

## What are lesions?

Lesions, also known as plaques, are areas of myelin damage. There may also be axonal degeneration (an axon is part of a neuron).

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## What is axonal degeneration?

Neurons may be damaged at any stage of the disease. After several years, this damage may gradually lead to a progressive form of the disease. Research suggests that early treatment of MS delays injury and may slow disability progression.

## What is myelin?

Myelin is a white fatty substance composed primarily of lipids that insulates nerve fibres. It allows nerve impulses to be continuously transmitted with a faster speed in the central nervous system and to the rest of the body.

## Where are lesions found?

Lesions are found in the central nervous system (brain, spinal cord, optic nerves and cerebellum).

## What causes lesions to form?

Lesions form as a result of inflammation, which occurs when white blood cells and fluid build up around blood vessels. This inflammation damages the myelin and axons. Wherever tissue is destroyed, a lesion forms and a gradual build-up of scar tissue occurs.

## What do lesions do?

Lesions delay or block message transmission. They can block or slow these signals completely or partially, all the time or only sometimes. The symptoms of MS result from this slowing down or disruption of nerve impulses. These symptoms can be caused by the (temporary) inflammation of myelin or by irreversible scar tissue. Lesions do not all appear at the same time, and can be located at any site in the central nervous system. That is why MS symptoms vary greatly from one person to another or even in the same person over the course of the disease.

## What do lesions look like?

A person may have one or many lesions varying in size from several millimetres to lesions large enough to touch one another. Lesions may be round, oblong, linear or angular, and may blend into each other.

## How are lesions and MS symptoms related?

Where the lesion is located in the central nervous system determines the nature and severity of the symptoms. For example, a lesion on the optic nerve can give rise to a condition called optic neuritis, causing pain and impairment of vision in the corresponding eye (usually temporary).

On the other hand, a lesion in the spinal cord may cause either sensory or motor symptoms – such as numbness or tingling (sensory), or weakness in one or both legs (motor). New lesions may also be “clinically silent,” which means that they do not cause any physical signs. Thus, an MRI may show that a person has many lesions, but they may not have many symptoms.

## Will I always have lesions?

Lesions may increase or decrease in number and/or size or remain stable over time. In people who have MS, myelin repair (remyelination) may spontaneously repair partially, or not at all.

## What is magnetic resonance imagery (MRI) used for?

MRI is part of the diagnostic process but it does not replace clinical examinations. A “snapshot” of the brain usually reveals anomalies in people with MS. In order to clearly see the inflammation, a contrast medium called gadolinium may be injected intravenously into the individual before the examination. Sometimes in the early stages, the lesions aren’t visible. Moreover, sometimes MRI reveals anomalies in people who do not have MS. For these reasons, only a neurologist can make the diagnosis of MS based on the clinical history and examination, and help from the MRI images.

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