

Multiple sclerosis (MS) is a disease that affects the brain and spinal cord. In MS, the body's immune system attacks the protective covering of nerve cells, called the myelin sheath. When enough myelin is damaged, a wound or "lesion" appears in that spot. Lesions cause problems in cell communication by interrupting the transmission of electrical impulses from one cell to another.



Symptoms

MS symptoms vary from person to person but often include numbness or tingling in different parts of the body, changes in vision (including temporary loss of vision), difficulty thinking clearly, and fatigue.

Types

- **Relapsing remitting MS** is the most common type of MS. It affects more than half of all patients with MS. During a relapse, a person may start having symptoms because of new lesions. When a relapse ends, or remits, symptoms may go away entirely or mild symptoms may remain. Relapses may indicate disease progression, but MS does not progress between relapses.
- **Secondary progressive MS** is the second stage of relapsing remitting MS for many people. Over time, individuals with relapsing remitting MS may enter a

stage in which their disability gets steadily worse, without a period of remission.

- **Primary progressive MS** is a type of MS that gets progressively worse from the onset of symptoms, as new lesions accumulate in the brain and spinal cord. There may be periods of stabilization with mild improvements, but there are no clear periods of remission when the disease is not active.
- **Progressive relapsing MS** is the least common type. Like primary progressive MS, the disease gets progressively worse after onset, but this type also includes acute relapses during which symptoms worsen abruptly, similar to relapsing remitting MS.

Causes

Although the exact causes of MS are unclear, evidence suggests that a person's genes and the environment contribute to their risk for developing MS.

Risk Factors

- **Genes:** Having a parent, brother or sister, or child with MS increases a person's risk for developing MS. This supports the idea that genes play a role. At this time, more than 200 genes have been identified as risk factors for MS, but each one contributes only a small amount to a person's overall risk.
- **Viral infection:** Exposure to a common virus (Epstein-Barr virus, or EBV) may increase risk for MS in some people. Research has shown that up to 99% of people with MS were previously infected with EBV. However, it is important to remember that the virus is also present in most people without MS.
- **Smoking:** The more a person smokes, the higher their risk for developing MS. Continuing to smoke after MS has been diagnosed also accelerates progression.
- **Low vitamin D:** Vitamin D deficiency has also been linked to the development of MS. Less exposure to the sun (the natural source of vitamin D) may help explain why people in more northern climates are at higher risk for MS.

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Common Diagnostic Tests

A diagnosis of MS requires lesions in two different places in the brain or spinal cord at different points in time.

- Magnetic resonance imaging (MRI) can reveal lesions in the brain and spinal cord. Often an injection is given before the MRI to help highlight lesions when they are in an active phase of development.
- Blood tests are used to help rule out other diseases or conditions.
- A lumbar puncture, or spinal tap, is a way of obtaining a sample of cerebrospinal fluid. This fluid can be tested to show abnormalities associated with MS. It can also be used to rule out other conditions or infections unrelated to MS.
- Neuropsychological evaluation to characterize thinking uses pencil and paper tests of memory and attention. Testing helps doctors measure changes in thinking over time. Neuropsychologists can provide personalized recommendations for improving changes in thinking and mood related to MS.

Treatment

- There is currently no cure for MS. However, disease-modifying therapies change how quickly MS progresses by helping to prevent relapses and reducing inflammation in the nervous system.
- Cognitive rehabilitation, also known as speech therapy, can help a person function better by teaching strategies for working around thinking problems.
- Physical therapy may also be prescribed to help improve or maintain mobility and prevent falls. Maintaining an active lifestyle improves mood and thinking ability. It can also reduce pain related to MS.

Suggestions for Patients

- Consult with your doctor about the best medication to treat your symptoms. Make sure you take medication as directed. Avoid missing any doses, because this may increase the risk of a relapse.
- Stick to a balanced diet low in fat and processed foods and high in fiber. This can reduce inflammation, give you more energy, and support healthy bladder and bowel function.
- Get plenty of sleep. Better sleep can help you think more clearly and reduce daytime fatigue. Certain medications can also improve mental alertness and reduce fatigue if you have these problems.

- Your living environment should be customized to meet your specific needs. Essential things should be kept within reach, and safety features should be installed to reduce the risk of falls. This is particularly important if you have trouble walking.
- Getting connected with other individuals with MS may help you feel understood and provide you with additional resources for coping with your MS symptoms.

Suggestions for Caregivers

- Educate yourself about MS and its treatment options. This knowledge can empower you to ask questions and express your concerns to the doctors.
- Connecting with other caregivers may ease the difficult emotions that sometimes arise by allowing you to exchange resources and share feelings with others in a similar role.
- Accept help from friends and family. Reducing caregiver burden can provide you with more time for necessary self-care.
- Have an open mind regarding technologies that could allow your loved one to remain as independent as possible.

Resources

Additional resources for patients and caregivers, such as educational materials, support groups, and more, can be found below.

National Multiple Sclerosis Society

www.nationalmssociety.org

Multiple Sclerosis Foundation

www.msfocus.org

Multiple Sclerosis Association of America

(800) 532-7667

Barrow Multiple Sclerosis Program

(877) 857-1920