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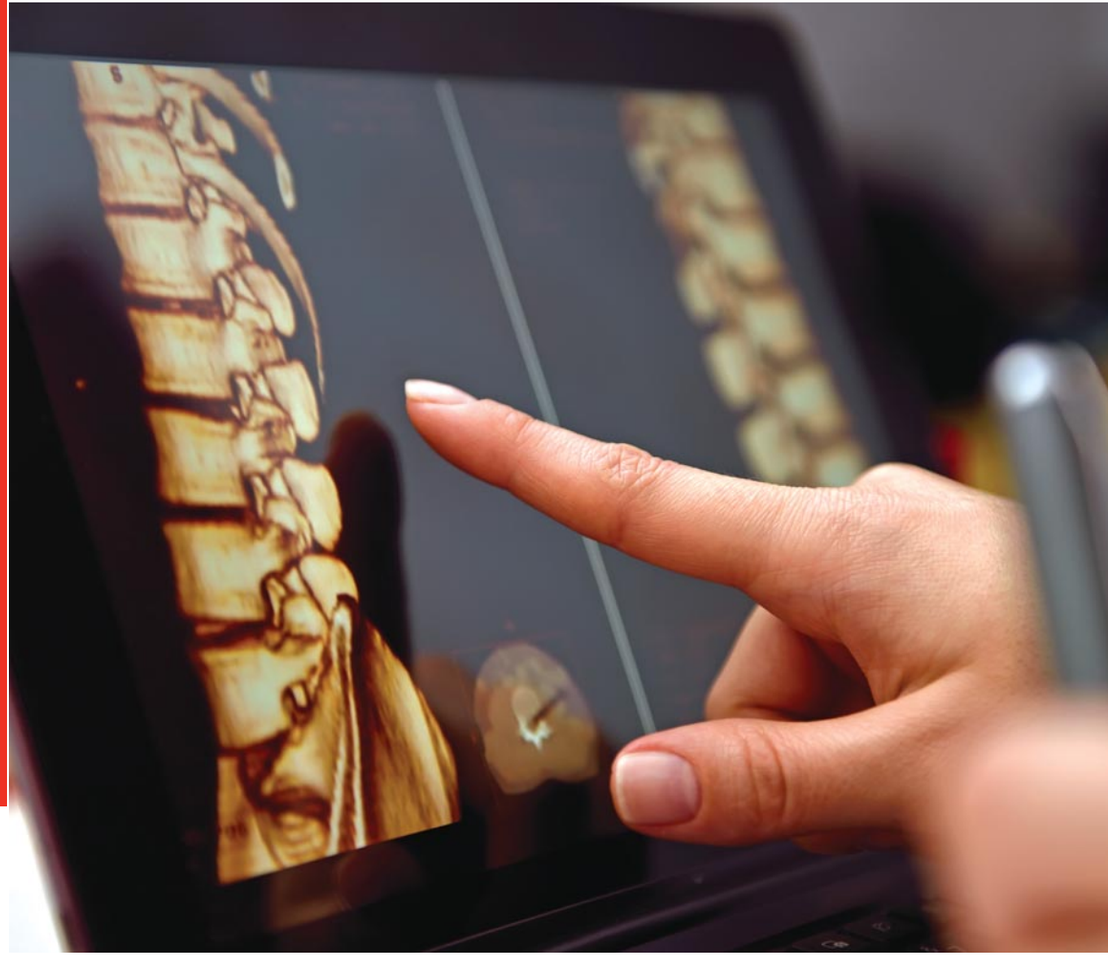
Spinal Cord Injury

A Guide for Patients & Families



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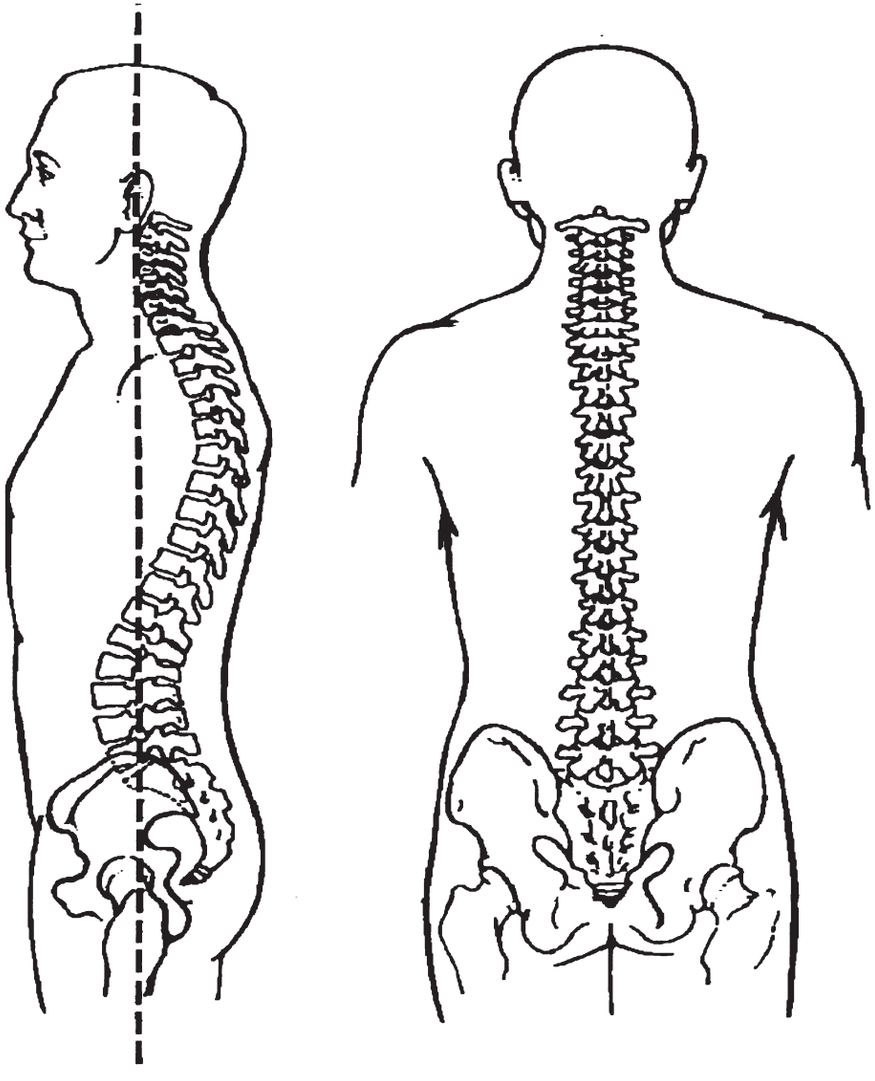

Spinal Cord Injury

A Guide for Patients & Families

If you have suffered a spinal cord injury, you are not alone in this often long and frustrating journey. Each year approximately 11,000 Americans sustain a life-changing spinal cord injury. A spinal cord injury (SCI) is traumatic damage to the spinal cord that often results in permanent changes in the ability to move and feel sensation. Motor vehicle accidents are the leading cause of spinal cord injuries, followed by violence (gun shot wounds, stab wounds, assaults), falls, and sports injuries. Some people also have a degenerative disease process or tumor that may cause spinal cord damage.

Any damage to the spinal cord is very complex. Each injury is different, and injuries can affect the body in many different ways. The recovery is a long process and often involves months of rehabilitation.

How Does the Spinal Cord Work?

The spinal cord is made up of bundles of nerves that form a pathway along which messages travel between the brain and other parts of the body. It carries messages from the brain to tell a body part to move or it carries messages from other parts of the body back to the brain about feeling or sensation (such as hot/cold, sharp/dull).

Because the spinal cord is so important to movement and sensation, it is surrounded and protected by bones called vertebrae. These vertebrae, or backbones, are stacked on top of each other and form the main support for the body. The spinal cord runs through the middle of the vertebrae.

The spinal cord is about 18 inches long and extends from the base of the brain, down the middle of the back to just below the waist. It is divided into four sections.

Cervical – This is the top part of the spinal cord at the neck area. It includes nerves that travel from the spinal cord out to the arms giving your arms movement and sensation.

Thoracic – This is the area that extends from your upper back/chest area to right below your belly button. The nerves in this area control the muscles and sensation in your trunk.

Lumbar – The lumbar area is at your low back. These nerves control movement and sensation in your legs.

Sacral – This is the very bottom section of your back and tailbone; the nerves from the spinal cord in this area control your bowel, bladder, and sexual function.

What Happens When the Spinal Cord Is Injured?

A spinal cord injury can occur either from an accident or from disease to the vertebral column or spinal cord itself. In most spinal cord injuries, the backbone pinches the spinal cord, and it becomes bruised or swollen. Injury to the spinal cord greatly affects the messages that are sent via the nerves between the brain and other parts of the body, as mentioned above.

After a spinal cord injury, most nerves above the level of injury keep working the way they always have. Below the level of injury, however, the spinal cord nerves can no longer send messages between the brain and the parts of the body the way they did before. This is what causes paralysis and numbness that a person with a spinal cord injury may experience.

Changes after the Initial Injury

Sometimes the spinal cord is only bruised or swollen after the initial injury. As the swelling goes down, the nerves may begin to work again. There are no tests to tell how many nerves, if any, will begin to work again. The more time passes without improvement, the less likely it is that there will be improvement. If a little recovery in function does occur, there is considerably more hope. This is no guarantee of how much more function will return.

Some individuals, however, have involuntary movements, such as twitching or shaking. These movements are called spasms. Spasms are not a sign of recovery. A spasm occurs when a nerve sends a random causing the muscle to move. The individual cannot control this movement.

In addition to movement and feeling, a spinal cord injury affects other bodily functions depending on the level of injury. The lungs, bowel, and bladder may not work the same as before the injury. There may also be changes in sexual function. During rehabilitation, the medical team will teach you new ways to manage your bodily functions (see the Bowel and Bladder section later in the booklet).

Type of Injury

The spinal cord injury type is classified by the doctor as complete or incomplete.

Complete – A complete injury means there is no function below the level of the injury, no sensation and no voluntary movement. Both sides of the body are equally affected.

Incomplete – An incomplete injury means that there is some function below the primary level of the injury. A person with an incomplete injury may be able to move one limb more than another, may be able to feel parts of the body that cannot be moved, or may have more function on one side of the body than the other.

Quadriplegia Vs. Paraplegia

You may hear the following terms related to spinal cord injuries:

Quadriplegia (or Tetraplegia) – Injuries of the cervical (neck) region with associated loss of muscle strength in all four extremities.

Paraplegia – Injuries of the trunk, legs, lower back and tailbone area; loss of normal use and feeling in part or all of the trunk and/or legs and feet. May affect bowel, bladder, and/or sexual function.

How Are Spinal Cord Injuries Evaluated?

Patients with traumatic spinal cord injuries are taken to a trauma center for evaluation and treatment. When you enter the Emergency Department, a team of physicians, nurses, and technicians quickly assesses your condition. These assessments may include the following:

Neurological Exam – A series of exams used to identify the amount of sensation and muscle strength present throughout the body. This information is useful in determining more specifically where the spinal cord is injured.

X-ray – An X-ray is used to take a picture of the bones in the neck and back that surround the spinal cord. This is used to determine exactly where the injury

occurred and the extent of the injury.

CT Scan (CAT Scan) – This is a computerized scan that takes pictures of the spinal cord itself to determine the extent of the injury.

MRI (Magnetic Resonance Imaging Scan) – Large magnet and radio waves are used instead of X-rays to take a picture of body tissues. An MRI may be used when more detail is needed or when a CT scan does not reveal the full extent of the injury. The test is painless and may take up to 60 minutes to complete.

Treatment

Rehabilitation of the spinal cord injury patient begins immediately and includes input from physicians, nurses, therapists, dieticians, social workers and family members.

Initial treatment goals may include:

- Medical management and surgery to stabilize the spine, if needed
- Education on spinal cord injuries, including prevention of pressure sores, contractures (tight muscles), and respiratory complications
- Depending on the results of the first three goals, one of the next goals is to get you into a wheelchair.

Treatment varies with the type of injury. The doctor will decide which treatments are recommended and discuss them with you. These may include but are not limited to:

Surgery

Because each spinal cord injury is so different, no one specific surgery is the best option. Below are various types of possible surgical interventions:

- **Spinal Fusion** – A spinal fusion is performed when a bone fracture is present or when there is instability in the spine. Often a variety of metal plates, screws, and/or rods are used to fixate the fracture and prevent it from causing further injury.
- **Anterior Cervical Discectomy and Fusion (ACDF)** – With an ACDF, part of the injured spinal disc is removed, and the surrounding bones are fused together with metal plates and/or screws.
- **Iliac Crest Bone Graft** – Part of the hip bone is shaved off and used to fuse vertebrae together.

Braces/Splints

TLSO (Thoraco-Lumbar-Sacral Orthotic) – This is a body brace that extends from the upper trunk to just above the hips. It is used to stabilize the back when a fracture is present. This brace prevents any forward, backward, or twisting movement of the trunk and is usually worn for several months to protect the back so the bones can heal correctly.

Cervical Collar (Aspen or Miami-J Collar) – A cervical collar is a firm neck brace that is worn snuggly when a fracture is present in the neck. This collar prevents the head and neck from moving while protecting against further injury of the neck bones and tissues.

Halo – A halo is a brace that permits absolutely no movement of the head, neck, and upper torso. It consists of large metal bars secured to the head and upper chest. This brace is used when there is a very unstable fracture in the upper neck, or following surgery when maximum stability is required.

Splints – Splints can be used for the feet as well as the hands. Splints for the feet look like a "boot-type" shoe and are used to keep the heels off the bed and to maintain the ankle in a stretched position. This is vital in preventing wounds on the heel (caused by the heels lying flat against the bed) and contractures at the ankle (having the ankle get stuck with the foot pointed downwards). Splints for the hands are often required to maintain appropriate positioning of the hand and fingers to allow for more functional use.

Positioning

It is very important throughout the rehab process that you learn to tolerate an upright sitting position. Due to the spinal cord injury, the body requires more time and assistance to adjust to changes in blood pressure, and many patients will become dizzy their first few times sitting upright. Before your injury, you may have felt this same sensation when you stood up too quickly. Some people refer to it as feeling "swimmy headed" or having a "head rush." This feeling is caused by a sudden drop in blood pressure (hypotension). After a spinal cord injury, veins and arteries below your level of injury are unable to tighten or widen the way they used to. Also, when the muscles in your arms/trunk/legs aren't working, they can no longer assist with circulation. Therefore, blood pressure is more likely to drop after a spinal cord injury. In order to compensate for this problem, you may need to wear pressure garments (long

white stockings) and possibly ace wraps on your legs. An abdominal binder may be added around your abdomen as well.

Ventilator Support

The nerves that control your breathing are located high up in the neck. If your injury is located very high on the spinal cord (towards the base of your head), you may have difficulty breathing or won't be able to breathe on your own. If this is the case, you may be put on a ventilator to help you breathe until you are stronger and able to breathe on your own.

Intravenous Line (IV)

An IV is a temporary tube placed in the patient's vein (usually in the arm) to administer medications and fluid when necessary.

Foley Catheter

This is a tube placed in the patient's bladder to drain urine.

Rehabilitation

Rehabilitation begins the moment you enter the hospital. The team of health care professionals involved in your care may include: physicians, surgeons, nurses, speech therapists, occupational therapists, physical therapists, respiratory therapists, dieticians, social workers, case managers, therapeutic recreation specialists and chaplains. The goal is to work together with you and your family to ensure patient health recovery and to strive for your highest level of independence.

Pain

After a spinal cord injury, pain usually has some impact on your life. Sometimes you may experience pain immediately after your injury. Then as your body heals, the pain subsides. Muscle and nerve pain from the trauma related to your injury are common.

Muscle (or musculoskeletal) pain usually occurs above the level of injury. You may experience this pain below the level of injury if you still have some feeling. Musculoskeletal pain is usually caused by overuse of muscles and joints and is usually described as aching or throbbing pain. Musculoskeletal pain usually gets better with rest. Anti-inflammatory medications ordered by your physician may help with the inflammation of the muscles.

Nerve (or neuropathic) pain usually occurs below your level of injury. The cause is not well understood, but it is believed that the pain is caused by irritation of the nerve endings at the site of the injury. This pain is usually described as sharp, shooting or burning. Neuropathic pain is somewhat more difficult to resolve and is usually treated with medication.

Skin Care

Before a spinal cord injury, your legs might tingle or "fall asleep," which is the body's way of telling you to change position when circulation is reduced. Because of the loss of sensation after a spinal cord injury, you may no longer feel that tingling sensation, so you will not know that circulation is impaired or that it is time to change positions. Therefore, it is very important that you by frequently perform exercises called "pressure reliefs." This is done either by moving your legs yourself, or by instructing someone else to move them for you.

The beginning of a pressure sore is seen when a reddened area remains red once pressure is removed. This can easily turn into an open sore. Body parts below the level of injury are numb, and paralyzed sores can develop quickly and many take several weeks to months or even years to heal. Both a poor diet and smoking can drastically increase the amount of time needed for a sore to heal. It is very important to check the skin on any bony areas several times throughout the day to make sure there are no red spots, which indicate increased pressure and the possible beginning of sores.

Pressure reliefs can be performed in the following ways:

- In bed – by rolling from one side to the other every two hours.
- In the wheelchair – by leaning side to side or having someone tip the wheelchair back 45 degrees every 30 minutes. The position needs to be held for approximately 1-3 minutes.

Major skin sore problem areas

- Heels
- Tailbone
- Ischials (the bones you sit on)
- Hipbones
- Any other bony prominences that might be numb, such as knees, shoulder blades, elbows, spine, pelvis, back of head

It is very important that you PROTECT these areas with pillows in bed or proper positioning in the wheelchair.

Prevention of pressure sores begins on day one!

Pressure sores can be prevented in the following ways:

- Doing pressure reliefs regularly as noted above
- Checking your skin twice daily
- Keeping skin clean and dry (by getting cleaned up immediately after a bowel/bladder accident)
- Eating healthy foods, including protein which helps sores heal more quickly
- AVOID SMOKING! If you do smoke, STOP! Smoking decreases blood flow and oxygen to the skin, making it more likely to break down and less likely to heal once broken down.

Bowel and Bladder Issues

After a spinal cord injury, the messages sent by the nerves located in your bowel and bladder are not able to reach your brain like before the injury. This means you may not be able to tell when your bowel or bladder is full or be able to move the muscles that control elimination. Therefore, a bowel and bladder program will need to be started. A bowel program involves a regimen of diet, medication and stimulation to produce bowel movements at regular intervals. Bowel programs are usually done 30 minutes after a meal in the morning or evening. The goal is to train the bowel to empty at the same time every day so that it is predictable, as well as to prevent constipation. If a bowel program has not been established, ask your physician and nurse about initiating one.

A bladder program is established to empty urine on a scheduled basis to prevent bladder accidents, bladder infections, and possible kidney damage.

The main types of bladder management programs are:

- Intermittent catheterization
- Indwelling catheter
- Condom catheter (for men)

Intermittent catheterization involves a flexible tube being inserted in the patient's bladder on a regular schedule to drain urine. An indwelling catheter is a flexible tube that remains in the bladder to drain urine immediately.

The health care team will decide the best bowel and bladder program for individual patients.

What Happens Next in the Rehabilitation Process?

People with spinal cord injuries are usually medically stabilized after several days or weeks in the acute care hospital. This stabilization means that the life-threatening aspects of the spinal cord injury have passed, and you are ready for further physical rehabilitation. Your rehab begins in the acute care hospital (usually in the ICU), unless your condition is considered medically unstable.

Once stable, you may be transferred to a rehabilitation hospital for more intense therapy and physical rehabilitation. The goal in the rehab hospital is to help you gain as much independence as possible in all aspects of your life. An equally important goal is to educate families on how they can best assist and encourage you as you adjust to SCI and its impact on your personal life.

Patient care in the rehabilitation hospital is based on a team approach and is led by a physiatrist, a physician that is specially trained in physical medicine and rehabilitation. Other members of the team include:

- **Rehabilitation Nurses** who specialize in caring for patients who have sustained spinal cord injuries.
- **Occupational Therapists, Physical Therapists, Speech Language Pathologists, and Therapeutic Recreation Specialists** will continue the work that began in the acute care hospital. Therapy is more intensive in the rehabilitation hospital.
- **Clinical Case Managers** liaison between the family and the treatment team. They provide emotional support and counseling for discharge planning, offer information on community resources, and assist in discussions with insurance companies.
- **Neuropsychologists** are psychologists specializing in patients who have had spinal cord injuries or other devastating injuries. They conduct a neuropsychological assessment to evaluate and treat any cognitive deficits.

What will life be like after a spinal cord injury?

Adapting to living with a spinal cord injury and learning to live with new limitations can be difficult and frustrating. This is a life changing event for you and your loved ones. It is important to remember that you do not lose the ability to think, feel emotions, learn, love, work, play or to love life to its fullest.

People with spinal cord injuries have jobs, drive, participate in athletics and recreational activities, and have relationships and children. Many people with SCI return to their home, although they may need some adjustments made to maximize independence.

What Is the Family's Role in Recovery?

Having a loved one in the hospital with a spinal cord injury is a time of crisis in the family. Different people will find different ways to deal with this stress. Below are some suggestions that may help to lessen the burden of these difficult times.

- **Contact person** – Choose a primary contact person who can discuss and make decisions about patient care with the hospital staff.
- **Wash your hands frequently** – The risk of infection and passing along illness in the hospital is very high. Washing your hands frequently will drastically help to decrease the risk of infection being passed on to your loved one.
- **Express your feelings** – both positive and negative. You will draw more support from those around you than you may think.
- **Rotate family visitation** – Take friends and family up on offers to visit and sit with your loved one to allow you time for yourself. It is very easy for family members to become burned out and frustrated.
- **Touch** – Touch is a very personal and meaningful therapy that can bring relaxation and calmness.
- **Pictures** – Bring pictures of loved ones, friends and family to place around the room to encourage a sense of "home" in the hospital environment.
- **Support** – Seek and accept the support of your friends, church or community when they offer to assist with errands, mail, groceries, etc.

Understand that each of us is different and that staff is trying their best to adapt to your loved one's needs. We respect your knowledge about the patient's emotional and physical needs, and we encourage your participation. There are many support services available to you and your family, including social workers, chaplains and psychologists. We can contact these professionals as the need arises.

There are also resources in the community, including peers with SCI, who are willing to talk with you and your family.

Resources For You and Your Loved Ones

North Carolina Spinal Cord Injury Association
3701 Wake Forest Road
Raleigh, NC 27609
919-350-4172
www.ncscia.org

National Spinal Cord Injury Association
6701 Democracy Boulevard
Suite 300-9
Bethesda, MD 20817
1-800-962-9629 (toll free)
www.spinalcord.org
E-mail: info@spinalcord.org

Spinal Cord Injury Information Network
http://www.spinalcord.uab.edu/

Understanding Spinal Cord Injury
www.spinalcordinjury101.org

Notes