CONDITION

Lyme disease

Lyme disease is a bacterial infection passed to people through the bite of an infected tick.

WHAT IT IS
Tick-borne bacterial infection

BODY SYSTEM
Skin, joints, heart, and nervous system

MAIN SYMPTOMS
Expanding rash, fever, fatigue, joint pain

WHAT CAUSES IT
Infection with Borrelia bacteria

HOW IT IS DIAGNOSED
Clinical assessment and two-step antibody testing

MAIN TREATMENT
Antibiotics and symptom management

CAN IT BE CURED?
Yes - antibiotics usually clear the infection

IS IT AN EMERGENCY?
Sometimes - fainting, chest pain, or severe breathing trouble

LONG-TERM OUTLOOK
Most recover, but some have lasting symptoms

Overview

Lyme disease is an infection caused by Borrelia bacteria. It reaches people through the bite of an infected blacklegged tick, also called a deer tick in parts of North America. Different tick species spread the infection in Europe and Asia.

Ticks live in wooded, grassy, and brush-filled areas. They attach to the skin and feed on blood. An infected tick usually needs to remain attached for a period of time before it passes on the bacteria. A brief touch or a tick crawling on your skin does not transmit Lyme disease.

Early Lyme disease often causes an expanding skin rash, sometimes with fever, tiredness, headache, or muscle aches. Without treatment, the infection can sometimes spread to the joints, heart, or nervous system.

Antibiotics like amoxicillin or doxycycline treat the infection. Most people recover well,

especially when treatment begins early. Some people have symptoms such as fatigue, pain, or difficulty thinking that continue after treatment, even though the active infection has been treated.

Lyme disease does not spread through ordinary contact with another person. You cannot catch it by touching, kissing, or sharing food.

Symptoms

Symptoms can begin several days to weeks after an infected tick bite. You may not remember being bitten because young ticks can be very small.

A common early sign is an erythema migrans rash. This is a red or discoloured patch that slowly expands over several days. It may feel warm, but it is usually not very painful or itchy.

The rash does not always look like a classic "bull's-eye." It may be evenly coloured, have a darker centre, or be harder to see on brown or black skin. A small red bump that appears immediately after a bite and settles within a day or two is usually a local skin reaction rather than erythema migrans.

Other early symptoms can include:

If the infection spreads, symptoms may appear weeks or months later. These can include several expanding rashes, severe headache, neck stiffness, shooting nerve pain, numbness, or weakness.

Lyme disease can affect the facial nerve, causing one or both sides of the face to droop. It can also inflame tissues around the brain and spinal cord, known as meningitis.

Heart involvement, called Lyme carditis, can interfere with the electrical signals that control the heartbeat. It may cause palpitations, chest discomfort, shortness of breath, dizziness, or fainting.

Lyme arthritis usually causes obvious swelling and pain in one or a few large joints, especially a knee. The swelling may come and go.

- Fever or chills
- Headache and unusual tiredness
- Swollen lymph nodes, sometimes called glands
- Muscle or joint aches

Causes and risk factors

Lyme disease is caused by infection with bacteria in the Borrelia burgdorferi group. A tick can pick up the bacteria when feeding on an infected animal and later pass them to a person.

Not every tick carries Lyme bacteria, and not every infected tick bite leads to infection. Risk is higher when an infected tick has been attached and feeding for longer. Transmission generally becomes more likely after about 36 to 48 hours, although it may be difficult to know exactly when a tick attached.

Your chance of exposure is higher if you spend time in places where infected ticks live. Activities such as hiking, gardening, camping, hunting, or working outdoors can increase contact with ticks.

Ticks are often found in leaf litter, long grass, brush, and the edges of woodland. Pets can also carry unattached ticks into a home, although pets do not directly give people Lyme disease.

Lyme disease is not inherited. There is no good evidence that it spreads through casual contact, sexual contact, air, food, water, or insect bites such as mosquito bites.

Diagnosis

A healthcare professional will ask about your symptoms, possible tick exposure, recent travel, and any rash. The likelihood of Lyme disease differs by location, so where you have lived or travelled matters.

A typical expanding erythema migrans rash in someone with possible tick exposure can be enough to diagnose early Lyme disease. Blood tests may still be negative at this stage because the immune system has not yet made a measurable level of antibodies.

When testing is appropriate, laboratories usually use a two-step antibody process. The first test looks for antibodies that may be linked to Lyme infection. A second test then helps confirm the result. Some laboratories use two different enzyme immunoassays; others use an immunoblot as the second step.

Antibodies can remain positive for months or years after an infection has resolved. A positive result therefore does not always mean that bacteria are still active. Test results need to be considered alongside your symptoms and exposure history.

Testing people who have only broad symptoms, such as tiredness, without a likely exposure or features of Lyme disease can produce misleading results. Tests are also not normally used to prove that treatment has worked.

Testing a removed tick is not a reliable way to diagnose you. A tick may test positive without

having transmitted infection, or test negative even if another unnoticed tick caused a bite.

Tests of spinal fluid or joint fluid may be used in selected cases when nervous system or joint complications are suspected.

Treatment and management

Lyme disease is treated with antibiotics. The choice of antibiotic and length of treatment are based on which parts of the body are affected, your age, pregnancy status, allergies, and other health needs.

Commonly used oral antibiotics include doxycycline, amoxicillin, and cefuroxime. Intravenous antibiotics, given into a vein, may be needed for certain nervous system problems or serious heart involvement. Lyme arthritis is usually treated with an oral antibiotic first, although further treatment may be considered if marked joint swelling continues.

Do not use leftover antibiotics or medicines obtained without appropriate assessment. Antibiotics can cause side effects, and other conditions can resemble Lyme disease.

Some people briefly feel worse soon after starting treatment. This can include fever, chills, headache, or stronger muscle aches and may be a reaction to bacteria being killed. New severe symptoms, breathing problems, or signs of an allergic reaction need urgent medical assessment rather than being assumed to be a treatment reaction.

Pain relief, rest, gentle movement, and support for sleep may help during recovery. If a joint remains inflamed after the infection has been treated, management may focus on controlling inflammation and restoring movement.

Long or repeated courses of antibiotics have not been shown to help persistent general symptoms after recommended treatment. They can cause serious harms, including severe diarrhoea, bloodstream infections, and complications from intravenous lines.

Complications

Complications are more likely when infection is not recognised and treated early, but they can also occur before a diagnosis is made.

Possible complications include:

Heart block is a complication in which electrical signals do not travel normally through the heart. Severe heart block can cause fainting or dangerous changes in heart rate and requires hospital monitoring.

A small proportion of treated people report continuing fatigue, body pain, or problems with concentration. This is often called post-treatment Lyme disease syndrome. The cause is not fully understood. Current evidence does not show that it is usually due to an ongoing infection that needs prolonged antibiotics.

Persistent symptoms still deserve assessment. Other conditions, medication effects, sleep problems, and the effects of a recent illness may need to be considered.

- Facial nerve weakness or other nerve pain
- Inflammation around the brain and spinal cord
- Disturbed heart rhythm from Lyme carditis
- Recurrent or persistent swelling in a large joint
- Ongoing fatigue, pain, or thinking difficulties after treatment

Prevention

Lyme disease cannot always be prevented, but reducing tick bites and removing ticks promptly lowers the risk.

When entering tick habitats, you can:

Check warm or hidden areas carefully, including the scalp, hairline, behind the ears, armpits, waist, groin, backs of the knees, and between the toes.

To remove an attached tick, use fine-tipped tweezers. Grasp it close to the skin and pull upward with steady, even pressure. Clean the bite area and your hands afterward. Do not burn the tick or cover it with substances such as petroleum jelly or nail polish.

Preventive antibiotics are not needed after every tick bite. In some regions, a healthcare professional may offer preventive treatment when the tick is likely to carry Lyme bacteria, has been attached long enough, and can be treated within a limited time after removal.

Continue to watch for an expanding rash, fever, facial weakness, or other new symptoms after a bite.

- Walk near the centre of trails where possible
- Wear long trousers and closed shoes
- Use an appropriate tick repellent as directed on its label
- Treat clothing or outdoor gear with products intended for that purpose
- Check your skin, clothing, children, pets, and equipment afterward

- Shower soon after coming indoors and wash outdoor clothing

Living with it and what to expect

Most people treated for early Lyme disease improve, although symptoms do not always disappear immediately. Fatigue, aches, or nerve irritation may take several weeks to settle after the bacteria have been treated.

Recovery from nervous system, heart, or joint involvement may take longer. Facial movement often improves over time, but the pace is not the same for everyone. Joint swelling may return or continue for a period even after antibiotic treatment.

Routine follow-up may be useful if symptoms are not clearly improving, if a joint remains swollen, or if nerve or heart symptoms were part of the illness. Repeat blood tests are generally not useful for tracking recovery because antibodies can stay positive long-term.

If symptoms continue for months, care usually focuses on the problems affecting daily life. This may include help with sleep, pain, gradual physical activity, school or work adjustments, and assessment for other possible causes.

Having Lyme disease once does not provide reliable lifelong protection. Another infected tick bite can cause a new infection, so tick precautions remain important.

When to get medical help

Arrange a routine medical appointment if you develop an expanding rash after possible tick exposure, even if you feel well. Also seek assessment for unexplained fever, new facial weakness, marked joint swelling, nerve pain, or numbness after spending time in a tick area.

Contact a healthcare service promptly after a tick bite if you are pregnant, have a weakened immune system, or are unsure whether part of the tick remains in the skin. A small retained mouthpart is not usually dangerous, but the area should be monitored for infection.

Seek urgent medical care for new palpitations, significant dizziness, worsening shortness of breath, a severe headache with neck stiffness, or rapidly developing weakness.

Call emergency services for fainting, severe breathing difficulty, persistent chest pain, confusion, a seizure, or signs of a severe allergic reaction. Sudden facial drooping with arm weakness or speech difficulty also needs emergency assessment because it may be a stroke rather than Lyme disease.

Common questions

Does every tick bite cause Lyme disease?

No. The tick must be infected, and it usually needs to remain attached long enough to transmit the bacteria. Prompt removal lowers the risk. Watch for an expanding rash or flu-like symptoms afterward.

Does a Lyme rash always look like a bull's-eye?

No. Many erythema migrans rashes are plain red or discoloured expanding patches. They may not have rings or a clear centre. The rash can also look different depending on skin tone.

Can I have Lyme disease without a rash?

Yes. Not everyone notices or develops a recognised rash. Diagnosis then relies more heavily on symptoms, exposure history, examination, and correctly timed blood tests.

Why was my Lyme blood test negative?

Antibody tests can be negative during the first few weeks because your immune system has not produced enough antibodies yet. A negative result later in the illness makes Lyme disease less likely, but the meaning depends on the timing and symptoms.

Is Lyme disease contagious?

No. Ordinary contact with another person does not spread Lyme disease. It is transmitted mainly through the bite of an infected tick.

Can Lyme disease come back after antibiotics?

Symptoms may take time to settle, and some people have longer-lasting fatigue or pain. A new infected tick bite can also cause another infection. A positive blood test alone does not show that the original infection has returned.

Sources

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