What Is Quadriplegia?

Paralysis can be either partial, periodic, complete, or incomplete. Paralysis of both the arms and legs has been traditionally been called quadriplegia. Quad comes from the Latin for four and plegia comes from the Greek for inability to move. Currently the term tetraplegia is becoming more popular, but it means the same thing. Tetra is from the Greek for inability to move.

What Are The Causes of Quadriplegia?

The primary cause of quadriplegia is a spinal cord injury, but other conditions such as cerebral palsy and strokes can cause a similar appearing paralysis. The amount of impairment resulting from a spinal cord injury depends on the part of the spinal cord injured and the amount of damage done. Injury to the spinal cord can be devastating because the spinal cord and the brain are the main parts of the central nervous system, which sends messages throughout your body.

When the spinal cord is injured the brain cannot properly communicate with it and so sensation and movement are impaired. The spinal cord is not the spine itself; it is the nerve system encased in the vertebrae and discs which make up the spine.

Quadriplegia and Functionality

Quadriplegia occurs when the neck area of the spinal cord is injured. The severity of the injury and the place it occurred at determine the amount of function a person will maintain. A major spinal cord injury may interfere with breathing as well as with moving the limbs. A patient with complete quadriplegia has no ability to move any part of the body below the neck; some people do not even have ability to move the neck.
Sometimes people with quadriplegia can move their arms, but have no control over their hand movements. They cannot grasp things or make other motions which would allow them a little independence. New treatment options have been able to help some of these patients regain hand function.

Complications of Quadriplegia

Quadriplegia causes many complications which will need careful management:

- **Loss of bladder and bowel control.** Because the spinal cord nerves control the function of the bladder and bowels, people with quadriplegia have various degrees of loss of control in this area. Without proper management these problems can lead to urinary tract infections and to constipation. Urinary tract infections can be fatal if not treated in time, particularly if the patient is in a weakened condition. Your health care team will help you deal with bladder and bowel control so that you will not develop an infection.

- **Pressure sores**. When you are immobile for long periods of time, pressure from the weight of the body can cause your skin to develop sores. If you have quadriplegia you are at great risk of developing pressure sores, because you cannot shift your body weight on your own. Pressure sores can become infected and lead to serious complications, even death. For this reason, once your injuries are stable, nurses and nurse's aides will turn you at regular intervals in the hospital and your caregivers at home will need to do the same thing. Special mattresses and cushions also help to prevent pressure sores.
- **Blood clots.** When you have quadriplegia, your blood circulation slows down since you are immobile. This can cause clots to develop. Clots are not always obvious; deep within the muscles are veins which can develop clots (a condition called deep vein thrombosis). An artery in the lungs can also be blocked by a clot (pulmonary embolism). Deep vein thrombosis and pulmonary embolism can be fatal. Your medical team will work to prevent clots. You may be given blood thinners to improve your circulation. Support hose and special inflatable pumps placed on the legs may also be used to increase circulation.
- **Respiratory problems**. The nerve signals to you chest and diaphragm may be weakened or distorted by a spinal cord injury, making breathing on your own difficult or impossible. If your diaphragm is wholly paralyzed, you will be intubated and placed on a ventilator. A special pacemaker is sometimes used to simulate the diaphragm's nerves and allow the patient to breath without a ventilator. Some people are able to wean away from the ventilator by learning how to consciously control their breathing. People with quadriplegia are at increased risk for pneumonia and other respiratory infections even if they have not trouble breathing on their own. Medications and respiratory exercises are used to help prevent respiratory problems when mobility is a problem.
- **Autonomic dysreflexia.** A dangerous, occasionally fatal problem called autonomic dysreflexia can afflict people with spinal cord injuries located above the middle of the chest. This means that an irritation or pain below the site of your injury may send a signal which will not reach the brain, but will cause a nerve signal that disrupts your body's functions. As your heart rate drops, your blood pressure may rise, putting you at risk for a stroke. Ironically, simple problems such as irritating clothes or a full bladder may trigger this reflex; fortunately, removing the cause of the irritation or changing position may relieve the negative effects.
- **Spastic muscles.** Some people with quadriplegia experience muscle spasms which cause the legs and arms to jerk. Although you may be tempted to think that this is a sign of regaining movement or sensation, it is simply a symptom of the damaged spinal cords inability to properly relay remaining nerve signals to the brain. Most people with quadriplegia will not develop spastic muscles.
- **Related injuries**. People with quadriplegia may experience an injury, such as a burn, without realizing it, since they have no sensation in their limbs. For this reason it is important that your caregivers do not place a heating pad or electric blanket on you.

- **Pain.** Although people with quadriplegia may not feel external sensations, it is possible to feel pain within your arms, legs, back, and other areas which do not respond to external stimuli. Pain medications prescribed by your doctor can relieve the pain.

Treatments for Quadriplegia

Trauma Care

Immediate treatment of quadriplegia consists of treating the spinal cord injury or other condition causing the problem. In the case of a spinal cord injury, you will immobilized with special equipment to prevent further injury, while medical personnel work to stabilize your heart rate, blood pressure, and over all condition. You may be intubated to assist your breathing. This means that flexible tube carrying oxygen will be inserted down your throat. Imaging tests will be used to determine the extent of your injury.

Surgery may be needed to relieve pressure on the spine from bone fragments or foreign objects. Surgery may also be used to stabilize the spine, but no form of surgery can repair the damaged nerves of the spinal cord. Unfortunately, the nerve damage caused by the initial spinal cord injury has a tendency to spread. The reasons for this tendency are not completely understood by researchers, but it is related to spreading inflammation as blood circulation decreases and blood pressure drops.

The inflammation causes nerve cells not directly in the injured area to die. A powerful corticosteroid, methylprednisolone (Medrol) can sometimes help prevent the spread of this damage if it is given within eight hours of the original injury; however, methylprednisolone can cause serious side effects and not all doctors are convinced that it is beneficial.

Rehabilitation

Rehabilitation for quadriplegia once consisted primarily of training to learn how to deal with your new limitations. Passive physical therapy was given to help prevent the muscles from atrophying. Today, many new options are offering quadriplegia patients new hope. These new options combine older methods with new technology with encouraging results.

While passive physical therapy once consisted solely of the therapists manipulating the patient's arms and legs in an effort to increase circulation and retain muscle tone, today therapists can use electrodes to stimulate the patient's muscles and give them an optimal workout. This technology is called functional neuromuscular stimulation (FNS). FNS stimulates the intact peripheral nerves so that the paralyzed muscles will contract.

The contractions are stimulated using either electrodes that have been placed on the skin or that have been implanted. With FNS, the patient may ride a stationary bicycle to improve muscle

and cardiac function and prevent the muscles from atrophying. An implantable FNS system has been used to help people with some types of spinal injury regain use of their hands.

This is an option for people with quadriplegia, who have some voluntary use of their arms. The shoulder's position controls the stimulation to the hand's nerves, allowing the individual to pick up objects at will. Tendon transfer is another option which allows some people with quadriplegia more use of the arms and hands. This complicated surgery transfers a nonessential muscle with nerve function to the shoulder or arm to help restore function. FNS may be used in conjunction with tendon transfer.

Other forms of treatments for quadriplegia are still in the experimental stage. Many clinical trials of new treatment options are run every year. If you or a loved one suffers from quadriplegia, you may want to consider one of these trials. Ask your doctor to help you find a suitable trial.