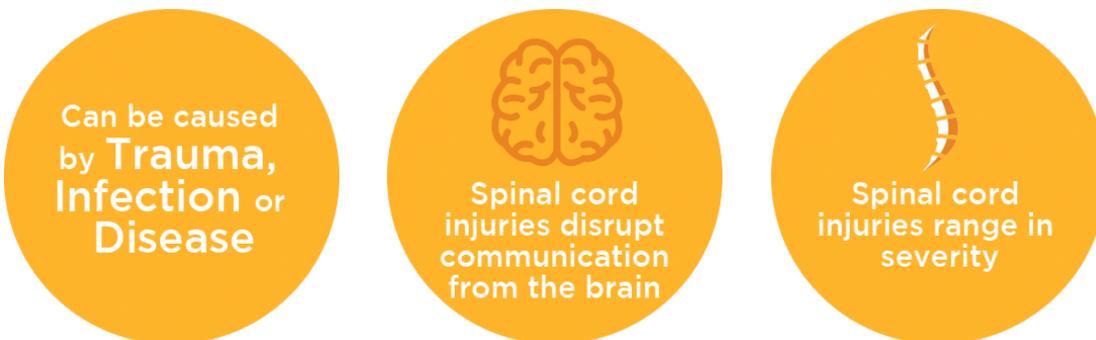


## Spinal Cord Injury

### What Is a Spinal Cord Injury?

The spinal cord is a thick cord of nerve tissue located within the bones of the spine, or backbone. It carries signals from the brain to the rest of the body.

Spinal cord injuries disrupt the normal communication that flows between the brain, the spinal cord and the peripheral nerves. This disruption can lead to loss of movement (paralysis) and loss of sensation—including the ability to feel heat, cold and touch—below the area where the spinal cord is injured.



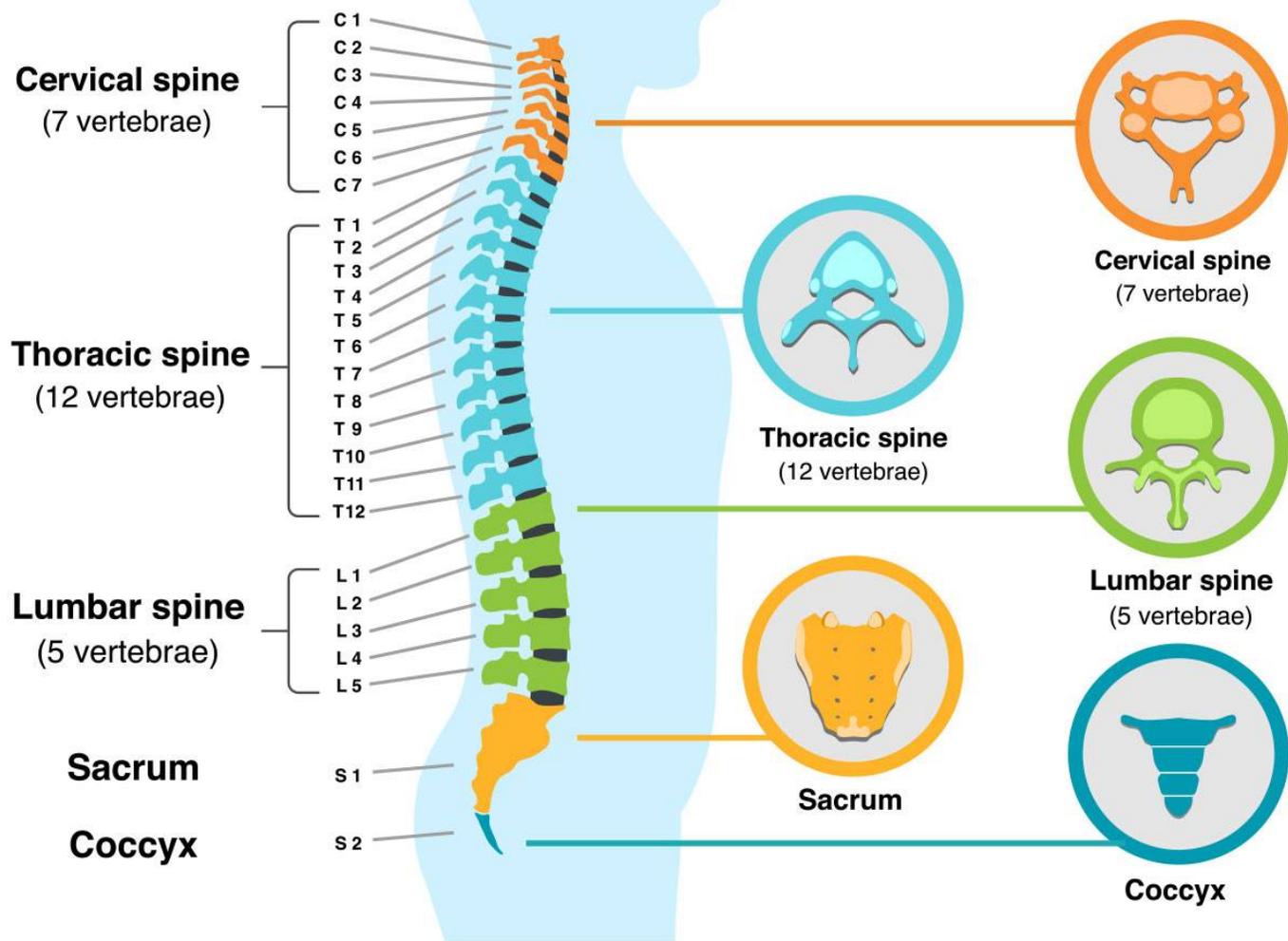
Spinal cord damage affects all people differently. In addition to severity, the location of the injury on the spinal cord matters. Injuries higher up on the spinal cord affect more areas of the body than those lower on the back do.

For example, a neck-level injury could cause paralysis in both arms and legs (also known as quadriplegia) and make breathing without a ventilator impossible. An injury lower on the spinal cord might affect only the legs (known as paraplegia) and lower parts of the body.

### Injury Location

The spine is made up of 33 small bones called vertebrae. The vertebrae are grouped into four categories based on their location on the spine.

# Human Vertebral Column



- Cervical spine (vertebrae C1 through C8). The uppermost part of the spine, where the neck is located. C1 is the vertebra closest to the skull.
- Thoracic spine (vertebrae T1 through T12). The second highest part of the spine, spanning the upper and middle back. T1 is closest to the neck.
- Lumbar spine (vertebrae L1 through L5). The lower back area. L1 is highest on the spine.
- Sacral spine (vertebrae S1 through S5). Between the lower back and the tailbone. S1 is highest on the spine.

Health care providers often refer to the specific vertebra associated with the different spinal cord injury levels. Physical therapists and occupational therapists at Gillette also use these levels to create a rehabilitation plan after injury. Click through the module below to learn more about the different symptoms associated with spinal cord

injuries. At Gillette, we address these symptoms with specific [physical therapy](#) and [occupational therapy](#) for each spinal cord injury level.



The image is a digital graphic with a light blue header and a light green body. The header contains the title "Exploring Your Brain and Spinal Cord" in white, sans-serif font. Below the title are two tabs: "Brain Injury" and "Spinal Cord Injury", both in white text on a dark green background. The main area features three illustrations: on the left, a dark grey silhouette of a girl's head with colorful gears inside; in the center, a cartoon boy with dark skin and curly hair, wearing a blue t-shirt, waving with his right hand and holding a magnifying glass over his chest; on the right, a dark grey silhouette of a person's upper body with a colorful spine. Below the illustrations is the word "Welcome" in a large, white, sans-serif font. At the bottom, there is a paragraph of text in a smaller, dark grey font.

# Exploring Your Brain and Spinal Cord

Brain Injury | Spinal Cord Injury

Welcome

Gillette Children's Specialty Healthcare would like to help you explore and learn how different medical conditions affect the brain and spinal cord. We hope this learning tool helps you understand how certain conditions might affect daily lives. We've also provided tips on interacting with people who have brain and spinal cord injuries.

## Injury Severity (Incomplete and Complete)

Spinal cord injuries range in severity. With an incomplete injury, the spinal cord can communicate some messages to and from the brain. Children who experience incomplete injuries might retain some sensation and motor function below the injury. With a complete injury, however, all motor function and sensation below the injury is lost.

Gillette Children's Specialty Healthcare uses the American Spinal Injury Association (ASIA) Scale to describe how severe an injury is:

## American Spinal Injury Association (ASIA) Scale

- A** Complete: No motor or sensory function is preserved in the sacral segments S4 – S5.
- B** Incomplete: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4 – S5.
- C** Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.
- D** Incomplete: Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.
- E** Normal: Motor and sensory function are normal.

At Gillette, we also treat children who experience **concussions and related nerve damage** (neurotrauma); including cervical injuries and what some people call “spine concussions.”

## What Causes Spinal Cord Injury?

The most common causes of spinal injuries include:

- Motor vehicle accidents.
- Traumatic injuries.
- Falls.
- Sports and recreation accidents.
- Diseases, such as tumors, infections and inflammation of the spinal cord.
- Vascular syndromes.

## Spinal Cord Injury Symptoms and Effects

Spinal cord injuries can lead to a number of complications and effects. Some of the most common symptoms include:

- Loss of movement (paralysis) below the injury.
- Loss of sensation—including the ability to feel heat, cold and touch—below the injury.
- Exaggerated reflexes or muscle spasms below the injury.
- Loss of bowel and bladder control.
- Potentially life-threatening over-activity of the autonomic nervous system (autonomic dysreflexia). **Autonomic dysreflexia** affects body functions such as heart rate, blood pressure and breathing.
- Trouble breathing, coughing or clearing mucus from the lungs.
- Trouble swallowing.
- Changes in sexual function and fertility.

## Spinal Cord Injury Treatment

Although complete damage to the spinal cord cannot be reversed, comprehensive treatment can help your child live a full life. While researchers continue to make progress in potential breakthroughs, Gillette focuses on helping children and teens develop strength, skills and confidence to achieve their highest levels of health, independence and happiness.

Kids and teens that have spinal cord injuries often need the following types of care.

### Emergency Care

Spinal cord injuries often result from traumatic injuries caused by car accidents, sports injuries and other events. Your child might come to Gillette directly through the **Level I Pediatric Trauma Center**, which we operate in partnership with Regions Hospital.

Your child might need surgery immediately to relieve pressure on their spinal cord or to stabilize their spinal column. Sometimes surgery and medical treatment are needed for secondary injuries.

### Critical Care

Following emergency treatment, children and teens that have experienced spinal cord injuries often need close monitoring in a critical care setting. Gillette's **Pediatric Intensive Care Unit (PICU)** provides the highest level of care for children and teens who are critically injured. We begin full therapy services soon after patients arrive in our PICU.

If your child's injury affects their ability to breathe, we offer **pulmonology and respiratory care**. We also support

your family's needs with services including [psychology](#), [social work](#), [chaplains](#), and [child life](#) as well as [therapeutic recreation](#).

## Your Care Team

[Comprehensive inpatient rehabilitation](#) care plays an important role in the health, independence and happiness of your child following a spinal cord injury. Gillette is the region's top provider of full pediatric inpatient rehabilitation care.

Under the direction of experts in [rehabilitation medicine](#) and [rehabilitation therapies](#), your child can have daily [physical](#), [occupational](#) and [speech and language therapy](#) in an environment designed specifically for their needs. Our facility includes technology-equipped rooms that feature technology such as voice or visual activation to help your child communicate with their caregivers or do basic things like turn on the lights.

Depending on the ASIA level of injury (levels C and D), therapy might include respiratory therapy or technology such as [robotic-assisted locomotor training \(Lokomat®\)](#), advanced technology such as the ReWalk exoskeletal system, or functional electrical stimulation. Our certified rehabilitation nurses provide direct care and help your child practice what they learn in therapy. Our [integrative care services](#) are available to your child throughout their stay as well.

Throughout your child's hospital stay, [care coordinators](#) are your family's main point of contact. Care coordinators keep lines of communication open between children, family members and the care team.

Routine family conferences provide opportunities for sharing information as your child goes through treatment—from the moment you arrive at the hospital to a successful return to home, school and community.

## Orthotics, Prosthetics and Seating

[Orthotics, Prosthetics and Seating](#) can help your child manage the day-to-day challenges that accompany a spinal cord injury. Your child's occupational therapists and speech-language pathologists work with orthotics, prosthetics and seating specialists to help your child choose the right rehabilitative equipment to make sure they are as independent as possible.

Depending on the level of injury, equipment might include:

- [Braces \(also known as orthoses\)](#).
- [Seating and mobility equipment](#).
- Augmentative and alternative communication ([AAC](#)) devices.
- Environmental control devices or phone and computer access equipment.

Your child might try various pieces of equipment during their hospital stay to figure out which options best meet their needs.

Patient and Family Education

**Patient Education Resources:**

- [Addressing Sexual Development within the Hospital Setting](#)
- [Ankle-Foot Orthosis - Translations included](#)
- [Bacterial Colonization in Urine and Symptomatic Urinary Tract Infection \(UTI\)](#)
- [Bowel Management – Translations included](#)
- [Breath Stacking \(Lung Volume Recruitment\)](#)
- [Clean Intermittent Catheterization at Home: Female](#)
- [Clean Intermittent Catheterization at Home: Male](#)
- [Emergency Tracheostomy Care at Home](#)
- [Finding Socks and Shoes to Wear With Your Brace - Translations included](#)
- [Gastric Tube \(G-tube\) Emergency Instructions – Translations included](#)
- [Gastrostomy Feeding Button](#)
- [Gastrostomy Tubes](#)
- [Healthy Weight Guide](#)
- [High-Fiber Diets – Translations](#)
- [Irrigating the Bladder](#)
- [Jejunostomy Tubes](#)
- [Mitrofanoff Procedure](#)
- [Nutrition and Healing - Translations included](#)
- [Oral Hygiene](#)
- [Pin/Wire Site Care - Translations included](#)
- [Pressure Sores](#)
- [Spasticity](#)
- [Sleep Hygiene – Translations included](#)
- [Suction Information](#)
- [Trauma, Its Effects on Children – Translations included](#)
- [Watch Out for Pressure Ulcers – Translations included](#)
- [Wearing a Hard Cervical Collar](#)

## **Integrated Care**

If your child experiences a spinal cord injury, you'll work closely with internationally recognized providers to develop

a custom treatment plan.

Your child might receive care from providers in these specialties and services during the process of spinal cord injury recovery:

- [Child Life](#)
- [Chaplaincy](#)
- Rehabilitation Nursing
- [Rehabilitation medicine](#)
- [Rehabilitation therapies](#)
- [Psychology](#)
- [School services](#)
- [Social work](#)
- [Therapeutic recreation](#)

[Make An Appointment](#) [651-290-8707](#)

This information is for educational purposes only. It is not intended to replace the advice of your health care providers. If you have any questions, talk with your doctor or others on your health care team.

If you are a Gillette patient with urgent questions or concerns, please contact Telehealth Nursing at [651-229-3890](#).