



# AUTONOMIC NERVOUS SYSTEM

Spinal cord injuries cause a domino effect throughout the body, disrupting not only mobility, but many other critical functions. The impact on the autonomic nervous system can be especially significant. Understanding how the autonomic nervous system works, and the ways in which a spinal cord injury can cause dysfunction, can help manage or prevent disorders and secondary health conditions.

## Q: What is the autonomic nervous system?

The autonomic nervous system (ANS) controls an array of involuntary functions in your body, including temperature regulation, heart and respiratory rate, sexual response, blood pressure and digestion. Consider all that your body does without any conscious effort on your part, from breathing and blinking to going to the bathroom and sweating through a workout. These actions are dependent on a successfully functioning ANS, which receives information about the body and outside factors through nerve cells and responds by either stimulating or inhibiting body processes. Its two main parts, the sympathetic and parasympathetic systems, work together to create balance in the body. The **sympathetic system** causes a “fight or flight” response, increasing heart rate or blood pressure and preparing the body for action. The **parasympathetic system** typically slows and restores function, improving digestion, decreasing blood pressure and signaling the heart to pump more slowly. The initial stimulating effect of the sympathetic system is generally balanced out by the parasympathetic response, preventing the body from dangerously overreacting to pain.

## Q: How does my spinal cord injury affect my autonomic nervous system?

A spinal cord injury disrupts the ability of the ANS to regulate functions of internal organs including the heart, blood vessels, stomach, intestine, liver, lungs, and sweat, salivary,

and digestive glands. One way in which an injury can impact the ANS is by preventing the response from the parasympathetic system from travelling below your injury level. The result allows the heightened stimulation triggered by the sympathetic system to continue unchecked. Pain or discomfort from full bladders, constipation, sex, broken bones or even menstruation can lead to increased blood pressure that causes autonomic dysreflexia, a potentially life-threatening condition. An abnormally functioning ANS can also cause a variety of other health issues, including a sudden drop in blood pressure when standing up or during digestion, excessive sweating, and sexual dysfunction.

### **Q: How can I best manage changes to my autonomic nervous system after injury to prevent secondary conditions?**

Understand the ways in which your system may be triggered and act preventatively to ward off dangerous reactions. Regularly perform bowel and bladder management. Promptly treat and tend to pressure sores or ingrown toenails. Stay hydrated by drinking water steadily throughout the day. Wear an abdominal binder or compression socks to help increase blood circulation and prevent low blood pressure. Rise slowly from laying down, using a wheelchair that tilts back if necessary, to gradually reach an upright position. Eat smaller meals throughout the day to aid digestion and prevent blood pressure fluctuations. Be mindful of getting too much sun or exposure to the cold if temperature regulation is an issue.

### **Q: What injury levels are most affected by autonomic nervous system abnormalities?**

Individuals with cervical injuries and those above T6 are at higher risk for developing autonomic dysreflexia and autonomic disorders, including orthostatic hypotension.

*Sources: Merck Manual, Model Systems Knowledge Translation Center, Craig Hospital, Christopher & Dana Reeve Foundation, Shirley Ryan Ability Lab.*

#### **Need to talk to someone?**

Our Information Specialists are available to answer your questions.

Call toll-free 1-800-539-7309 Mon-Fri, 9 am-8 pm EST.

Or schedule a call or ask a question online at

<https://www.ChristopherReeve.org/Ask>.

## **Resources for Autonomic Nervous System**

### **Biology Dictionary: Autonomic Nervous System**

<https://biologydictionary.net/autonomic-nervous-system>

**Lumen: Anatomy & Physiology: Divisions of the Autonomic Nervous System**

<https://courses.lumenlearning.com/epcc-austincc-ap1-2/chapter/divisions-of-the-autonomic-nervous-system>

**Mayo Clinic: A Study to Understand Why Laying Down May Influence High Blood Pressure in Patient's with a Disease that Causes Problems with the Autonomic Nervous System**

[https://www.mayo.edu/research/clinical-trials/cls-20314840?\\_ga=2.28158076.1928874869.1601663753-384977201.1601315568](https://www.mayo.edu/research/clinical-trials/cls-20314840?_ga=2.28158076.1928874869.1601663753-384977201.1601315568)

**Medline Plus: Autonomic Nervous System Disorders**

<https://medlineplus.gov/autonomicnervoussystemdisorders.html>

**Merck Manual: Overview of the Autonomic Nervous System**

<https://www.merckmanuals.com/professional/neurologic-disorders/autonomic-nervous-system/overview-of-the-autonomic-nervous-system>

**VeryWellMind: What is the Autonomic Nervous System?**

<https://www.verywellmind.com/what-is-the-autonomic-nervous-system-2794823>

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