

# Nervous System Health and Disorders

by Sophia



## WHAT'S COVERED

In this lesson, you will learn about various disorders of the nervous system. Some disorders of the nervous system can be more serious than others, and the causes of disorders of the nervous system can vary quite a bit. Specifically, this lesson will cover:

## 1. Physical Injury

The following disorders can be caused by some sort of physical injury or trauma:

- **Seizures** are a brain disorder that can be caused by trauma from an injury or from birth, as well as epilepsy or other causes. Recall that the voltage potential of a neuron has to rise significantly (well above the threshold) before an action potential can take place and propagate a signal down a neuron. This prevents random, slight fluctuations in voltage potential within the cell from causing the neuron to fire without a good reason to do so. However, if the neuron's inhibitions are low or its "excitability" high, random firing is more likely to occur and result in a seizure.
- **Concussions** are another type of disorder that are caused by physical injury, and are the most common brain injury. Oftentimes they're caused by some sort of sports injury.
- **Paralysis** is a type of injury where there's damage to the spinal cord. This kind of injury can lead to limbs or other body parts not functioning correctly because the nerve channel is sometimes disrupted.



### DID YOU KNOW

Some research is actually being done now using stem cells to try and repair damage to spinal cords, which would be a huge breakthrough for people who are suffering from paralysis.



### TERMS TO KNOW

#### Seizure

Sudden, involuntary movement caused by erratic, uncoordinated electrical discharges by the brain.

#### Concussion

A type of injury where the brain is "shaken violently"; can cause disruption of neuron activity and should be monitored closely; there are different levels of concussions that can occur.

#### Paralysis

## 2. Breakdown of Neurons

The breakdown of neurons can cause disorders such as Parkinson's disease or Alzheimer's disease.

- **Parkinson's disease** happens when neurons located in the thalamus of the brain die. When this happens, the neurotransmitters norepinephrine and dopamine are not being produced, which affects normal muscle function. There are various risk factors, including autoimmune disorders (if you suffer from rheumatoid arthritis, you're more likely to be predisposed to Parkinson's), and certain toxins, such as reheated cooking oils.
- **Alzheimer's disease** is a disease that occurs from the degeneration of neurons and the buildup of amyloid proteins, which can lead to memory loss, or loss of intellectual functions. It's oftentimes associated with aging. As a person gets older, the degeneration of neurons happens more quickly. Alzheimer's also appears to have a genetic component; people with blood relatives who suffer from Alzheimer's are more likely to contract the disease themselves.



### TERMS TO KNOW

#### Parkinson's Disease

A disease caused by degeneration of the midbrain (substantia nigra) that causes a marked inability of a person to relax their muscles.

#### Alzheimer's Disease

A form of dementia caused by a slow degeneration of the cerebral cortex.

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## 3. Infection

Multiple sclerosis, encephalitis, and meningitis are all related to some sort of infection.

- **Multiple Sclerosis** is a disease that usually presents itself during young adulthood. It's an autoimmune disease that can be triggered by a viral infection. You get a random infection and your immune system calibrates itself to fight it. Once you've recovered from the virus, your recalibrated immune system mistakes your own myelin sheaths for more virus and attacks those myelin sheaths. When this happens, nervous system signals aren't transmitted as efficiently as they would be normally. This results in deteriorating motor coordination and loss of sensation.
- **Encephalitis** occurs when a virus (such as West Nile virus or herpes virus) makes it past the blood-brain barrier and causes an infection in the brain. The immune system attacks the virus, causing inflammation in the brain.
- **Meningitis** is another disease caused by a bacterial or viral infection and is often fatal. If any of the three layers of meninges that cover the brain get infected, the immune system will attack the site of infection, causing inflammation. The swelling meninges press down on the brain, and the resulting fever can cause brain damage or even death.



### TERMS TO KNOW

### Multiple Sclerosis

An autoimmune disease in which the immune system attacks one's own myelin sheaths; the loss of the myelin sheaths insulating the axons of our neurons causes motor complications, loss of sensations and episodes often referred to as "flare-ups."

### Encephalitis

Swelling of the brain caused by infection.

### Meningitis

Inflammation of the meninges; caused by a bacterial or viral infection.

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## 4. Other Disorders

Schizophrenia and autism are other disorders of the nervous system.

- **Schizophrenia** is associated with several factors, such as changes to the brain. The result is that a schizophrenic becomes very paranoid and might have auditory hallucinations. It's a mental disorder in which a person's grasp of reality and social life are affected.
- **Autism** is a developmental disorder that is commonly diagnosed in early childhood. In this type of disorder, there's a wide spectrum of how a person who has autism can be affected. Some don't show as much of an effect as others do, and some can be affected very, very severely by this disorder. But it affects thinking, language, and social skills.



### TERMS TO KNOW

#### Schizophrenia

A psychotic disorder that causes delusions, hallucinations, incoherent speech, inappropriate/negative behavior.

#### Autism

A class of social disorders in which people have a hard time forming normal social relationships and often display repetitive behavior.



### SUMMARY

This lesson has been an overview on disorders of the nervous system. Specifically, you learned about disorders caused by **physical injury**, **breakdown of neurons**, **infections** and **other disorders** like schizophrenia and autism.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



### TERMS TO KNOW

#### Alzheimer's Disease

A form of dementia caused by a slow degeneration of the cerebral cortex.

**Autism**

A class of social disorders in which people have a hard time forming normal social relationships and display repetitive behavior.

**Concussion**

A type of injury where the brain is “shaken violently”; can cause disruption of neuron activity and should be monitored closely. There are different levels of concussions that can occur.

**Encephalitis**

Swelling of the brain caused by infection.

**Meningitis**

Inflammation of the meninges; caused by a bacterial or viral infection.

**Multiple Sclerosis**

An autoimmune disease in which the immune system attacks one's own myelin sheaths. The loss of the myelin sheaths insulating the axons of our neurons causes motor complications, loss of sensations, and episodes often referred to as “flare-ups.”

**Paralysis**

Complete loss of voluntary function.

**Parkinson's Disease**

A disease caused by degeneration of the midbrain (substantia nigra) that causes a marked inability of a person to relax their muscles.

**Schizophrenia**

A psychotic disorder that causes delusions, hallucinations, incoherent speech, inappropriate/negative behavior.

**Seizure**

Sudden, involuntary movement caused by erratic uncoordinated electrical discharges by the brain.