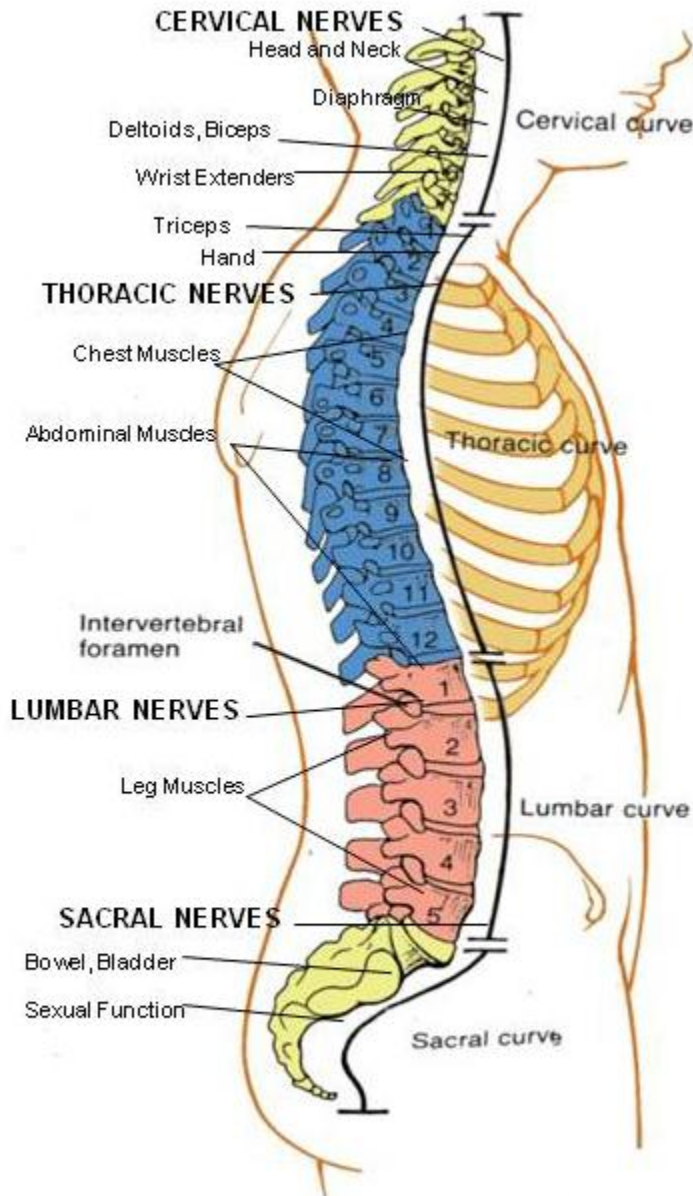


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Spinal Cord Injury: What is it and what does it affect?

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The spinal cord is like a great telephone communications system made of millions of nerves that carry messages between the brain and all parts of the body. It is surrounded by bony rings called vertebrae. The column of nerves and bones that travel from the brain to the tail bone make up the spinal cord. The protective bony structure is the spinal column. An injury to the spinal column may cause the bones

around the spinal cord to break and press against the spinal cord, causing damage to nerves. Damage to the spinal cord and nerves can happen without damage to the bones.

Many nerves lead from the brain through the spinal cord to the skin, muscles, and organs of the body. There are both sensory and motor nerves. The sensory nerves travel from the skin and organs of the body up the spinal cord to the brain. These nerves send information to the brain about heat, cold, pressure, pain, and body position. The motor nerves travel down from the brain, out the spinal cord, to the muscles. It is through these nerves that the brain tells the body to move.

Nerves enter and exit the spinal cord at specific levels and each level goes to specific parts of the body. The first seven levels are called cervical levels; they control breathing, neck, and arm function. Next are the twelve thoracic levels. These nerves are responsible for the chest and torso areas. The five lumbar levels are next and control the legs. Last are the sacral levels that are involved in bowel, bladder, sexual, and leg function.

Nerves operate along a pathway (the spinal cord); when the path is broken the messages cannot get through. This occurs when there is an injury or disease of the spinal cord. It is much like a broken telephone cable: the telephones on each end (the brain and the body parts) work, but the communication between the two is broken. So following damage to the spinal cord the levels above the damage continue to work but all levels below the damage will be affected.

The degree of loss of body function following injury or disease to the spinal cord depends on the level and "completeness" of the injury. The completeness of the injury refers to the amount of messages that are traveling through the spinal cord. If there is no feeling or movement below the level of injury, it is considered a complete injury. If there is some feeling or movement well below an injury level then it is an incomplete injury.

Initially after an injury the nerves are "in shock." There is swelling around the spinal cord, much like any other part of your body that swells when injured. As the swelling begins to decrease, there may be some improvement in body function below the injury level.

In addition to its role in movement and feeling, the spinal cord affects other body systems such as skin, bowel, bladder, and breathing. So after damage to the spinal cord, depending on the level and "completeness" of the injury, these body functions may not work the same as before. The following is a general explanation of how a spinal cord injury affects body functions.

Skeletal System

Right after injury, some calcium and minerals often leave the bones. Eventually, these may deposit in the urinary system causing stones (calculi). Getting out of bed and moving around as soon as advised will help prevent this; so for this and other important reasons, therapists try to get you out of bed and as active as possible.

Because you cannot move about as you used to, joints (knees, elbows, shoulders, etc.) may become stiff. This is why you have range of motion exercises (ROM). You can help keep full movement of your joints by correct positioning in bed and by doing as much of your self care as possible.

Urinary Tract System

The urinary system is made up of kidneys (which filter the blood and produce urine) and the bladder (which holds and then gets rid of the urine). After a spinal cord injury, the kidneys continue to make urine

but the bladder may not work as before. You may be unable to tell when your bladder is full or you may not be able to push the urine out when necessary. The bladder may hold the urine and a catheter may be needed to empty it or the urine may come out without your wanting it to, causing urinary accidents. There are different types of catheters, medication, and other techniques that can promote independence with emptying your bladder. Therapists work with you to find ways to manage your urinary system.

Bowels

The digestive system breaks down the food you eat. After a spinal cord injury, digestion continues but the ability to control bowel movements may be affected. Once food is broken down in the digestive tract it is stored in the rectum. When the rectum becomes full, a message is sent to the brain which then tells you to wait until you can get to a bathroom. Following a spinal cord injury, messages may not get to the brain so there may be a problem in stopping or starting a bowel movement. Depending on the level of injury, you may not have use of the abdominal (stomach) muscles which help push the stool out. Bowel accidents, constipation, and impaction can occur.

After a new spinal cord injury you will have to re-train your bowels. A new routine including different techniques, methods, and medications can help you regain normal bowel elimination. Developing a new program will prevent accidents, and promote regular bowel movements. Nurses work with you to develop a bowel program.

Skin

Skin protects the body from the outside world by making it hard for bacteria and germs to enter the body. It also keeps necessary fluids and nutrients inside the body to help you stay healthy. The spinal cord serves as an important messenger to your skin to protect it from being hurt. For example when you sit in one position for a long time you begin to feel uncomfortable and shift or move around in your chair; this helps prevent sores from developing. After a spinal cord injury you may no longer feel the discomfort and not move around, putting yourself at risk for a pressure sore (bed sore). If sores develop, the skin is open and germs can enter the body, increasing risk for serious infections. There are many ways to change positions, and to be aware of possible skin problems before they occur. Skin checks and skin care can be discussed with your nursing team. Nurses will help you find ways to compensate for not being able to feel body discomfort.

Respiratory System

Lungs are the major organ involved in breathing and these are not affected by spinal cord injury. However, being able to move air in and out of the lungs depends on muscles. So depending on the level of the injury, being able to cough or take deep breaths may be affected. The most important muscle in breathing is the diaphragm. This is a large dome-shaped muscle that is directly below the lungs. If a spinal cord injury is at cervical 4 or higher, a machine or ventilator may be necessary to help with breathing. Additional airway problems exist in spinal cord injuries at this level. Coughing and deep breathing is a way to fully expand and open your lungs to keep them moving and healthy. The thoracic levels help make the cough strong and lungs clean. There are things you can do to help keep your lungs healthy. If your injury is below thoracic 6 and you are active you will probably not notice any changes in your ability to breathe. A good tool for any person staying in the hospital setting is called the incentive spirometer. It is a tool that makes you take deep breaths, opening up your lungs and helping them stay clear and healthy. These are given on all units and can be discussed with nursing and respiratory staff.

Autonomic Function

The autonomic nervous system consists of nerves controlled by the brain and spinal cord that run both

inside and outside the spinal cord. This system controls glands, digestion, heart, temperature and blood pressure among others. After a spinal cord injury some of these functions may be affected, such as temperature and blood pressure regulation. This is particularly true if the injury has occurred at thoracic 6 or above. Normally when you go out in very cold or hot weather body temperature does not change. After a spinal cord injury your body temperature may rise on hot days or drop on cold ones. You may also be at risk for a serious condition called autonomic dysreflexia. This can occur when something has happened to the body below the level of injury and you cannot feel it. A message is sent through the nerves but it is blocked before reaching the brain. Because your nerves cannot effectively communicate the cause of the problem your blood pressure may rise. Common causes and symptoms of autonomic dysreflexia can be reviewed with the nursing staff.

Sex and Intimacy

Sex, sexuality, and intimacy are all closely related to each other. Feeling attractive and happy, being attracted to others, having and keeping relationships, physical intercourse, and being able to have children are all part sex and intimacy. After a spinal cord injury, there are often changes in these areas. For both men and women, losses in sensation may result in a need to find new ways to experience pleasure. Men may have changes in erectile function, ejaculations, and fertility. In women fertility is unchanged. Men and women should feel comfortable discussing issues related to sexual intimacy with their health care providers.

Feelings and Reactions

Not only is your body affected by a spinal cord injury, but also emotions are very much involved. It may help to know that most persons with a spinal cord injury go through several different emotional reactions including feeling down, depressed and angry. You may ask, "Why me?" Sometimes you will not feel like doing anything at all. For some people the worst part is not being able to do everything for themselves. It can be very upsetting when you must rely on others to do things for you. Most people say it helps to talk about feelings. If you talk to others about your feelings it is easier for them to help you; otherwise it is hard for people to know what you are going through. You may find it helpful to talk to someone who has experienced a spinal cord injury. The Rehabilitation Institute of Chicago has a Peer Visitor program and can arrange for a visit from someone who has had a similar injury that you can talk to. Talk to your care manager or therapist to set this up.

RIC provides you new ways to adapt and learn the new ABILITY each person has. Although the techniques and ways of doing things may be different than pre injury, RIC provides you with adaptations and new ways of going about daily life.

The Information Sheet "The Nervous System" will give you a general idea of what damage to the spinal cord does by specific levels. It is important to know that the level of damage, and whether the injury is complete or incomplete, make a difference. Also, other important factors such as general health, age, fitness, size and motivation, determine how much you can do for yourself.

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