you to a neurologist. ^[2]

Seeing a specialist

You should be able to see a neurologist within six weeks of being referred by your GP. ^[2]

The neurologist may repeat some of the things your GP has already done. Here is what the neurologist will probably do.

- The specialist will probably [ask you questions](#) to find out more about your symptoms and if they fit with MS.
- The specialist may give you a [physical examination](#) to see if there are any signs of damage to your nerves.
- The specialist may [do some tests](#) to see how likely it is that MS is causing your symptoms, or if some other condition might be causing them.

Making the diagnosis

Once the neurologist has the results of all of your tests, they can try to make a diagnosis. If you have MS, these tests should show that:

- The coating of your nerves (called myelin) has been damaged in at least two places in your brain and spinal cord
- Your symptoms aren't caused by another condition.

If the specialist tells you that you probably have MS, they should take time to discuss the diagnosis with you and give you written information about MS and about local and national organisations that can help you. ^[2] You should also be put in touch with a specialist nurse or another health professional who knows about MS, so they can talk about your diagnosis with you and organise any help you might need. ^[2]

How common is multiple sclerosis?

Multiple sclerosis (MS) is quite common.

- About 100,000 people in the UK have MS. ^[11]
- Around 1 in 800 people in Europe and North America have it. MS is the most common cause of disability due to nerve damage in young adults. ^{[12] [13]}
- MS is usually diagnosed in people between the ages of 20 and 40 years. ^{[11] [14]}

Multiple sclerosis

- MS affects about three times as many women as men. ^[11]
- In the UK, MS is more common in the north of Scotland than farther south. ^[5] In Europe, it's more common in northern countries (such as Norway, Sweden, and Finland) than in southern ones (such as Spain, Italy, and Greece). ^[5] No one knows why, but the disease gets more common the farther you go from the equator.
- MS may have become more common over the last 20 years. But experts aren't sure if more people are getting MS or if doctors have just become better at diagnosing it. ^[15]

What treatments work for multiple sclerosis?

If you have multiple sclerosis (MS), the nerves in your brain and spinal cord slowly lose their coating. Over time, they become damaged and may stop working properly. At present, there's no cure for MS. But you can have treatments to improve your symptoms, slow down the disease, and help you keep living a full life.

Doctors can't say for certain what course your MS will take, so it's hard to know what treatments you'll need. A lot depends on which type of MS you have. (For more, see [Types of multiple sclerosis](#) .)

Key points about treating multiple sclerosis

- Some drugs slow down the progress of your MS and reduce the number of relapses you have. These include interferon beta, natalizumab, glatiramer acetate, and immunoglobulin.
- Other drugs help ease your symptoms during a relapse. These include steroids such as methylprednisolone.
- Some drugs are given for specific symptoms that may be bothering you, either during a relapse or all the time. These include amantadine for tiredness and baclofen for muscle spasms.

You'll probably need different treatments for MS during your lifetime. (For more, see [How multiple sclerosis is treated](#) .)

The National Institute for Health and Care Excellence (NICE), which advises the government on health care, has made recommendations about how MS should be treated. You can read their recommendations at <http://guidance.nice.org.uk/CG8> .

If you have the relapsing-remitting type of MS, it can be hard to tell when you should start taking drugs for it. (For more, see [When to start treatment](#) .)

Treatment of multiple sclerosis

Which treatments work best? We've looked at the research and given a rating for each treatment according to how well it works. We've looked separately at the different kinds of treatments you may need.

- [Treatments to reduce relapses and disability](#)
- [Treatments to help symptoms during a relapse](#)
- [Treatments to help tiredness](#)
- [Treatments to help muscle spasms](#)
- [Treatment by a team of specialists](#)

(For help in deciding which treatment is best for you, see How to make the best decisions about treatment.)

Treatment Group 1

Treatments to reduce relapses and disability

Treatments that are likely to work

- [Glatiramer acetate](#) : You might have injections of glatiramer acetate if you have relapsing-remitting MS. The brand name is Copaxone. [More...](#)
- [Interferon beta](#) : You might be given injections of interferon beta if you have relapsing-remitting or secondary progressive MS. The brand names are Avonex, Betaferon, Extavia, and Rebif. [More...](#)

Treatments that work, but whose harms may outweigh benefits

- [Azathioprine](#) : You might take these tablets if you have relapsing-remitting MS or secondary progressive MS. The brand name is Imuran. [More...](#)
- [Mitoxantrone](#) : You might be treated with mitoxantrone if you have very active MS. The brand name is Novantrone. [More...](#)
- [Natalizumab](#) : You may be treated with natalizumab if you have bad relapsing-remitting MS that is getting worse. Its brand name is Tysabri. [More...](#)

Multiple sclerosis

Treatments that need further study

- [Methotrexate](#) : This treatment isn't usually recommended for MS. But it's been tested for people with relapsing-remitting and secondary progressive MS. The brand name is Maxtrex. [More...](#)
- [Immunoglobulin](#) : You might be treated with immunoglobulin if you have relapsing-remitting MS. But it's only used if other treatments haven't helped. [More...](#)

Other treatments

We haven't looked at the research on these treatments in the same detail we have for most of the treatments we cover. (To read more, see Our Method.) But we've included some information because you may have heard of them or be interested in them.

- [Linoleic acid](#) : This is a type of essential fatty acid used to slow the progress of your MS. [More...](#)
- [Fingolimod](#) : You may be offered fingolimod if you have highly active or severe relapsing-remitting MS. Its brand name is Gilenya. [More...](#)

Treatment Group 2

Treatments to help symptoms during a relapse

Treatments that are likely to work

- [Corticosteroids](#) : These come as tablets or injections. Examples include methylprednisolone (brand names Medrone, Solu-Medrone) and prednisolone. [More...](#)

Treatments that need further study

- [Plasma exchange](#) : This treatment takes out a part of your blood that causes inflammation. [More...](#)
- [Natalizumab](#) : This medicine is usually used to prevent relapses, but it has also been tested as a way of treating symptoms during relapses. The brand name is Tysabri. [More...](#)
- [Cannabis](#) : Cannabis is usually illegal in the UK, but a spray form (brand name Sativex) is available from doctors. [More...](#)

Treatment Group 3

Treatments to help tiredness

Treatments that are likely to work

- [Changing your lifestyle](#) : This means making certain changes in everyday activities to help you have more energy. [More...](#)

Treatments that need further study

- [Amantadine](#) : You might be treated with these capsules if your MS is making you very tired. The brand name is Symmetrel. [More...](#)
- [Exercise](#) : This aims to help you feel less tired by making you fitter and stronger. [More...](#)
- [Modafinil](#) : These tablets (brand name is Provigil) may make you feel less fatigued. [More...](#)

Treatment Group 4

Treatments to help muscle spasms

Treatments that need further study

- [Baclofen pump](#) : This pump is put in your back, under your skin. It pumps baclofen onto the nerves from your spinal cord. The brand name of this type of baclofen is Lioresal Intrathecal. [More...](#)
- [Botulinum toxin](#) : Injections of botulinum toxin are given into the muscles around your hips to help relax them, so you can move your legs more easily. [More...](#)
- [Gabapentin](#) : Gabapentin is an anticonvulsant drug that is normally used to treat epilepsy. Some people with MS find that it helps their pain, especially pain from muscle spasms. Its brand name is Neurontin. [More...](#)
- [Medicines that relax your muscles](#) : These include baclofen tablets (brand name Lioresal) and tizanidine tablets (brand name Zanaflex). Researchers have also looked at how cannabis can help. [More...](#)
- [Physiotherapy](#) : This therapy aims to loosen up your muscles so they're less stiff. [More...](#)

Multiple sclerosis

Other treatments

We haven't looked at the research on these treatments in the same detail we have for most of the treatments we cover. (To read more, see Our Method.) But we've included some information because you may have heard of them or be interested in them.

- [Benzodiazepines](#) : These drugs are used for muscle spasms. Some examples are diazepam and clonazepam (brand name Rivotril). [More...](#)
- [Deep brain stimulation](#) : This treatment is used to relieve muscle twitching and shaking. [More...](#)

Treatment Group 5

Treatment by a team of specialists

Treatments that need further study

- [Rehabilitation in a clinic](#) : This is a programme to check and treat all your symptoms during regular visits to a clinic. [More...](#)
- [Rehabilitation in hospital](#) : This is a programme to check and treat all your symptoms while you stay in hospital. [More...](#)

What will happen to me?

It's hard to say how multiple sclerosis (MS) will affect you. It affects people in different ways.



Your symptoms may come and go for many years.

A lot depends on which type of MS you have. (To learn more about the different kinds of MS, see [Types of multiple sclerosis](#) .)

- If you have the most common type, relapsing-remitting MS, your symptoms may come and go for many years.
- If you have primary or secondary progressive MS, your symptoms won't go away and will probably continue to worsen.

Multiple sclerosis

In most people, the relapsing-remitting type of MS turns into the secondary progressive type as time goes by.^[16] If your relapsing-remitting MS was diagnosed 10 years ago, your chances of having secondary progressive MS are about 5 in 10 (50 percent).^[17]

Here are some more things we know about how MS may affect you.

- The longer you have MS, the more symptoms you're likely to have. You may gradually need more help getting around.
- But some people with MS have very little disability even after 15 to 20 years.
- Don't assume you'll need a wheelchair. Many people with MS can walk unaided. Others can walk short distances but need walking aids and perhaps a motorised chair or scooter to help them with longer trips.
- More and more people with MS are now taking drugs to reduce relapses (flare-ups) and slow the disease. These drugs haven't been around long enough for doctors to see their effects over many years.
- MS doesn't change how long you live by much. You'll probably live almost as long with MS as you would if you didn't have the disease.^[18]

It's hard for doctors to say what will happen to you, but certain things about your MS can help your doctors roughly predict what might happen. (For more, see [What your MS can tell you about your future](#) .)

Questions to ask your doctor

If you've been told that you have multiple sclerosis (MS), you may want to talk to your doctor to find out more.

Here are some questions that you might want to ask.

- What type of MS do I have?
- Should I take drugs to try to slow down the disease?
- How likely is it that drugs can slow down the disease?
- Which drugs do you recommend and why?
- How can these drugs help me?
- Do these drugs have side effects?
- How long should I keep taking them?

Multiple sclerosis

- What if they don't seem to be working?
- What other treatments should I have for my MS?
- What treatments can help if I start having trouble getting around?
- Will I be able to have children?
- Will MS affect my pregnancy and delivery?
- Are there any lifestyle changes I can make to help myself? For example, will eating certain foods or exercising help?

Treatments:

Glatiramer acetate to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on glatiramer acetate?](#)

This information is for people who have multiple sclerosis. It tells you about glatiramer acetate, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Glatiramer acetate may help people with the relapsing-remitting type of multiple sclerosis (MS). If you have this type, you get bouts of symptoms that last for at least 24 hours, and usually for a few weeks. (For details, see [Types of multiple sclerosis](#) .)

Glatiramer acetate injections don't work for everyone, so doctors follow guidelines about who should have them on the NHS. (For more, see [When to start treatment](#) .)

What is it?

Glatiramer acetate (brand name Copaxone) used to be called copolymer-1. It's a mix of substances called amino acids. You or your carer can give yourself injections of it under your skin once a day.

How can it help?

If you have relapsing-remitting MS: ^[24] ^[25]

- Daily injections of glatiramer acetate may reduce how many relapses you have. In one study, people taking glatiramer acetate had an average of 1.2 relapses in two

Multiple sclerosis

years. This compared with 1.7 relapses over two years for people taking a dummy treatment (a [placebo](#)).

- But these injections may not affect how disabled you are by your MS.

If you have progressive MS, then glatiramer acetate probably won't slow down how fast your symptoms get worse.^[25] ^[26] (With relapsing-remitting MS, your symptoms come and go. With progressive MS, your symptoms gradually get worse.)

Glatiramer acetate seems to work for relapsing-remitting MS about as well as another drug called [interferon beta](#).^[27]

How does it work?

No one knows exactly how these injections work for people with MS. But the treatment seems to calm the cells from the [immune system](#) that attack the coating around your nerves.^[28] Preventing some of the [inflammation](#) of MS helps your nerves to work more normally. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

About 15 in 100 people get an [allergic reaction](#) after at least one of their glatiramer acetate injections.^[29] Their skin turns red, their chest feels tight, and they feel anxious. The reaction can last up to 30 minutes.

Some people get swelling, itching, and pain at the point where the drug is injected.^[25]

How good is the research on glatiramer acetate?

We found one big summary of the research (known as a [systematic review](#)) that looked at how glatiramer acetate injections can control the symptoms of multiple sclerosis (MS).^[25] It included six good-quality studies ([randomised controlled trials](#)).

Overall, the studies showed that people had fewer relapses, needed less time in hospital, and fewer courses of [corticosteroids](#), compared with people taking a dummy drug (placebo). But the studies didn't all find these benefits.

Interferon beta to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on interferon beta?](#)

Multiple sclerosis

This information is for people who have multiple sclerosis. It tells you about interferon beta, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

Yes, injections of interferon beta may help people with relapsing-remitting MS. But we don't know if it can help people with secondary progressive MS. (For details on different types, see [Types of multiple sclerosis](#) .)

Interferon beta injections don't work for everyone, so doctors follow guidelines about who should have them on the NHS. (For more, see [When to start treatment](#) .)

What is it?

Interferons are **proteins** that your body makes to fight **infections** and to calm **inflammation** . They can also be made in a laboratory and used as medicines. There are two types of interferon beta:

- interferon beta-1a (brand names Avonex, Rebif)
- interferon beta-1b (brand names Betaferon, Extavia).

You or your carer can inject yourself. These drugs are all similar, but you use them in slightly different ways: ^[30]

- Avonex is injected into your muscle once a week
- Betaferon and Extavia are injected under your skin every other day
- Rebif is injected under your skin, usually three times a week.

How can it help?

Interferon beta can help the symptoms of a relapse and prevent disability. ^[31] Interferon beta injections can help you in several ways.

- If you have relapsing-remitting MS, having injections of interferon beta can reduce how many relapses you have. In the studies, 55 in 100 people taking interferon had attacks of symptoms over two years. This compared with 69 in 100 people taking a dummy treatment (a **placebo**). ^[32]
- Interferon beta may slow the progression of your MS and reduce your level of disability. ^[32]

Multiple sclerosis

The first long-term study of interferon beta showed that the amount of disability people had 16 years later was about the same, whether they had interferon or a pretend (placebo) treatment.^[33] A second report of this long-term study published 21 years after the original trial found that people who took interferon beta lived longer.^[34]

The research isn't clear on whether interferon beta helps people with progressive MS. Some studies found a benefit, but others didn't.^{[35] [36] [37] [38] [39]} (If you have relapsing-remitting MS, you have bouts of symptoms that come and go. If you have progressive MS, some of your symptoms stay after a relapse and get worse over time.)

Some research has looked at people who've only had one attack of symptoms.^{[40] [41]} Taking interferon beta seems to make it less likely that people will get more symptoms of MS within a year.^[40] In one of the studies, 2 in 10 people taking interferon beta went on to have more symptoms of MS, compared with 3 in 10 people who took a placebo.

However, you're not likely to be offered interferon beta if you've only had one attack of symptoms. That's because most people are not diagnosed with MS until they have had at least two attacks. Doctors need to make certain that there aren't other causes for your symptoms.

How does it work?

Interferon beta interferes with certain **white blood cells** (called T cells) that cause inflammation. It seems to stop these cells getting into your brain and spinal cord. By reducing inflammation, interferon beta slows down nerve damage, so you're less likely to get symptoms of MS.^[28]

(To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

You'll probably have some side effects if you have injections of interferon beta. But they tend to go away after a few months.

- About half the people who use interferon beta get flu-like symptoms in the first six months. Muscle aches and pains and fever are common.
- About 8 in 10 people say that the place where they have the injection gets sore and inflamed. This is more common with interferon beta-1b than with interferon beta-1a.^[42]
- Some people taking interferon beta get changes in the balance of chemicals in their **liver** . But these aren't usually serious and they clear up on their own. There have also been some reports of liver damage with the drugs Avonex and Betaferon, although this is rare.^{[43] [44]} You should have regular tests to check how your liver is working if you take interferon beta.^[45]

Multiple sclerosis

- People seem to get fewer side effects after they've been using interferon beta for about six months. ^[42]

How good is the research on interferon beta?

There's good evidence that interferon beta helps to prevent relapses if you have relapsing-remitting multiple sclerosis (MS). But it's less clear if this treatment can help if you have progressive MS. (For details, see [Types of multiple sclerosis](#) .)

If you've had just one bout of MS symptoms

Several studies have looked at people who've taken interferon beta after their first bout of MS symptoms. ^[40] ^[41] Although the evidence suggests that interferon beta may delay a second bout of symptoms, it isn't usually used in this way. That's because most people are not diagnosed with MS until they have had at least two attacks.

If you have relapsing-remitting MS

We found three summaries of many studies (called [systematic reviews](#)) that looked at people who have relapsing-remitting MS. ^[46] ^[31] ^[32]

The largest review found good evidence that taking interferon beta reduces how often people with MS have relapses. ^[46] The second review found that people given interferon beta injections were less likely to have more bouts of symptoms and less likely to get secondary progressive MS. ^[31] But a lot of people dropped out of these studies, and that makes the findings less reliable. A third review found the best studies of interferon beta 1a lasted around two years. ^[32] We're not sure if taking interferon works if you take it for longer than this.

If you have progressive MS

We found two studies (randomised controlled trials) of interferon beta in people with secondary progressive MS and one summary of research (a systematic review). ^[36] ^[47]

The results of these two studies were unclear. The researchers couldn't be sure that interferon beta injections helped slow down how soon people became disabled by their MS. ^[36] ^[47]

The review said that, overall, interferon beta didn't seem to affect how disabled people with secondary progressive MS became compared with a dummy treatment (placebo). ^[48]

Immunoglobulin to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

Multiple sclerosis

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on immunoglobulin?](#)

This information is for people who have multiple sclerosis. It tells you about immunoglobulin, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. There's not enough evidence to say.

In the UK, you should only be prescribed immunoglobulin by a specialist. Preferably, you should get this medicine as part of a study.^[2] You should have regular checks for side effects. Immunoglobulin is not often used in the UK.

What is it?

Immunoglobulins are **proteins** made by your **immune system**. They protect you from **infections** and diseases.

Immunoglobulins are collected from donated blood. They're separated from other things in the blood and then used as a treatment that can be put into one of your veins once a month if you have MS.

You may hear this treatment called IVIG, which is short for intravenous immunoglobulin. Intravenous means into your vein.

Here are some of the many brand names for immunoglobulin:

- Gammagard
- Sandoglobulin
- Vigam.

How can it help?

If you have the relapsing-remitting type of multiple sclerosis, then treatment with immunoglobulin may reduce how many relapses of MS you have. (For more on the different kinds of MS, see [Types of multiple sclerosis](#).)

In one study, the average number of relapses a year across the group of people taking immunoglobulin was 0.5. This means they had less than one relapse each. People taking a dummy treatment (a **placebo**) had on average 1.3 (one or two) relapses each in a year.^[49]

In another study, some people who had immunoglobulin over two years saw their level of disability become a bit milder. People who had a placebo had no change in their level of disability.^[50]

Multiple sclerosis

However, not all studies show a benefit from immunoglobulin. One big, good-quality study said people were no less likely to have a relapse after a year's treatment with immunoglobulin, than after a year's treatment with a placebo drug. ^[51]

Immunoglobulin doesn't seem to help people who have the secondary progressive type of multiple sclerosis. ^[52] ^[53] (If you have relapsing-remitting MS, you have bouts of symptoms that come and go. If you have secondary progressive MS, some of your symptoms stay after a relapse and worsen over time.)

In one study, people who had only one attack of symptoms (their first attack) were treated with immunoglobulin to see if it stopped them getting more attacks in future. Only a quarter of the people who took immunoglobulin had had a relapse a year later, compared with half of those who didn't take immunoglobulin. ^[54]

But you are not likely to be offered immunoglobulin if you have had only one attack of symptoms. That's because most people are not diagnosed with MS until they have had at least two attacks. Doctors need to make sure that there aren't other causes for your symptoms.

How does it work?

No one knows exactly how immunoglobulin works. But it seems to calm your immune system and stop it damaging the coating around your nerves. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

Immunoglobulin doesn't seem to cause many side effects for most people. ^[49] A few people in the studies stopped taking it because they got a rash.

One study found people treated with immunoglobulin were less likely to stop treatment because of side effects than people treated with [interferon beta](#) . ^[55]

Serious side effects are rare with immunoglobulin. But a few people have had meningitis , kidney failure , or a severe allergic reaction after high doses of this treatment. ^[56]

Immunoglobulin may be dangerous for people who are at risk of getting blood clots. ^[57] In one study looking at people with secondary progressive MS, 4 in 100 people got a blood clot. ^[58] This compared with 1 in 100 people taking a dummy treatment (a placebo). Blood clots can be dangerous if they travel in your blood to your lungs.

How good is the research on immunoglobulin?

The evidence that immunoglobulin helps people with multiple sclerosis (MS) isn't very strong.

Multiple sclerosis

If you have relapsing-remitting MS

We found two reviews that collected together the research on immunoglobulin for [relapsing-remitting MS](#).^[49] ^[59] Both reviews found that immunoglobulin slightly reduced the number of bouts of symptoms (relapses) people had over up to two years.

However, the individual studies in these reviews were quite small. A bigger study, looking at 127 patients, found that immunoglobulin made no difference to the likelihood of having a relapse over the course of a year.^[51]

One study found that immunoglobulin slightly reduced the amount of disability people had, but the benefit was small.^[50]

If you have secondary progressive MS

We found two good-quality studies that looked at how immunoglobulin affects the symptoms of [secondary progressive MS](#). They both found that immunoglobulin didn't seem to cut the number of relapses people had or slow down how fast their symptoms got worse.^[49] ^[60]

Azathioprine to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can they be harmful?](#)

[How good is the research on azathioprine?](#)

This information is for people who have multiple sclerosis. It tells you about azathioprine, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you have multiple sclerosis (MS), taking azathioprine tablets may reduce how many relapses you have. But it won't change how disabled you are by much. And azathioprine has serious side effects.

You should only be prescribed azathioprine tablets by a specialist. Preferably, you should get this medicine as part of a study.^[2] If you take azathioprine, you should have checks for side effects.

What is it?

Azathioprine (brand name Imuran) calms your **immune system**. This treatment was first used to stop transplanted organs being rejected by the body. Now it's used to treat many diseases that involve your immune system, including MS.

Multiple sclerosis

How can it help?

If you have MS and you take azathioprine tablets for a year or more, you'll probably have fewer relapses than if you didn't take them. ^[61] ^[62] The effects should last for at least two years.

How does it work?

No one knows exactly how azathioprine works in MS, but it affects several types of cells that cause **inflammation** in your body. So it might reduce the inflammation around your nerves. And this may help with the symptoms of MS. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can they be harmful?

Yes, azathioprine tablets can have serious side effects.

Common side effects are stomach upset and skin rashes. About 1 in 10 people get side effects that they can't put up with and have to stop taking the drug.

The drug can also stop your **bone marrow** working properly. In particular, it may stop your bone marrow making enough **white blood cells** , which help your body fight off **infections** . ^[61]

The most serious side effect of azathioprine is that, if you take it for a long time, it may increase your risk of cancer. People who take it for more than five years have a higher risk of cancer. ^[63]

How good is the research on azathioprine?

We found two **systematic reviews** of research on using azathioprine tablets to treat multiple sclerosis (MS). ^[61] ^[62]

The studies found that people who took azathioprine were less likely to have a relapse. It wasn't clear whether treatment helped their level of disability.

These studies were all carried out a long time ago, so it is difficult to compare azathioprine with newer treatments for multiple sclerosis, such as [interferon beta](#) and [glatiramer acetate](#) .

Mitoxantrone to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on mitoxantrone?](#)

Multiple sclerosis

This information is for people who have multiple sclerosis. It tells you about mitoxantrone, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

Yes, mitoxantrone can help people with types of multiple sclerosis (MS) called relapsing-remitting MS and secondary progressive MS. (For details, see [Types of multiple sclerosis](#).) If you have one of these types, mitoxantrone can help you have fewer relapses and help keep your disability from getting worse.

Mitoxantrone can cause serious side effects so you will need regular checks on your heart and your blood.

What is it?

Mitoxantrone is a drug that calms your **immune system**. Its brand name is Novantrone. It's usually used to treat cancer.

Doctors usually give mitoxantrone as a drip (also called an IV or **intravenous infusion**). It takes about five minutes. You'll probably have the treatment at your doctor's surgery or a clinic once every three months.

Mitoxantrone can make you feel sick, so you'll probably be given medicine to calm your stomach too.

How can it help?

If you have relapsing-remitting MS that's getting worse, or secondary progressive MS:

- Mitoxantrone may reduce how many relapses you have and stop your disability getting worse. ^[64]

(If you have relapsing-remitting MS, you have bouts of symptoms that come and go. If you have secondary progressive MS, some of your symptoms stay after a relapse and worsen over time.)

How does it work?

No one knows exactly how mitoxantrone works in MS. But the treatment seems to calm your immune system. ^[65] This might help delay the nerve damage and disability caused by cells from the immune system attacking the coating of your nerves. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

Yes, this treatment has several possible side effects.

Multiple sclerosis

Common problems

Mitoxantrone can make you feel sick and make your hair fall out. ^[65]

It can also cause a fall in the number of **white blood cells** in your blood. ^[65] This can reduce your ability to fight off infections, especially in the tubes that carry urine from your **bladder** to the outside. You may need to take **antibiotics** to get rid of the infection.

If you're a woman, treatment with mitoxantrone can disrupt your periods. There's a good chance they'll stop while you're taking this treatment.

Heart problems

The biggest problem with mitoxantrone is that it can damage your heart. This can happen early on during treatment or months or years after your treatment has stopped. The damage is dangerous because it means your heart does not pump blood properly. The risk of this happening is higher if you take the drug for a long time or if you have a high dose. But this side effect is rare. In one study, 2 out of nearly 1,400 people with MS who were given mitoxantrone got heart problems. ^[66]

People with cancer who have been given large amounts of mitoxantrone are more likely to get heart problems than people who take it for MS. ^[23] In people taking this treatment for cancer, the risk of getting heart failure is between 2 in 100 and 3 in 100.

In the UK, doctors are advised to check that your heart is working properly if you are getting a large amount of mitoxantrone. ^[67]

In the US, the Food and Drug Administration (FDA), which checks the safety of drugs, says that your doctor should test your heart to make sure it is working well before each treatment with mitoxantrone. ^[23] (To read more, see [US advice on heart tests for mitoxantrone](#) .)

Leukaemia

Treatment with mitoxantrone can increase your risk of a type of cancer called leukaemia. Leukaemia causes your body to make too many white blood cells. In a study of 802 people with MS who had mitoxantrone, two people got leukaemia. ^[23] This is more than you would expect in the general population.

Because of this increased risk of leukaemia, you should have a blood test before each treatment with mitoxantrone to check that you have the normal amount of blood cells. ^[23]

How good is the research on mitoxantrone?

We found one summary of the research (a **systematic review**) including four studies of people with relapsing-remitting MS or secondary progressive MS. ^[64] (For details on the different types of MS, see [Types of multiple sclerosis](#) .)

Multiple sclerosis

The review found people given mitoxantrone had:

- Fewer relapses a year
- Disability that got worse more slowly.

Natalizumab to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on natalizumab to reduce relapses and disability?](#)

This information is for people who have multiple sclerosis. It tells you about natalizumab, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Natalizumab may help you if you have the relapsing-remitting type of multiple sclerosis (MS).^[31]

(To learn more, see [Types of multiple sclerosis](#) .)

Taking natalizumab can reduce the number of relapses you have and make it less likely that you'll become disabled.^[46] However, the benefits need to be weighed against the side effects, which can be serious.

What is it?

Natalizumab is a drug that affects how your **immune system** works. It's given as a drip (also called an **intravenous infusion** or IV). This will probably take about an hour. You'll need one dose each month.

The brand name for natalizumab is Tysabri.

The National Institute for Health and Care Excellence (NICE) is the organisation that gives advice on which treatments should be available on the NHS. NICE says that natalizumab is only recommended for severe, relapsing-remitting MS that is getting worse quickly. That means:^[68]

- You have two or more serious relapses in a year
- An **MRI scan** of your brain shows nerve damage that's getting worse.

Multiple sclerosis

How can it help?

If you have the type of MS where your symptoms come and go (relapsing-remitting MS), natalizumab can slow down how quickly your MS gets worse. It can also cut the number of relapses you get.

In one study, about 7 in 10 people who took natalizumab went for two years without having a relapse.^[69] Only about 4 in 10 people who took a dummy treatment (a placebo) went for two years without a relapse.

People who took natalizumab were also less likely to become more disabled than people who took a placebo.

How does it work?

Natalizumab affects white blood cells, which are part of your immune system. It stops these cells passing from your blood into your brain and nervous system.^[70] This may help stop the damage to your nerves that causes the symptoms of MS.

Can it be harmful?

Natalizumab can cause serious side effects. In studies of people taking it for several years to prevent relapse, about 1 in 2,000 people taking natalizumab got a dangerous infection in their brain.^[71] This type of infection is bad enough to kill someone or leave them severely disabled. Its medical name is progressive multifocal leucoencephalopathy (PML).

Natalizumab may also cause damage to your liver. Your doctor should do blood tests to check that your liver is working properly. See your doctor straight away if you notice that your skin or the whites of your eyes become yellowish, or if your urine looks darker than normal.^[72]

Because of the risk of side effects, natalizumab is only used for people with severe MS that's getting worse quickly. It should be prescribed by a specialist. And it's important to contact your doctor if you notice any new symptoms or if your symptoms get worse.

Other side effects include infections, tiredness, a fever, and a rash.^[70]

About 1 in 10 people get an allergic reaction to natalizumab.^[69] But this isn't usually serious. Less than 1 in 100 people have a serious reaction.^[70] You'll be checked on for an hour or so after each dose just in case you have an allergic reaction.

The research has only looked at people who took natalizumab for two years. So, we don't know how well it works if you take it for longer.

Natalizumab shouldn't be used with other drugs that affect your immune system, such as [interferon beta](#).^[70] The research isn't clear about whether it helps if you take it with another drug. And taking two drugs might make side effects more likely.

How good is the research on natalizumab to reduce relapses and disability?

There's good research showing that natalizumab can help people with [relapsing-remitting multiple sclerosis](#) (MS). Two large summaries of studies (called [systematic reviews](#)) of people with MS show taking natalizumab can prevent relapses and prevent disability.

[46] [31]

One study looked at 942 people. ^[69] After two years, 67 in 100 people taking natalizumab hadn't had a relapse, compared with 41 in 100 people who took a dummy treatment (a [placebo](#)).

Also, 17 in 100 people taking natalizumab continued to become more disabled, compared with 29 in 100 people taking a [placebo](#).

Methotrexate to reduce relapses and disability

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on methotrexate?](#)

This information is for people who have multiple sclerosis. It tells you about methotrexate, a treatment used to reduce relapses and disability in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you have primary progressive or secondary progressive multiple sclerosis (MS), taking methotrexate tablets may slow down how quickly you become disabled. (For details, see [Types of multiple sclerosis](#).) But there isn't enough research to be sure.

In the UK, methotrexate is not on the list of drugs that doctors are advised to use in MS. ^[2]

What is it?

Methotrexate is a drug that calms your [immune system](#). You take it as a tablet once a week. The brand name is Maxtrex.

How can it help?

Taking methotrexate tablets may reduce your disability if you have primary progressive or secondary progressive MS. (With secondary progressive MS, some of your symptoms stay after a relapse and get worse over time. With primary progressive MS, your symptoms never really go away from the start. They slowly get worse but may vary over time.)

Multiple sclerosis

In one study: ^[73]

- With no treatment, 8 in 10 people with progressive MS became more disabled over two to three years
- But only 5 in 10 people taking methotrexate became more disabled.

However, this study only looked at 60 people. And when the researchers measured people's levels of disability, they looked mainly at how well people could move their arms. It's not clear whether the difference in disability that the study found was big enough to make people's lives easier.

How does it work?

No one knows exactly how methotrexate tablets work in MS. But the drug calms your immune system and reduces **inflammation**. This might help delay the nerve damage and disability caused by cells from the immune system attacking the coating of your nerves. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

There's a small risk that methotrexate will stop your **bone marrow** working properly or damage your **liver**. So you'll probably need to have regular tests if you take this drug to make sure it isn't harming you.

How good is the research on methotrexate?

The evidence that methotrexate helps people with multiple sclerosis (MS) is quite weak. We found one big summary of the research (known as a **systematic review**). This review found only one study of methotrexate.

This study only included 60 people with progressive MS. ^[53] (For details on the different kinds of MS, see [Types of multiple sclerosis](#).)

The study found that methotrexate tablets reduced disability more than a dummy treatment (a **placebo**). But most of the improvement was in how well people's arms worked. So we can't say how helpful these tablets are if MS affects other parts of your body.

Linoleic acid

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

This information is for people who have multiple sclerosis. It tells you about linoleic acid, a treatment for multiple sclerosis.

Multiple sclerosis

Does it work?

We haven't looked at the research on linoleic acid in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see Our Method.) But we've included some information because you may have heard of this treatment or be interested in it.

What is it?

Linoleic acid is a type of essential fatty acid found in vegetables. It is called an essential fatty acid because it's essential that you get it from your food. Your body cannot make it from other things you eat.

Linoleic acid is found in sunflower oil, corn oil, soya oil, safflower oil, and evening primrose oil. You can also take linoleic acid supplements.

How can it help?

Some people with MS find that taking supplements containing linoleic acid helps their symptoms.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about treatments, says that taking between 17 grams and 23 grams of linoleic acid every day may help slow down how fast your disability from MS gets worse.

[2]

How does it work?

The body uses linoleic acid to help make the coating of the nerves (the myelin sheath). This coating gets damaged in multiple sclerosis. Upping your intake of linoleic acid may slow down this damage.

Can it be harmful?

Linoleic acid is likely to be safe, but it might affect other medicines you are taking. Be sure you check with your doctor before using this or any other supplement.

Fingolimod

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

This information is for people who have multiple sclerosis. It tells you about fingolimod, a treatment for highly active relapsing-remitting multiple sclerosis.

Does it work?

We haven't looked at the research on fingolimod in as much detail as we've looked at the research on most of the treatments we cover. (To read more see Our Method.) But we've included some information because you may have heard of this treatment or be interested in it.

What is it?

Fingolimod is a drug that affects how your immune system works. You take it as a tablet once a day.

The brand name for fingolimod is Gilenya.

The National Institute for Health and Care Excellence (NICE) is the organisation that gives advice on which treatments should be available on the NHS. NICE says that fingolimod is only recommended for highly active, relapsing-remitting MS that is getting worse quickly. That means: ^[74]

- You should be able to have fingolimod if you've had interferon beta treatment for the past year but you've still had as many or more relapses than the year before, or your relapses have continued to be severe.

How can it help?

If you have highly active or severe relapsing-remitting multiple sclerosis, fingolimod can help to reduce the number of relapses you have, and also slow down how fast your level of disability gets worse. ^[74]

How does it work?

Fingolimod is a drug that affects how your immune system works. It stops white blood cells from entering your brain, which prevents them attacking the nerves that cause the symptoms of multiple sclerosis.

Can it be harmful?

Fingolimod can cause side effects. The most common side effects include: ^[74]

- Diarrhoea
- Flu
- Headaches
- Liver problems.

Multiple sclerosis

Fingolimod may also cause a decrease in heart rate and heart rhythm problems. The European Medicines Agency (EMA) has stated that people who have a history of heart problems, or are taking drugs to lower their heart rate, should only be prescribed fingolimod under close supervision.^[75] Their heart beat should be monitored at least overnight following the first dose. The EMA has also recommended that everyone starting treatment with fingolimod should have their heart beat monitored before being given the first dose of the medicine and for at least six hours after.^[75]

Corticosteroids to help symptoms during a relapse

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on corticosteroids?](#)

This information is for people who have multiple sclerosis. It tells you about corticosteroids, a treatment used to help symptoms during a relapse of multiple sclerosis. These steroids are not the same as the anabolic steroids used by some bodybuilders. It is based on the best and most up-to-date research.

Do they work?

Yes. If you have a relapse of MS symptoms, steroid tablets or injections may make you feel better.

Although steroids help to treat a relapse, they don't have long-term benefits. So, they won't stop you having another relapse or affect how disabled you become.

Steroids are the standard recommended treatment for MS relapses in the UK.^[2]

What are they?

Steroids are drugs that reduce inflammation. Doctors call them corticosteroids. They're used to treat many conditions that cause inflammation, such as arthritis and asthma. They're not the same as the anabolic steroids that some bodybuilders use.

You can have daily tablets or injections of steroids. In the studies, people took steroids for up to about 15 days.

- The steroid doctors use most in MS is called methylprednisolone. Usually it's given as an injection into a vein. The brand name is Solu-Medrone.
- Your doctor may also give you methylprednisolone tablets (brand name Medrone).

Multiple sclerosis

How can they help?

If you're treated with a steroid when you have a relapse, there's a good chance that you will recover faster than if you didn't have this treatment.

Symptoms get milder in about 65 in 100 people with MS who take a steroid to treat their relapse, compared with 40 in 100 of those who don't take anything.^[76] It doesn't seem to matter whether you take steroids for five days or 15 days. A review of studies found that steroid tablets and injections work about as well as each other.^[77]

One summary of six studies of people with MS found that 60 in 100 people who took steroids had milder symptoms, compared with 40 in 100 people given a dummy treatment (a placebo). But the steroids didn't have any effect on how disabled people became in the long term or on their chances of having more relapses.^[76]

How do they work?

Steroids reduce the inflammation around nerves in your brain and spinal cord. This should help your nerves heal and work better, so that signals move more smoothly along them. As a result, your symptoms should get better. (To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can they be harmful?

Yes. Minor side effects are common with steroids.^[2] They can also cause serious side effects. Harmful effects are more likely if you take steroids for a long time. They are less likely with the short courses you take for a relapse of MS symptoms.

Side effects of steroids include:^[2]

- A risk of infections
- Weak bones that break more easily
- Weight gain
- An upset stomach.

Steroids can also cause **high blood pressure** and raise the amount of a sugar called glucose in your blood.^[2]

About 1 in 20 people find that steroid tablets affect their mood.^[78] This can happen a few days after you start treatment. You may be irritable, anxious, confused, or have trouble sleeping. Or you may get an unusually high mood (euphoria). Rarely, people get more serious side effects, such as thinking about suicide or seeing things that aren't really there. It's also possible to get these side effects when you stop taking steroids.

Multiple sclerosis

Your doctor should explain the benefits and risks of steroids before you start taking them. If you get any worrying symptoms while you're taking steroids, see your doctor straight away.

How good is the research on corticosteroids?

There's good evidence that steroids can help to relieve your symptoms during a relapse (flare-up) of multiple sclerosis (MS). We looked at a summary of the research that included six good studies (called randomised controlled trials) that all showed steroids can help MS symptoms. ^[76]

Plasma exchange to help symptoms during a relapse

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on plasma exchange?](#)

This information is for people who have multiple sclerosis. It tells you about plasma exchange, a treatment used to help symptoms during a relapse of multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you've recently become much more disabled from your multiple sclerosis (MS), then plasma exchange may help you recover to some extent. But there hasn't been enough research to say for certain whether it will help you.

What is it?

During plasma exchange, the liquid part of your blood (called plasma) is taken out and plasma from someone else is put back in.

This treatment is sometimes called plasmapheresis.

Here's more on how it works: ^[20]

- First, your blood is taken out through a tube
- A machine separates the plasma from the cells that make up the rest of your blood (such as red blood cells)
- These blood cells are mixed with replacement plasma
- The mixture of your own blood cells and the new plasma is returned to your body.

Multiple sclerosis

This isn't done all at once. You'll probably need several sessions over a few days or weeks.

Your doctor may suggest plasma exchange if [steroids](#) haven't worked.

You should only be advised to have this treatment by a specialist. Preferably, you should have this treatment as part of a study.^[2] If you have this treatment, you should be carefully monitored for side effects.

How can it help?

If you have a relapse of MS that is causing bad symptoms, and drugs called steroids haven't helped you to recover, then plasma exchange might help, although we don't know for sure.

We found two studies (called [randomised controlled trials](#)) of plasma exchange for people with MS or a similar disease affecting the coating around their nerves.^[79] ^[80]

One study looked at 22 people who hadn't got better by using drugs called steroids.^[79] (For more on that treatment, see [Steroids to help symptoms during a relapse](#) .)

Some of the people in the study were given plasma exchange and some people were given a dummy treatment (a [placebo](#)). Five people given plasma exchange saw their symptoms improve, compared with just one person given the dummy treatment.

Another larger study included 116 people.^[81] It found no difference in improvement of symptoms after a flare-up for people given either plasma exchange or the dummy treatment. But the time it took to recover was shorter for people given plasma exchange.

How does it work?

If you have MS, your [immune system](#) attacks the coating around the nerves in your brain and spinal cord. Some of the substances that damage the coating of your nerves travel around your body in your blood. So, removing the plasma from your blood helps to get rid of these substances, at least until your body makes more plasma. This gives your nerves a chance to heal.

(To learn more about what happens in MS, see [What is multiple sclerosis?](#))

Can it be harmful?

Researchers haven't reported any side effects from this treatment.^[79] But you can get problems from the tubes and needles used to remove your blood and put it back. For example, you can get an [infection](#) or have bleeding.

How good is the research on plasma exchange?

There have only been two studies looking at this treatment for multiple sclerosis (MS). One said it might help, and the other said it made little difference.^[81] ^[79] We can't say for sure which study is more reliable.

We need to see more good-quality research to know whether plasma exchange is really helpful for people with MS.

Natalizumab to help symptoms during a relapse

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on natalizumab to help symptoms during a relapse?](#)

This information is for people who have multiple sclerosis. It tells you about natalizumab, a treatment used to help symptoms during a relapse of multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We don't know. If you have multiple sclerosis (MS) and you're having an attack of symptoms (a relapse), natalizumab may not help you get better. However, there hasn't been enough research to know for sure.

Natalizumab does work if you take it to [prevent relapses](#).

What is it?

Natalizumab is a drug that affects how your **immune system** works. It's given as a drip (also called an **intravenous infusion** or IV).

The brand name for natalizumab is Tysabri.

The National Institute for Health and Care Excellence (NICE) is the organisation that gives advice on which treatments should be available on the NHS. NICE says that natalizumab is only recommended for severe, relapsing-remitting MS that is getting worse quickly. That means:^[68]

- You have two or more serious relapses in a year
- An **MRI scan** of your brain shows nerve damage that's getting worse.

How can it help?

We're not sure if natalizumab can help if you're having a flare-up of MS symptoms (a relapse).

One study looked at 180 people having a mild or moderate relapse.^[82] Some of them were given one dose of natalizumab. The people who'd taken it didn't do any better than people who were given a dummy treatment (a placebo).

How does it work?

Natalizumab affects white blood cells, which are part of your immune system. It stops these cells passing from your blood into your brain and nervous system.^[70] This may help stop the damage to your nerves that causes the symptoms of MS.

When taken for several years, natalizumab helps to prevent relapses and can slow down how quickly someone with MS becomes disabled. However, the research so far seems to show that it won't improve your symptoms quickly if you take it during a relapse.

Can it be harmful?

Natalizumab can cause serious side effects. In studies of people taking it for several years to prevent relapses, about 1 in 1,000 people got a dangerous infection in their brain.^[83] This type of infection is usually bad enough to kill someone or leave them severely disabled. Its medical name is progressive multifocal leucoencephalopathy (PML).

Natalizumab may also cause damage to your liver.^[72] Some people get an allergic reaction to the drip, although less than 1 in 100 get a serious reaction.^[70]

When people have just one dose to treat a relapse, the most common side effects are a headache, a sore throat, dizziness, nausea, pain, trouble sleeping, tingling skin, and diarrhoea.^[82]

How good is the research on natalizumab to help symptoms during a relapse?

There's good research showing that [natalizumab can prevent relapses](#) of [relapsing-remitting multiple sclerosis](#) (MS) if you take it for several years. However, it's not clear whether it works as a short-term treatment for relapses when they happen.

So far, there's only been one good study on using natalizumab as a treatment for relapses.^[82] It looked at 180 people who were having a mild or moderate relapse. Natalizumab didn't work any better than a dummy treatment (a placebo).

Cannabis to help symptoms during a relapse

In this section
[Does it work?](#)

Multiple sclerosis

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on cannabis?](#)

This information is for people who have multiple sclerosis. It tells you about cannabis, a treatment used to help symptoms during a relapse of multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We don't know. Some people with multiple sclerosis (MS) say that cannabis improves their symptoms. Researchers have looked at smoking cannabis, and also at using tablets or a spray containing cannabis extract. So far, the research hasn't given a clear answer about whether cannabis helps people with MS or not.

What is it?

Cannabis (also called marijuana) is a drug made from the cannabis plant. It's often smoked as a recreational drug, because it leads to a 'high' feeling.

It is illegal to possess most kinds of cannabis in the UK. There is no official exception to the law for people who use cannabis for medical purposes.

A cannabis spray is available under the brand name Sativex. It aims to help with muscle spasms without the 'high' of smoking cannabis. Talk to your doctor if you're interested in this treatment.

There's also been some research on cannabis tablets. You probably won't be able to get these in the UK.

How can it help?

Some research has suggested that cannabis could have benefits for people with MS.^[84] But we need more research to be sure. It's possible that cannabis helps with:^[84]

- Muscle stiffness or spasms
- Pain
- Sleep problems.

Several studies have looked at Sativex, the cannabis spray. The research isn't clear, but it hints that the spray could help with muscle spasms.^[85] However, this treatment might not help everyone, and the benefits may be small. For example, one study found that people rated their muscle spasms as improving by just 0.5 on a scale of 0 to 10.^[86]

Research on cannabis tablets suggests they don't help with muscle spasms.^[87] ^[88]

How does it work?

It's not clear how cannabis might help with the symptoms of MS. But the aim is to relax the muscles in your arms and legs, and reduce discomfort.

Can it be harmful?

Cannabis can have side effects. Common problems in a study of cannabis tablets included dizziness, a dry mouth, and diarrhoea. ^[88]

Here are some other problems you might get with cannabis. ^[84]

- Cannabis smoke may damage your lungs in the same way as tobacco smoke.
- Young people who smoke cannabis are more likely to get some mental illnesses. But we don't know if cannabis actually causes these problems.
- Cannabis can also cause dizziness and clumsiness, affect your mood, and stop you thinking clearly. These problems go away when you stop taking it.

How good is the research on cannabis?

The research isn't very clear about whether cannabis helps people with multiple sclerosis (MS). In smoked and spray forms, it might help slightly with muscle spasms and pain.

^[86] ^[89] The results of studies that looked at cannabis pills are mixed. Two studies found that they don't seem to work ^[87] ^[90], but a third study found that they helped to reduce muscles spasms compared with a dummy treatment (placebo) at 12 weeks of treatment. ^[91]

Amantadine to help tiredness

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on amantadine?](#)

This information is for people who have multiple sclerosis. It tells you about amantadine, a treatment used to help tiredness in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you have multiple sclerosis (MS), taking amantadine capsules may help you feel less exhausted. But the research isn't good enough to say for certain whether this treatment works or not.

What is it?

Amantadine is a drug that works against viruses and is sometimes used to treat flu. But it also increases levels of a chemical called dopamine in your brain and spinal cord. Dopamine helps signals travel between your nerve cells.

Amantadine comes as a capsule that you swallow. Its brand names are Symmetrel and Lysovir.

How can it help?

If you take amantadine capsules, you may feel a little less exhausted than you usually do. You may find that you can do more of your everyday activities than you could before. ^[92] ^[93] But some of the research on this treatment wasn't done very well. So we can't be sure whether it works.

How does it work?

Doctors don't know why amantadine capsules seem to help people with MS feel less exhausted.

Can it be harmful?

Some people who take amantadine capsules have problems getting to sleep. ^[92] ^[93] You may also:

- Have hallucinations
- Feel sick
- Be hyperactive
- Feel anxious.

But the side effects are usually mild. Less than 1 in 10 people treated with amantadine stop taking the capsules because of side effects. ^[93]

How good is the research on amantadine?

There isn't much evidence that taking amantadine capsules helps to reduce the feeling of exhaustion that you can get with multiple sclerosis (MS).

We found two reviews and each looked at the same four studies. ^[92] ^[93] The studies weren't done in a very good way. They also used different methods, so it's hard to compare their results.

Multiple sclerosis

None of the studies found big improvements in exhaustion when people with MS took amantadine capsules. But exhaustion did improve a little in each study, so the treatment seemed to be doing some good for some people.

Changing your lifestyle to help tiredness

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on changing your lifestyle?](#)

This information is for people who have multiple sclerosis. It tells you about changing your lifestyle to help you feel less tired. It is based on the best and most up-to-date research.

Does it work?

We don't know. We didn't find any good studies that looked at whether making changes in your lifestyle can help you feel less tired from your multiple sclerosis (MS) in the long term.

What is it?

There are lots of ways you could change your lifestyle that, in theory, could help you feel less tired. ^[94]

- An occupational therapist may be able to suggest changes to your life that help you save energy.
- Your employer may be able to make helpful changes at work. For example, being able to work flexible hours might make it easier to manage your fatigue.
- Keeping a diary of when you feel tired may help you spot things that make your fatigue better or worse.
- Building rest into your routine may help. Some people prefer short periods of rest, or you may want to have a longer break or a nap when you get home from work. You might find meditation, yoga, or other relaxation techniques help you get the most out of the time when you're resting.
- Although exercise is tiring, it can help you stay fit, which may improve your fatigue. A physiotherapist may be able to help you find an amount and type of exercise that suits you. (To read more, see [Exercise](#) .)

How can it help?

Changing your lifestyle in ways you find helpful may make you feel less tired. One review looked at six studies of people with MS who made changes to conserve their energy, such as balancing work and rest, altering activities so they were less demanding, and getting help from other people. Making changes like this helped people feel less tired. But most of the studies didn't last very long. We don't know if it helps in the long term.

^[95] Your doctor and the other medical professionals treating you will be able to give you advice on managing fatigue.

How does it work?

In theory, changing your lifestyle could help you save your energy and help your body cope better with MS. So it could help you feel less tired.

Can it be harmful?

It's unlikely that making changes to your lifestyle will be harmful. The studies that have looked at this didn't find any harmful effects. ^[95]

How good is the research on changing your lifestyle?

One review looked at six good studies on changing people's lifestyle to conserve energy (for example, by taking naps or switching to a lighter kind of work). It found that these kinds of changes can help fatigue if you have multiple sclerosis. ^[95]

Exercise to help tiredness

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on exercise?](#)

This information is for people who have multiple sclerosis. It tells you about exercise, a treatment used to help tiredness in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. Regular exercise may improve your strength and fitness. But there isn't enough good research to know if exercise can help you feel less tired from your multiple sclerosis (MS). However, many doctors in the UK feel that regular exercise is helpful. ^[2]

What is it?

An exercise programme has a range of activities to improve your fitness and reduce your fatigue. Here's what a typical session might look like:

Multiple sclerosis

- A warm-up period to loosen up your muscles
- About 20 minutes to 30 minutes of aerobic exercise (that's the kind that gets your heart beating faster)
- A cool-down period to let your body get back to normal
- About 5 minutes to 10 minutes of stretching.

You might do this kind of exercise three times a week. But your programme should suit your physical abilities. The aerobic part might include walking, running, or using a machine such as an exercise bicycle.

How can it help?

There's good evidence that taking regular exercise can help you keep strong, fit, and able to move around.^[96] Your mood may also improve.^[97] But we need larger studies to be sure if exercise can help you feel less tired.^[98]

A small study found that exercise meant people could walk further, but didn't help them become less disabled overall, and didn't affect how tired they felt.^[99]

How does it work?

Regular exercise may help you feel fitter and stronger.^[96] It may also have other health benefits. For example, it may reduce your body fat and your cholesterol level, and it may improve your mood.

Can it be harmful?

The research didn't find any side effects from exercise.^[96] However, symptoms of MS tend to be worse when your body temperature gets higher, and exercise can heat your body up. Some doctors worry that exercising could worsen your symptoms and even trigger a relapse.^[100] So you shouldn't overdo it. But mild to moderate exercise doesn't seem to be harmful.

You may find it hard to stick to an aerobic exercise programme if you are very tired.

How good is the research on exercise?

We found one summary of the research (a **systematic review**) including 260 people with multiple sclerosis.^[101] There was strong evidence that exercise can help you keep:

- Strong
- Fit

Multiple sclerosis

- Able to move around.

There was also some evidence that exercising may improve your mood. But the people who followed an exercise programme didn't feel less tired. However, some of the studies weren't good quality. So we don't really know if exercise helps tiredness.

Modafinil to help tiredness

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on modafinil?](#)

This information is for people who have multiple sclerosis. It tells you about modafinil, a treatment used to help tiredness in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We don't know. Modafinil has been used as a treatment for the extreme tiredness (fatigue) some people get with MS. But we don't know if it works.

What is it?

Modafinil tablets (brand name Provigil) were first used to treat an illness that makes you keep falling asleep (called narcolepsy). It helps people with narcolepsy stay awake, and feel less tired. So doctors thought it might also help people with tiredness caused by other medical conditions.

How can it help?

We're not sure if it can help people with MS.

There's only been one small study looking at modafinil as a treatment for fatigue in people with MS. ^[102] Modafinil didn't work any better than a dummy treatment (a placebo).

How does it work?

Modafinil works by changing the amounts of chemicals in the part of the brain that controls sleep and wakefulness. ^[103]

Can it be harmful?

Stomach upset and difficulty sleeping are the most common side effects. ^[102]

Multiple sclerosis

Modafinil can cause a very serious rash.^[104] This can be life-threatening and need treating in hospital. Talk to your doctor straight away if you get a rash while you're taking modafinil.

Some people taking modafinil have had problems that affected their mood and the way they thought.^[105] These problems included an unusually high mood, seeing things that weren't there, and having thoughts of suicide.

Modafinil isn't usually recommended for people who've had mental health conditions in the past.

Modafinil can interfere with other drugs that you might take for your MS. For example, it can interfere with drugs called [benzodiazepines](#) or with certain antidepressants. So be sure to talk to your doctor about your other treatments if you're thinking about trying modafinil tablets.^[106]

How good is the research on modafinil?

We only found one small study (a randomised controlled trial) of 115 people.^[107] Some people in the study took modafinil (brand name Provigil) for five weeks and some people took a dummy treatment (a placebo). People felt just as tired whether they took modafinil or the placebo. But this study is too small to be sure that modafinil doesn't work.

Baclofen pump to help muscle spasms

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on a baclofen pump?](#)

This information is for people who have multiple sclerosis. It tells you about using a baclofen pump to help muscle spasms in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If baclofen tablets haven't improved your muscle spasms, a device that pumps baclofen directly to the nerves of your spinal cord might help. (For more on baclofen tablets, see [Medicines that relax your muscles to help muscle spasms](#).) But more research is needed on this treatment to say how well it works.

What is it?

A baclofen pump is one of the treatments that specialists consider giving to people with MS if other medicines for muscle spasms haven't helped.^[108]

Multiple sclerosis

Baclofen is a drug that relaxes your muscles. The brand name of the kind of baclofen used in pumps is Lioresal Intrathecal.

A surgeon will put a small pump in your back, under your skin. Each day, it will pump some baclofen right into the space around your spinal cord.

You'll need to have more baclofen put into your pump every 10 to 12 weeks. But this can be done through your skin, so you won't have to have the pump taken out. ^[2]

How can it help?

If you get a pump with baclofen, it might help to reduce your muscle stiffness and cut the number of spasms you have, within a few days. ^[2] But more research is needed to know for sure.

How does it work?

Baclofen relaxes your muscles and stops them getting stiff and tight and going into spasm. You can take baclofen as tablets (brand name Lioresal). But if your spasms are very bad, you may not be able to take enough of the tablets to help you. Also, taking too many tablets can make you sleepy.

Pumping the drug directly to the nerves of your spinal cord, where it's needed most, may work better than taking lots of tablets.

Can it be harmful?

Yes. There's a risk that your pump could come loose. It could also stop working or cause you some pain. ^[2] Baclofen treatment shouldn't be stopped suddenly. You should stop taking it gradually over one to two weeks. ^[109]

How good is the research on a baclofen pump?

There haven't been many studies on baclofen pumps for treating multiple sclerosis (MS), but some people with very bad muscle spasms find them helpful.

We found one small study (a randomised controlled trial) that compared a baclofen pump with a pump containing a liquid without the medicine. ^[108]

The study included 19 people who had severe muscle spasms from MS or from a head injury. Baclofen tablets hadn't helped them. Researchers found that muscle stiffness and spasms became milder in people who had baclofen pumped into their spinal cord. The effects of the treatment lasted as long as the treatment was given.

But this study is too small to rely on, and not everyone in the study had MS. This makes it hard to say how relevant the results are.

Botulinum toxin to help muscle spasms

Multiple sclerosis

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on botulinum toxin?](#)

This information is for people who have multiple sclerosis. It tells you about botulinum toxin, a treatment used to help muscle spasms in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you have muscle stiffness or spasms because of multiple sclerosis (MS), botulinum toxin aims to help by relaxing your muscles. But we need more research before we can say how well this treatment works.

What is it?

Injections of botulinum toxin damage the nerves that tell your muscles to contract (tighten up). Doctors use just a small amount of the toxin to relax your muscles.

The brand names for botulinum toxin are Botox and Dysport. You've probably heard of people using this treatment to relax the muscles in their face and reduce wrinkles. The effects of the toxin wear off over time. One injection lasts about 12 to 16 weeks.

If you have a fairly specific group of muscles that are stiff or get spasms, your doctor may recommend botulinum toxin. But the treatment should be given only by a specialist, alongside [physiotherapy](#) or other therapies to help improve your movement. ^[2]

How can it help?

Injections of botulinum toxin can help stop your muscles contracting or twitching when you don't want them to.

One small study found that the injections made a slight difference to how far people could move their legs. ^[110] By easing spasms, botulinum toxin helped people to sit and lie with their knees slightly farther apart, so their thighs didn't rub together so much. This made it easier for them to wash between their legs too.

The research hasn't looked at whether it's easier to move or do things for yourself if you have botulinum toxin injections.

We need more research to know for certain how helpful botulinum toxin is.

How does it work?

Your nerves release a chemical that tells your muscles to contract. Botulinum toxin stops your nerves releasing this chemical. So your muscles should relax.

Can it be harmful?

Doctors try to be very careful when they give you these injections so that they block only the nerves to the stiff muscles. But some of the toxin might spread into other muscles. This is rare. But if you get any problems with swallowing, talking, or breathing after one of these injections, get medical help straight away.^[111]

And sometimes it's hard to predict what will happen if you have these injections. Relaxing one muscle might make another one contract.

In one study, people treated with injections of botulinum toxin said they had muscle weakness more often than people who had injections that didn't have any drug in them (called placebos).^[110] The side effects were more common when a higher dose of botulinum toxin was used.

How good is the research on botulinum toxin?

There hasn't been much research on using injections of botulinum toxin to treat muscle spasms caused by multiple sclerosis (MS).

We found one study (called a **randomised controlled trial**) that looked at 74 people with MS.^[110] In this study, people were given injections of botulinum toxin in different doses (lower, medium, and higher) or injections that didn't have any medicine in them (called placebos). The people given the higher doses were more able to move their legs.

Gabapentin to help muscle spasms

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on gabapentin?](#)

This information is for people who have multiple sclerosis. It tells you about gabapentin, a treatment used to help muscle spasms in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. Some people with multiple sclerosis (MS) find that gabapentin helps their pain, especially pain from muscle spasms.^[112] But there is no good research on whether it can help these muscle spasms.

What is it?

Gabapentin was first used to treat epilepsy. It is known as an anticonvulsant. You take it as a tablet or a capsule. The brand name is Neurontin.

Multiple sclerosis

How can it help?

There's no evidence that gabapentin can help muscle spasms caused by MS.

How does it work?

Doctors don't know why gabapentin should work.

Can it be harmful?

Gabapentin has many side effects that are similar to the symptoms of multiple sclerosis (for example, tiredness and shaking).^[113] But these will probably go away within a few weeks after you start taking the treatment.^[114]

Other side effects include **diarrhoea**, feeling sick, **urinary problems**, weight gain, and dizziness.

Tell your doctor if you are pregnant or planning a pregnancy before you take gabapentin.^[113] Your doctor will want to look closely at all your treatment options and decide which are safest for you and your baby.

How good is the research on gabapentin?

There isn't any evidence. We didn't find any good studies that looked at how gabapentin can treat muscle spasms caused by multiple sclerosis.

Medicines that relax your muscles to help muscle spasms

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on medicines that relax your muscles?](#)

This information is for people who have multiple sclerosis. It tells you about medicines that relax your muscles to help muscle spasms in multiple sclerosis. It is based on the best and most up-to-date research.

Do they work?

We're not sure. Even though these medicines are widely used, the research isn't good enough to say for certain whether they work to ease muscle spasms caused by MS.

What are they?

Doctors use several drugs to treat muscle spasms. We've listed below the drugs that have been studied in MS (and their brand names):

- tizanidine (Zanaflex)

Multiple sclerosis

- baclofen (Lioresal)
- dantrolene (Dantrium)
- cannabis.

Tizanidine, baclofen, and dantrolene are tablets that you swallow. They're designed to relax your muscles and reduce the muscle spasms that you might get.

The studies looking at cannabis for muscle spasms looked at tablets or sprays containing extracts of [cannabis](#) . Cannabis tablets aren't usually available in the UK, but there is a cannabis spray, called Sativex. It's illegal to possess most other kinds of cannabis in the UK.

British doctors are advised to use baclofen (brand name Lioresal) or another drug called gabapentin (brand name Neurontin) as the first choice of medicines to treat muscle spasms from MS. ^[2] (To learn more about gabapentin, see [Gabapentin to help muscle spasms](#) .)

Your doctor will prescribe dantrolene and tizanidine only if these other treatments haven't helped you.

How can they help?

We don't know for certain whether medicines to relax your muscles can help. This is what the research says:

- Baclofen tablets may not work better than dummy (placebo) tablets to reduce muscle tightness caused by MS. ^[115]
- Tizanidine tablets may work better than placebo tablets to reduce muscle tightness, but we can't be sure because of problems with the research. ^[115]
- Studies comparing baclofen tablets to tizanidine tablets found they had about the same effect on muscle tightness. ^[115]
- There are no good studies looking at dantrolene tablets for people with MS.

It's frustrating when studies don't give us clear results. However, just because the research isn't good, doesn't mean these medicines won't work for you. Individual patients with MS may well find these drugs helpful. Talk to your doctor about which drugs he or she thinks are most likely to work for you.

There have also been some studies looking at cannabis.

Multiple sclerosis

- Two studies found that cannabis tablets didn't work any better than a dummy treatment (a placebo).^[87] ^[88] But there's not enough research to know for certain whether these tablets work or not.
- Several studies have looked at Sativex, the cannabis spray. The research isn't clear, but it hints that the spray could help with muscle spasms.^[85] However, this treatment might not help everyone, and the benefits may be small. For example, one study found that people rated their muscle spasms as improving by just 0.5 on a scale of 0 to 10.^[86]

To read more about this treatment, see our information on [cannabis](#) .

How do they work?

These all work in slightly different ways. But the aim is to relax the muscles in your arms and legs.

Can they be harmful?

Yes. Both tizanidine and dantrolene can cause serious side effects.^[2] Dantrolene can cause liver damage and harmful changes in your blood.^[109] Tizanidine can harm your liver . In one study, 1 in 111 people got an **inflamed** liver from the drug (this is called hepatitis), and others had signs that the drug had injured their liver a bit.^[116]

Because of these side effects, dantrolene and tizanidine are used only if other treatments haven't helped. If you take them, you'll need tests to make sure your liver is still working properly. See your doctor if you get flu-like symptoms, feel sick, feel unusually tired, don't feel like eating, or get a yellow tinge to your skin or eyes. These could be a sign of liver problems.

Tizanidine reacts badly to other common medicines, including some antibiotics. Always tell your doctor about any other medicines you are taking.^[117]

Other research has found that both tizanidine and baclofen can cause dry mouth, drowsiness, and weakness in your muscles.^[118] But tizanidine might cause less muscle weakness than baclofen.

You shouldn't stop taking baclofen suddenly. You should gradually reduce how much you take over one to two weeks.^[109] Your doctor will help you to do this.

Researchers have also looked at the side effects of tablets containing cannabis extract. They found that these tablets can cause some minor side effects such as a dry mouth, dizziness, and **diarrhoea** .^[88] These tablets are not available in the UK, but you might also get these problems with the cannabis mouth spray.^[85]

How good is the research on medicines that relax your muscles?

Quite a few studies have looked at the effects of muscle-relaxing medicines on muscle spasms in people with multiple sclerosis (MS). But most of them haven't measured the effects of these drugs in a reliable way.

We found a summary of the research (known as a [systematic review](#)) that included 39 studies. ^[119] But only a few of these studies did a good job of measuring the effects of the drugs on muscle spasms. Also, some of the studies were too small to be helpful. The review included studies that looked at baclofen, tizanidine, and dantrolene.

The authors of the review said it wasn't possible to say whether any of the drugs worked better than a dummy ([placebo](#)) treatment. They said researchers needed to come up with a reliable, standard way of measuring muscle spasm, in order to do better research on these drugs in future.

Cannabis tablets

We found one large good-quality study. In it, researchers looked at 660 people with MS to see if taking tablets with a chemical from cannabis could reduce muscle spasms and stiffness. (These tablets are not available in the UK.)

The cannabis extracts didn't help the symptoms of muscle spasms. However, the people taking the cannabis extracts were more likely to think their symptoms had improved. So the researchers thought that cannabis might help control the pain that goes with spasms. ^[120]

Another small study of 57 people found cannabis extract didn't help with muscle spasms any more than a placebo. ^[121]

Physiotherapy to help muscle spasms

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on physiotherapy?](#)

This information is for people who have multiple sclerosis. It tells you about physiotherapy, a treatment used to help muscle spasms in multiple sclerosis. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you have stiffness or spasms in your muscles from multiple sclerosis (MS), physiotherapy may help you move a bit more easily. ^[2]

Multiple sclerosis

What is it?

If you have physiotherapy, a specialist will use exercises to make you stronger and other techniques to help your muscles and joints work better. You'll probably have a session once or twice a week, for several weeks.

If you have stiff muscles or spasms, guidelines on treatment for MS say that you should see a specialist physiotherapist, to find out whether you might benefit from therapy.^[2]

How can it help?

If you have physiotherapy, you might be able to move more easily and you might feel better.^[122] But after you stop the treatment, these benefits will probably wear off within a few weeks.^[123]

A fairly small study found that adding physiotherapy to treatment with [botulinum toxin](#) (Botox) worked better than botulinum toxin on its own.^[124]

How does it work?

The exercises and other techniques of physiotherapy might make it easier for you to move your arms and legs, to get about, and to do the things you want. This might also make you feel better and less upset about what you can't do.

Can it be harmful?

If your physiotherapy is done by someone who's properly trained and understands the needs of people with MS, you shouldn't have any problems.

How good is the research on physiotherapy?

If you have multiple sclerosis (MS) and have trouble moving, there isn't much evidence that physiotherapy will help you get about more easily. So it's hard to say how helpful it might be for you.

We found two good-quality studies (called [randomised controlled trials](#)). But the trials don't agree. One found that physiotherapy helped with balance and moving around.^[123] The other didn't find that it helped people move around. But people who had the therapy were less upset by their movement problems.^[125]

Both studies were small. There were 40 people in the first study and 45 in the second study. We need to see bigger studies to give us more reliable results.

Physiotherapy with botulinum toxin

Another small study, which looked at 38 people, found that adding physiotherapy to treatment with [botulinum toxin](#) (Botox) worked better than botulinum toxin on its own.^[124]

Benzodiazepines

In this section

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

This information is for people who have multiple sclerosis. It tells you about benzodiazepines, a treatment for multiple sclerosis.

We haven't looked at the research on benzodiazepines in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see Our Method.) But we've included some information because you may have heard of this treatment or be interested in it.

What are they?

Benzodiazepines, sometimes called tranquillisers, are used to treat many conditions, including anxiety. Some examples are diazepam and clonazepam (brand name Rivotril).

How can they help?

If you have multiple sclerosis, taking benzodiazepine tablets probably helps by reducing your muscle spasms and stiffness. This may help you or those looking after you to move your arms and legs more easily.

How do they work?

Benzodiazepines slow down certain processes in your brain. This can make you feel calmer and help your muscles relax. ^[126]

Can they be harmful?

There are a few things you should know about these drugs: ^[127]

- They can make you feel sleepy and sluggish, so you may prefer to use them only at night, or before you go to sleep
- They can be habit-forming. And if you develop a habit for one of these drugs, you can have dangerous symptoms if you stop taking it suddenly. So if your doctor gives you one of these drugs, be sure to take it only as he or she tells you to.

Deep brain stimulation

In this section

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

Multiple sclerosis

This information is for people who have multiple sclerosis. It tells you about deep brain stimulation, a treatment for multiple sclerosis.

We haven't looked at the research on deep brain stimulation in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see Our Method.) But we've included some information because you may have heard of this treatment or be interested in it.

What is it?

If you have multiple sclerosis, you may get movements you can't control. You may get a tremor, which is when part of your body shakes. Or you may get spasms, which is when your muscles twitch. Drugs can help some people with these problems. But if drugs don't help you, you may be able to try an operation called deep brain stimulation. An electrical device, a bit like a pacemaker, is put inside your body. It sends an electric current to your brain to try to stop your movement problems.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about which treatments should be available on the NHS, has published guidelines for doctors about deep brain stimulation. The guidelines say that deep brain stimulation works well enough and is safe enough to be used by the NHS. ^[128]

However, deep brain stimulation isn't suitable for everyone. A team of specialist doctors will need to do tests to see if it can help you.

What happens?

Before your operation, you'll have detailed scans of your brain taken. You'll either have a CT scan or an MRI scan. These scans let your doctors find out which part of your brain is causing your movement problems.

The operation can be done with a general anaesthetic to make you sleep. Or you may have a local anaesthetic to numb the area where the operation takes place.

During the operation, the surgeon makes a small hole in your skull. A wire is put into the part of your brain that's causing your movement problems. The wire runs under your skin to a battery pack. The battery pack is also put under your skin, usually at the front of your chest near your collarbone. You might need a second operation to put in the battery pack. The battery is about the size of a pack of cards. Electrical signals travel from the battery to your brain.

How can it help?

There isn't much research on how well deep brain stimulation helps people with multiple sclerosis. ^[128] Some studies found that people had less shaking after their operation. But the improvement may not have been big enough to make doing everyday things any easier.

Multiple sclerosis

People still had less shaking one or two years after their operation. But we don't know how well this operation works in the long term. ^[128]

The kind of care you get after your operation may affect how well deep brain stimulation works. ^[128] You can continue taking drugs to help control your movements after you've had the operation.

How does it work?

Electrical signals from the battery aim to block the brain signals that were causing your movement problems.

The left side of your brain controls the right side of your body, and vice versa. So, having a wire put into the left side of your brain may help with a tremor on the right side of your body. You can have deep brain stimulation on one or both sides of your brain. ^[128]

Can it be harmful?

All operations have risks. In one study, about 1 in 20 people who had deep brain stimulation got short-term problems from having had the operation. These included: ^[128]

- A build-up of fluid in the front part of the brain
- Dead skin on the scalp
- A skin infection
- A bad bruise (called a haematoma) in the place where the battery was put in.

In the study, none of these problems was serious.

You could get a problem with the electrical device: ^[128]

- The battery could break down. In one study, this happened to half the people
- The wire could slip out of the right part of your brain. This happened to about 1 in 10 people
- The wire could break. This happened to about 1 in 20 people.

Experts think that you could also get more serious problems because of deep brain stimulation. These could be:

- Brain damage
- Bad bleeding

Multiple sclerosis

- Not being able to move one side of your body
- Difficulty talking
- Feeling depressed
- Severe swelling in your brain
- A stroke.

It's also possible you could die during the operation.^[128] But we don't know how likely or unlikely this is. Your surgeon will be able to explain the risks before you decide to go ahead with your operation.

Rehabilitation in a clinic

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on rehabilitation in a clinic?](#)

This information is for people who have multiple sclerosis. It tells you about having rehabilitation in a clinic. It is based on the best and most up-to-date research.

Does it work?

If you have a progressive type of multiple sclerosis (MS), going to a clinic for rehabilitation might help you do more for yourself, and feel less tired. But it won't reduce your nerve damage. (For details on the different kinds of MS, see [Types of multiple sclerosis](#) .)

What is it?

Rehabilitation programmes in clinics vary from clinic to clinic, both in what happens and how long they last.

In one study we looked at, people with progressive MS went to a clinic six days a week for six weeks.^[129] They had a programme especially made to suit them.

In another study, the programme lasted for a year, but people had treatment for only five hours a week.^[130] During that time, they were treated by a team of specialists. They had:

- Treatments to improve their balance, coordination, walking, strength, and ability to move
- Exercises to help them keep using their arms so they could wash and dress themselves

Multiple sclerosis

- Social support
- Counselling on nutrition
- Advice on preventing wounds and falls.

You might hear your doctor call this treatment outpatient rehabilitation.

How can it help?

If you have a progressive type of MS and go on an intensive programme in a clinic like the one described above for a year, you might feel exhausted less often than you would normally and you might get fewer overall symptoms.^[130] At the end of the programme, you might be able to do more for yourself than if you hadn't gone on the programme.^[129]^[131] And you might be able to move around more.^[131] But the programme won't help the damage to your nerves. (If you have progressive MS, your symptoms never completely go away and they get worse over time.)

How does it work?

If you have this type of rehabilitation, each person on your team specialises in a different area. So, together, they can look at the whole picture and work out the best way to help you. This should work better than just trying to treat one problem at a time, day by day, as problems build up.

Can it be harmful?

If your rehabilitation is done by skilled and well-trained specialists, this treatment should be safe.

How good is the research on rehabilitation in a clinic?

There isn't much evidence that having rehabilitation in a clinic helps if you have multiple sclerosis (MS). We found two good-quality studies (randomised controlled trials) of rehabilitation for people with a progressive type of MS. There were more than 200 people in the trials in total and the programmes lasted for a year.

People did better on disability and symptom scores at the end of the year. They were better able to get around and care for themselves.

Rehabilitation in hospital

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on rehabilitation in hospital?](#)

Multiple sclerosis

This information is for people who have multiple sclerosis. It tells you about having rehabilitation in hospital. It is based on the best and most up-to-date research.

Does it work?

Probably, for a short time. If you have the progressive type of multiple sclerosis (MS), going into hospital for a few weeks to get your symptoms properly assessed and treated might help you do more for yourself. But it won't change the damage to your nerves. (For details on the different kinds of MS, see [Types of multiple sclerosis](#) .)

What is it?

Having rehabilitation in hospital for MS usually means that you'll have a team of specialists treating you. Your team might include:

- Neurologists, who are doctors specialising in conditions affecting the nervous system
- Nurses
- Physiotherapists, who help you move and get about more easily
- Occupational therapists, who help you with tasks that you need to do for work
- Speech therapists, who help you with speech problems
- Continence advisers, who help you with bladder and bowel problems.

These specialists work together to assess your symptoms and advise you on how to improve them. They'll work out a treatment plan that's best for you and the people helping you at home.

You might hear your doctor call this treatment inpatient rehabilitation.

How can it help?

If you have a progressive type of MS and take part in a rehabilitation programme in hospital, you may: ^[132]

- Gain more control over your movements
- Be more able to care for yourself
- Have better control over your bladder and bowels
- Find it easier to move about, say, from a chair to your bed and back again.

Multiple sclerosis

(If you have progressive MS, your symptoms never completely go away and they get worse over time.)

How does it work?

If you have rehabilitation in hospital, each person on your team specialises in a different area. So, together, they can look at the whole picture and work out the best way to help you. This should work better than trying to treat just one problem at a time, day by day, as problems build up.

Can it be harmful?

If your rehabilitation is done by skilled and well-trained specialists, this treatment should be safe.

How good is the research on rehabilitation in hospital?

There isn't much evidence that going into hospital for rehabilitation helps if you have multiple sclerosis (MS). We found only three good studies (called [randomised controlled trials](#)) of this treatment.

The first study compared a 25-day programme of rehabilitation in hospital with no treatment in 66 people with progressive MS. ^[132] (For details on this kind of MS, see [Types of multiple sclerosis](#) .) It found that the people who had hospital rehabilitation were less disabled than those who did not.

The second study included 50 people with MS and compared three weeks of rehabilitation with an exercise programme done at home. The hospital rehabilitation helped people get more out of life and feel better than the home programme. People also felt more independent nine weeks after hospital rehabilitation, but this had worn off 15 weeks after treatment. ^[133]

The third study found that rehabilitation in hospital didn't make any difference to people's level of disability or the damage to their nerves. ^[134]

Further informations:

Tiredness and weakness

More than three-quarters of people with multiple sclerosis (MS) feel very tired (fatigued), and many of them feel this way every day.

This extreme tiredness happens at all stages of MS, not just when it's advanced. It's more than the kind of tiredness you get if you don't have enough sleep. It's not having enough energy to do everyday things, such as making a meal and shopping. ^[9]

Multiple sclerosis

Your hands and arms may feel weak too. This can make it hard to lift or hold things. If your legs feel weak, you may stumble and have a hard time walking.

You may notice that your fatigue is worse:

- In the afternoon
- When you're under stress
- When your body temperature goes up (for example, from the heat in the summer or from a fever).

Fatigue can be frustrating. No one knows why MS causes fatigue. It isn't because you're not sleeping well. It's probably linked to the nerve damage.

Numbness and odd sensations

Numbness, tingling, 'pins and needles', and a painful burning sensation are all common symptoms of multiple sclerosis. ^[3] You can get numbness in your arms, hands, legs, or feet.

You can get other odd sensations too. For example, parts of your body might feel swollen, wet or tightly wrapped. These sensations tend to start in one part of your body and spread to other parts over several hours or days.

Problems moving parts of your body

If your multiple sclerosis (MS) affects the nerves that carry signals to your arms and legs telling them to move, you can get movement problems.

For example, if you reach for something, your arm might not do what you want it to do, or it might shake while you move it. If your muscles are very tight, or go into a spasm, it may be very hard to move. Sometimes one of your arms or legs is affected much more than the other.

Dim or blurred vision

Your multiple sclerosis (MS) can give you vision problems if it causes inflammation of the main nerves to your eyes. Doctors call this optic neuritis. ^[3]

- Things might look blurry for you from time to time.

Multiple sclerosis

- Or things might look dim even though it's light around you.
- Your vision might get worse over several hours or days.
- Usually just one eye is affected.
- The area around your eye might hurt, especially when you move your eye.

Vision symptoms are often the first clue that you could have MS. They can come and go throughout the disease, but tend to happen in the early stages. The good news is that your vision will probably go back to normal.

Some people with MS get double vision, or move their eyes quickly from side to side without meaning to. (This is called nystagmus.)

Dizziness and vertigo

If multiple sclerosis damages nerves in your brainstem, you can get dizziness or a feeling that things are spinning around you (called vertigo).

Your brainstem is the part of your brain that controls actions that you don't think about, such as your balance. If multiple sclerosis affects your brainstem, you might suddenly:

- Feel dizzy and unsteady on your feet
- Feel nauseated or be sick
- Move your eyes up and down
- Start seeing double.

Muscle spasms

If you have muscle spasms, your muscles tighten on their own. ^[3] Muscle spasms can make your hand or foot or another part of your body twitch or move, even though you didn't want it to.

You might also get stiff muscles that won't do what you want them to do. Muscles in your arms or legs might get so stiff that it's very hard to move them. For example, you might find it hard to open your hand wide or move your legs apart.

You might hear muscle spasms and stiffness called spasticity.

Bladder problems

Most people with multiple sclerosis get problems with their bladder at some time, usually after they've had the disease for some years.

You're more likely to get bladder problems if you have problems walking or moving your legs. This is because the nerves that control your bladder and your legs are in the same part of your spinal cord. ^[10]

- You might get a great urge to urinate even when your bladder is empty.
- You might lose control over when you urinate and leak some urine before you can get to the toilet. Doctors call this urinary incontinence.

Sexual problems

In men

If you're a man, having multiple sclerosis (MS) can make it harder for you to get an erection. Erection problems often follow bladder problems. This is because the nerves that control your bladder and your sexual function are in the same part of your spinal cord. ^[10]

You might find it hard to ejaculate and to have an orgasm too. But there are treatments to help you. (To learn more, see our section on [erection problems](#) .)

In women

Sexual problems are nearly as common in women with MS as in men, but they're often not discussed. ^[10] When you have sex, you might not feel as much excitement or pleasure as you did before you had MS, and you might feel very dry. This can make sex painful and make it harder for you to have an orgasm. Using a lubricant can help you feel less dry.

Bowel problems

Multiple sclerosis (MS) can give you different kinds of bowel problems.

- You might get constipation (find it hard to have a bowel movement). About half of people with MS get this. It can happen because the nerves to your bowel muscles are damaged. Or it can be a side effect of certain drugs that you take for MS. ^[10] Constipation can make you feel uncomfortable and bloated.

Multiple sclerosis

- You might have trouble controlling your bowels. This happens because of damage to the nerves that go to your anus (the opening where stools come out). You might not be able to feel the need to empty your bowels and you might lose some stools before you get to the toilet. Doctors call this faecal incontinence.

Emotional upset

It's frightening to find out you have multiple sclerosis (MS), especially as your doctor can't say for certain how it will affect you. You may find it hard to believe the diagnosis or take in what your doctor tells you.

After the initial shock, you may feel angry. And if your symptoms go away, as they often do in the early stages of MS, you may decide that it was all a big mistake.

Depression

Many people find it hard to cope with MS because they never know when it's going to flare up. This can make you feel as if you have no control over your condition, and you may get depressed.^[3]

Everyone feels sad from time to time. But if you're depressed:

- You won't take much pleasure in life
- You might not want to eat and you might lose weight
- You might have trouble sleeping through the night
- You might feel very tired
- You might find it hard to concentrate.

There are lots of treatments for depression, so it's a good idea to talk to your doctor about them. (For more, see our section on [depression](#) .)

Feelings of confusion

The nerve damage in multiple sclerosis (MS) can affect the way you think as well as the way your body works.

You may find that:

- You get confused

Multiple sclerosis

- You forget things
- You can't concentrate.

Other symptoms of MS can come and go, but if you get these kinds of symptoms, they probably won't go away. The good news is that you can learn new ways to improve your memory and concentration. And these symptoms tend to be mild. It's not like having dementia.

What your MS can tell you about your future

You can use the table below to find out what the features of your multiple sclerosis (MS) might mean for your future.^[19] But remember, no one can say for certain what will happen to you.

	Your MS may worsen more slowly if:	Your MS may worsen more quickly if:
Type of MS you have	You have relapsing-remitting MS	You have primary or secondary progressive MS
Time between first bouts of symptoms	You have a long gap between your first and second bout of symptoms	You have more than five bouts of symptoms in the first two years
Which part of your nervous system is affected when your MS is diagnosed	Only your brain or only your spinal cord is affected	Both your brain and your spinal cord are affected
What your MRI scan shows when you get your first symptoms	It shows that your nervous system looks normal	It shows that you have a lot of inflammation and nerve damage
How much disability you have after you've had MS for five years	You have very little disability.	You have a lot of disability (for example, you have problems getting around).

Questions your doctor may ask

Your doctor will probably ask you the questions below to find out more about your symptoms and if they fit with multiple sclerosis (MS).

- What symptoms do you have?
- How long have they lasted? For MS, symptoms need to last for at least 24 hours.
- Have you ever had these symptoms before and, if so, when? MS is usually diagnosed after two bouts of symptoms that happen at least 30 days apart.
- Have you had a cold, flu, or another infection lately? Like MS, these illnesses can cause tiredness.

Multiple sclerosis

- Do you have any other medical problems? This is to see if another condition, such as a stroke, might be causing your symptoms.

Things your doctor may do during a physical examination

Multiple sclerosis causes damage to your nerves. So your doctor will examine you to see if your nerves are working properly.

This may include: ^[20]

- An eye test to see how your eyes move and react to light
- A test of muscle strength to see if any of your muscles are weak
- A test of coordination to see, for example, if your arms move in a smooth or jerky way
- A test of sensation to see if you can feel things on your skin, such as a pin
- A test to see if you can feel the vibration (buzzing) from a tuning fork
- A test of your reflexes to see if your arms and legs move the way they should when your doctor taps a rubber hammer on your elbow or knee.

Tests your doctors may do

An MRI scan

If your doctor thinks you might have multiple sclerosis (MS), you'll probably need an MRI scan. This gives a detailed picture of your brain and can show areas of nerve damage due to MS.

The pattern of these areas can change as inflammation around your nerves comes and goes. Doctors look at how big the areas are and where they are to decide if you have MS. ^[21]

Nerve tests

A test on your nerves can help diagnose MS, especially if the results of your MRI scan aren't clear. Doctors often use a nerve test called a VEP test (which stands for visual evoked potential).

Multiple sclerosis

This test doesn't hurt. Your doctor will put wires on your scalp over certain areas of your brain. Then you'll watch some images on a computer screen. Your doctor will be able to tell if the nerves that help you see are working properly. Similar tests can tell your doctor if the nerves that help you hear, move, and feel things are working properly too. ^[3]

A lumbar puncture

The special fluid around your brain and spinal cord is called cerebrospinal fluid (or CSF for short). If you have inflammation of the nerves in your brain and spinal cord, this fluid may have certain **proteins** in it.

To get some CSF to test, your doctor puts a needle through the skin in your back and into the space around your spinal cord. This is called a lumbar puncture. You'll be given a **local anaesthetic** first so you won't feel much. But you'll need to hold very still during the test. You can get some problems from a lumbar puncture, such as bleeding and infections, but these aren't likely to happen if the test is done by an experienced doctor.

You may not need this test, especially if other tests clearly show you have MS. ^[2] But a lumbar puncture can help doctors tell what's causing your symptoms if other tests aren't helpful.

Blood tests

There isn't a blood test for MS, but blood tests can rule out other things that might be causing your symptoms. Sometimes other conditions, such as **Lyme disease** or **HIV infection**, can look like MS at first. If your doctors suspect one of these, they will check for them.

How multiple sclerosis is treated

How doctors treat your multiple sclerosis (MS) depends a lot on which [type of MS](#) you have. Your type can change during your lifetime.

You'll probably need different treatments over time. But the aim is always the same: to help you control your symptoms as much as possible and let you get the most out of life.

Here are the main ways doctors treat MS.

Reducing how many relapses you have

If you have relapsing-remitting MS, your doctor may give you drugs such as [interferon beta](#) (brand names Avonex, Betaferon, Extavia, Rebif) to try to:

- Reduce how many relapses (flare-ups) you get
- Stop your MS going on to the next type (secondary progressive MS).

Multiple sclerosis

Doctors aren't sure when you should start this type of treatment. (For more information, see [When to start treatment](#) .)

Helping your symptoms during a relapse

Whatever type of MS you have, your doctor may give you [steroids](#) for a short time during a relapse to help your symptoms. These drugs work by calming down the inflammation in your brain and spinal cord.

Helping certain types of symptoms

Steroids don't help all types of symptoms. You may need different treatments for these symptoms:

- Tiredness
- Muscle spasms and stiffness (called spasticity)
- Bladder problems, including leaking urine (called urinary incontinence)
- Bowel problems
- Sexual problems.

There are many drugs that you can try for these symptoms. For example, your doctor might suggest trying amantadine (brand name Symmetrel) for tiredness, and tizanidine (Zanaflex), baclofen (Lioresal), or gabapentin (Neurontin) for stiff muscles.

You can also try a rehabilitation programme. During these programmes, a team of specialists checks your symptoms and decides what help you'll need to ease them and to cope with your disabilities.

When to start treatment

If you have relapsing-remitting multiple sclerosis (MS) or secondary progressive MS, your doctor may talk to you about drugs that might help control your disease. With both these types of MS, you get bouts of symptoms called relapses. (For details, see [Types of multiple sclerosis](#) .) These treatments may reduce how many relapses you have and slow down your MS. They are sometimes called disease modifying drugs.

The ones most likely to be used are [interferon beta](#) , [glatiramer acetate](#) , and [natalizumab](#) .

As these medicines don't help everyone and they are expensive, you may only be considered for treatment on the NHS if you are in the following groups. ^[2]

Multiple sclerosis

Relapsing-remitting MS: You should be offered interferon beta (any type) or glatiramer acetate if you:

- Can walk 100 metres or more without help
- Have had at least two clear-cut relapses in the past two years
- Are aged 18 years or over
- Are not pregnant or breastfeeding, and do not have another medical reason why your doctor feels the medicine could be harmful.

You should be offered natalizumab if you have severe relapsing remitting MS that is getting worse. This means you have had two or more disabling relapses in one year, and have signs on an MRI scan that your MS is worsening. ^[22]

Secondary progressive MS: You should be offered interferon beta (any type) if you:

- Can walk 10 metres or more without help
- Have had at least two disabling relapses in the past two years
- Haven't become much more disabled due to gradual progression of your MS over the last two years
- Are aged 18 years or over
- Are not pregnant or breastfeeding, and do not have another medical reason why your doctor feels the medicine could be harmful.

Before you start treatment with interferon beta or glatiramer acetate, your doctor should discuss with you how long you are likely to continue treatment. You should expect to stop interferon beta treatment on the NHS if you:

- Have bad side effects
- Become pregnant or are trying for a baby
- Have two disabling relapses within a 12-month period
- Have secondary progressive MS and become more disabled over a six-month period
- Become unable to walk, with or without assistance, for more than six months.

US advice on heart tests for mitoxantrone

Mitoxantrone can damage your heart. As a result, the Food and Drug Administration, which checks the safety of drugs in the United States, advises that you should have one of the following tests on your heart before each treatment with mitoxantrone. ^[23]

Echocardiogram

An echocardiogram (or echo for short) is like an ultrasound of the heart. It's used to check how well your heart is pumping blood out. The amount of blood being pumped out is called the left ventricular ejection fraction. If this is 50 percent or higher, it means your heart is working normally. If it's less than 50 percent, you shouldn't have mitoxantrone.

MUGA scan

MUGA stands for multi-gated radionuclide angiography. This is a very accurate scan of the heart. It's used to check how well your heart is working and how blood is moving around your heart.

You'll first have an electrocardiogram (ECG) to measure the electrical signals in your heart. Next, radioactive chemicals will be injected into a vein, usually in your arm. A camera then will track the movement of the chemicals through your heart.

Doctors can use this scan to measure the amount of blood leaving your heart (your left ventricular ejection fraction). If this is less than 50 percent, you shouldn't have mitoxantrone.

Glossary:

immune system

Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

infection

You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

inflammation

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

genes

Your genes are the parts of your cells that contain instructions for how your body works. Genes are found on chromosomes, structures that sit in the nucleus at the middle of each of your cells. You have 23 pairs of chromosomes in your normal cells, each of which has thousands of genes. You get one set of chromosomes, and all of the genes that are on them, from each of your parents.

measles

Measles is a childhood infection caused by a virus. It makes you break out in a rash all over your body. It also gives you swollen glands and flu symptoms, like tiredness and fever. Sometimes it can cause worse problems, like an infection in your lungs or voice box. The measles, mumps and rubella (MMR) vaccine protects children from getting measles.

herpes simplex

Multiple sclerosis

Herpes simplex is a virus that causes a blistering skin rash. There are two different types of herpes simplex virus (HSV). HSV1 causes cold sores in your mouth. It's usually spread through saliva or through direct skin contact (like kissing). HSV2 causes a rash in your genital area. It is spread by rubbing during intimate contact (like having sex or sexual foreplay).

chickenpox

Chickenpox is a common childhood illness caused by a virus. It usually leads to a fever, tiredness and an itchy rash. The virus can easily spread from person to person, and people usually get it about two weeks after they were near someone with the illness. About two days before the rash starts, you can give the virus to others. Chickenpox clears up on its own in most children, but adults and some children may get complications such as pneumonia, kidney problems or heart problems. In the UK, people aren't usually immunised against chickenpox unless they have an immune disease (or another disease that would make infection dangerous for them).

rubella

Rubella is a childhood infection caused by a virus. It usually starts with mild cold symptoms, a sore throat and swollen glands. After that, you get a pink rash that spreads from your head to the rest of your body. Some people call it German Measles. The measles, mumps and rubella (MMR) vaccine protects children from getting rubella.

Epstein-Barr virus

Epstein-Barr virus (EBV) is a common cause of infections in children and young people. It's the virus that causes glandular fever. This infection can give you a sore throat, fever and swollen glands in your neck.

chlamydia

Chlamydia is an infection you can get by having sex without a condom. It can cause pain or discomfort and discharge from your sexual organs. If you're a woman, it can also cause infertility or a painful infection inside your body.

remission

Remission is when the symptoms of an illness get better, or go away completely for a period of time.

fever

If you have a fever, your body temperature is above 37 degrees Celsius (98.6 degrees Fahrenheit). With a fever you often get other symptoms, such as shivering, headache or sweating. A fever is usually caused by an infection.

bladder

Your bladder is the hollow organ at the top of your pelvis that stores urine. It is similar to a balloon, only with stronger walls. It fills up with urine until you go to the toilet.

stroke

You have a stroke when the blood supply to a part of your brain is cut off. This damages your brain and can cause symptoms like weakness or numbness on one side of your body. You may also find it hard to speak if you've had a stroke.

MRI scan

A magnetic resonance imaging (MRI) machine uses a magnetic field to create detailed pictures of the inside of your body.

proteins

A lot of your body's tissues are made out of proteins. Proteins can be made in your cells. Proteins are also part of the food you eat, particularly meat and dairy products. Your body breaks down the protein you eat into amino acids. Your cells then use these amino acids to build new proteins, which make up muscles, joints, hair and other parts of your body.

local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

Lyme disease

Lyme disease is an infection transmitted by the bites of certain ticks. Lyme disease can lead to severe, flu-like symptoms, including fatigue, fever, headache, muscle pain and a rash. Lyme disease can be treated with antibiotics. In rare cases, if the infection is not treated, people can get more serious problems, such as arthritis in their joints and problems with their nervous system and heart.

HIV

HIV stands for human immunodeficiency virus. It's the virus that causes AIDS. It makes you ill by damaging cells called CD4 cells. Your body needs these cells to fight infections. You can get HIV by sharing needles for injecting drugs, or by having sex without a condom with someone who has the virus.

ultrasound

Ultrasound is a tool doctors use to create images of the inside of your body. An ultrasound machine sends out high-frequency sound waves, which are directed at an area of your body. The waves reflect off parts of your body to create a picture. Ultrasound is often used to see a developing baby inside a woman's womb.

electrocardiogram

An electrocardiogram is a test that measures the electrical activity in your heart. The test doesn't hurt. It tells doctors how well your heart is working. It is called ECG for short.

Multiple sclerosis

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

allergy

If you have an allergy to something (such as pollen or a medicine), your body always overreacts to it. The reaction happens because your immune system (your body's system for fighting infection) is too sensitive to it.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

corticosteroids

Corticosteroids are substances that your body makes naturally. But they can also be made in a laboratory to treat certain conditions. Corticosteroids have many different effects, including helping the body to use sugar and to control the amount of fluid it retains. They also reduce inflammation in the body, which is why they are sometimes used to treat diseases like asthma. (Asthma is caused by inflammation in the tubes that carry air in the lungs.)

white blood cells

White blood cells are the cells in your blood that help your body fight infections. They are part of your immune system. The other cells in your blood, red blood cells, carry oxygen around your body.

liver

Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

meningitis

Meningitis is a swelling in the thin layers of tissue that surround your brain and your spinal cord. It usually happens because of an infection with certain kinds of bacteria or viruses. Meningitis can give you a severe headache and a stiff neck. And you may find it difficult to keep your eyes open in the light. Meningitis is a life-threatening disease. If you have these symptoms, you should go to hospital straight away.

kidney failure

Kidney failure is when your kidneys can't make urine properly. Kidney failure happens because of kidney disease. People with kidney failure need to have dialysis, which is a way to get rid of the substances in your blood that normally go in your urine.

bone marrow

Your bone marrow is the soft material inside your bones. Bone marrow makes and stores blood cells.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

antibiotics

These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

allergic reaction

You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

arthritis

Arthritis is when your joints become inflamed, making them stiff and painful. There are different kinds of arthritis. Osteoarthritis is the most common type. It happens when the cartilage at the end of your bones becomes damaged and then starts to grow abnormally. Rheumatoid arthritis happens because your immune system attacks the lining of your joints.

Multiple sclerosis

asthma

Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

viruses

Viruses are microbes (tiny organisms) that need the cells of humans or other animals to exist. They use the machinery of cells to reproduce. Then they spread to other cells in the body.

diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

urinary tract infection

A urinary tract infection (UTI) happens when bacteria invade the walls of your urinary tract, which includes your kidneys, bladder and urethra. An uncomplicated UTI is one that involves your bladder and urethra, but not your kidneys. A complicated UTI involves your kidneys and can be harder to treat. Doctors may refer to a kidney infection as pyelonephritis.

CT scan

A CT scan is a type of X-ray. It takes several detailed pictures of the inside of your body from different angles. CT stands for computed tomography. It is also called a CAT scan (computed axial tomography).

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

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