

Understanding Spinal Cord Injury

This fact sheet is aimed at helping you understand about the spinal cord and what it means to have a spinal cord injury. Basic information is provided to explain some of the terms you may hear during your time in hospital. The fact sheet provides links to further resources that may help your learning.

What is the spinal column?

The spinal column (or spine) is a structure made up of bones (vertebrae), nerves and ligaments. It provides support for the body and protects the spinal cord.

There are 33 vertebrae running from the base of the skull to the tailbone. They are stacked and held together by disks, ligaments and muscles. The spinal column is classed in sections with each vertebra being numbered. There are:

- 7 cervical vertebrae in the neck
- 12 thoracic vertebrae in the upper back
- 5 lumbar vertebrae in the lower back
- 5 sacral vertebrae that are joined to form the sacrum and
- 4 coccygeal vertebrae that are fused to form the coccyx

Each vertebra is referred to by its name and number, so that the cervical vertebrae are called C1 to C7 with the numbers counting downwards from the head. So the thoracic vertebrae become T1 – T12, and the lumbar vertebrae L1 – L5.

What is the spinal cord?

The spinal cord allows your brain to communicate with your body by sending “messages” through the nerves. The spinal cord runs from your brain down the inside of your spinal column and is made up of millions of nerve fibres. At each vertebra, nerves branch out to

send and receive information to and from different parts of the body. Both the nerves and the vertebra are numbered in the same way.

Messages are sent from the brain down the spinal cord to control every function of the body, some of which are under our control (the Somatic Nervous System) and others happen without us knowing (the Autonomic Nervous System).

By controlling automatic, involuntary functions, the autonomic nervous system’s main function is maintaining a stable environment within the body. Some functions include blood flow, heart function, breathing, body temperature and some aspects of bladder and bowel function. If you have damaged your spinal cord you have probably damaged your autonomic nervous system. More information regarding this can be found in the fact sheets on “Autonomic Dysreflexia” and “Other Conditions You May Hear About” in this series.



What is a spinal cord injury?

A spinal cord injury can occur through an event such as a break, crush, rip, tear or through a disease such as a growth on the spine. An injury can disrupt blood and oxygen supply to the spinal cord which can result in spinal cord damage, sometimes called “nerve death”. This damage will result in altered or blocked communication between the brain and the nerves.

The point on the spinal cord where the nerves are damaged is known as your level of lesion or level of injury. Your brain may have difficulty sending messages to parts of your body below the level of your injury and this will relate to how “complete” your injury is.

Description of terms

No two spinal cord injuries are the same. Each person’s spinal cord injury will be the result of a different degree of damage than someone else’s. You may hear the terms “tetraplegia”, “paraplegia”, “complete” and “incomplete” and be given an “ASIA classification” to help grade the type and degree of damage. Following is a description of these terms:

Tetraplegia (or Quadriplegia) is injury or damage to the spinal cord in the cervical region (neck) and will result in partial or complete paralysis of the upper and lower portion of the body. These terms mean exactly the same thing; one has Greek origins and the other Latin.

Paraplegia is injury to the spinal cord below the neck (T1 or below) and will result in partial or complete paralysis of the lower portion of the body including the legs and sometimes the torso.

ASIA classification means that, as well as being determined as complete or incomplete a spinal cord injury may have been classified according to the American Spinal Injury Association (ASIA) as either ASIA A, B, C or D. The table below explains each classification.

Muscle grading works on a scale of 0 to 5. A grade of 0 indicates no muscle movement and 5 indicates normal muscle contraction against resistance. A muscle grade of 3 means that a muscle is able to contract without any resistance placed on it, but against the force of gravity.

ASIA Classification

Classification	Description of Function
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 = Not Affected	Motor and sensory function are normal

A **Complete** injury means that, in most cases, messages are unable to travel past the level of injury or there is total blockage of messages. Traditionally, it results in total loss of movement and sensation below the level of lesion. The term “complete” is becoming less commonly used to describe loss of function after spinal cord injury.

An **Incomplete** injury means there is partial blockage and a degree of movement and/or sensation that can be communicated past the level of lesion. The degree of blockage may be given an “ASIA classification” or be called one of the terms listed under clinical syndromes.

Description of Clinical Syndromes

- 1. Central Cord** is an injury to the central cord that usually occurs in the neck and more commonly affects mobility of the upper limbs
- 2. Brown-Sequard** is a syndrome that usually results in a larger impairment to one side of the spinal cord and therefore greater loss of movement and sensation to one side of the body
- 3. Anterior Cord** refers to “the front” and this type of injury will usually result in impairment to motor systems with some preservation to sensory systems
- 4. Conus Medullaris/Cauda Equina** refer to the bundle of nerves (often referred to as the “horse’s tail”) that spread out from the base of the spinal cord. These nerves determine bladder, bowel and sexual function. Damage to the cauda equina may result in partial loss of motor and sensation abilities.



How might having a spinal cord injury affect me?

- Movement may be lost below the level of the injury
- Sensation may be lost below the level of injury
- Blood pressure and circulation may be altered
- Breathing may be affected
- Temperature control may be affected, including sweating and shivering
- Bladder and bowel function may be altered
- There may be spasms or involuntary movement below the level of injury
- Sexual function may be altered
- Fertility may be affected

As well as affecting your body, having a spinal cord injury can also affect the way you feel. Many people experience, understandably, some period of distress following a spinal cord injury. Living with any medical condition increases the chance of experiencing anxiety or depression. For most people, this period of distress will settle down relatively soon after injury. If feelings

of distress do persist, speak to your health professional about effective ways of managing these feelings. Refer to the “Adjusting to your Injury” fact sheet in this series for further information.

Remember, all spinal cord injuries are different and what happens with one person does not necessarily happen with another.

References and Further Resources

Check the resources available at your Spinal Unit. Talk with members of your rehabilitation team. They will be able to discuss your questions and provide written information for you and your family.

The internet is full of information on spinal cord injury. Some great information is available at:

NSW State Spinal Cord Injury Network
www.aci.health.nsw.gov.au/networks/spinal-cord-injury/resources

ParaQuad NSW
www.paraquad.org.au Tel: 8741 5600

Spinal Cord Injuries Australia
www.scia.org.au

Paralyzed Veterans of America
www.pva.org

American Spinal Injury Association
www.asia-spinalinjury.org/

Back on Track a handbook by Julian Verkaaik
www.nzspinaltrust.org.nz/pub_backontrack.asp

Apparelyzed: SCI Peer Support
www.apparelyzed.com

Web pages developed by people with SCI
www.spinalinjury.net
www.sci-info-pages.com