

Spine - Health and Disease

Types of Spinal Injury

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Spinal Cord Injury

The most common cause of spinal cord injury is motor vehicle accidents. The next most prevalent cause of spinal cord injury results from falls, followed by acts of violence. Sports-related spinal cord injuries occur more commonly in children and teenagers, whereas work-related injuries are more common in adults.

Most individuals who acquire a spinal cord injury are in their teens or twenties. Approximately 80% of them are male. The most common cause of traumatic spinal cord injury after 65 years of age are falls. The most common cause of non-traumatic spinal cord compromise in elderly individuals is progressive spinal stenosis, a disorder associated with narrowing of the central spinal canal causing encroachment of the spinal cord. Progressive narrowing of the spinal canal can result in direct spinal cord compression. More than one-half of all spinal cord injuries occur in the neck (cervical) region. Another third of injuries occur in the thoracic area (where the ribs attach to the spine) with the remainder occurring in the upper lumbar region.

A complete spinal cord injury produces total loss of all muscle and sensory function below the level of injury. About one half of all spinal cord injuries are complete.

Even in complete spinal cord injuries, the spinal cord is rarely cut or transected. The loss of function is usually caused by a contusion or bruise in the spinal cord or by compromise of blood flow to the injured part of the spinal cord.

The anterior cord syndrome results from injury to the motor and sensory pathways in the anterior parts of the spinal cord. These patients can feel some types of crude sensation via the intact pathways in the posterior part of the spinal cord, but movement and more detailed sensation are lost.

Bone Injury

Most bony injuries to the spine without fracture displacement are not associated with compromise of the spinal cord. However, some fracture types in the spine have a very high probability of cord contusion or compression. Some spinal fractures may require simple immobilization, such as a rigid collar for cervical spine fractures and a rigid support body jacket for fractures lower in the spine. Even if the bones and ligaments are not damaged, the muscles and other soft tissues of the neck may sustain injury that can be painful.

Ligamentous Injury

Spinal ligaments can be injured with significant trauma. Spinal ligaments are very strong and therefore the kind of force required

to rupture a ligament is likely to be associated with other tissue injuries in the same region. There are three grades of ligament strain; mild, moderate and severe. Post-traumatic disruption of a spinal ligament may result in abnormal or excessive spinal segment movement. Excessive movement is called instability. The most common causes of ligamentous injury are an automobile accident or an athletic injury.

Disc Injury

The intervertebral disc can be injured secondary to excessive rotation, shear or compressive forces. A degenerative disc is more vulnerable to being injured than a normal disc under the same circumstances. The most common disc injury is tearing or disruption of the outer layer of the disc, this ligament structure is called the annulus. The annulus forms the outer ligamentous boundary of the intervertebral disc. The annulus connects the vertebra together and contains the gelatinous central material called the nucleus pulposus. A rupture of the annulus allows the central nuclear material to migrate out of its containment, resulting in herniation. A disc can herniate in any direction including through the adjacent vertebral bone and endplate. Disc injury may accompany vertebral fracture and/or ligamentous injury.

Osteoporosis and Fracture (also under osteoporosis)

Osteoporosis is a disorder caused by a reduced amount of calcium in the bone. This bone thinning can lead to increased risk for fracture. This is not just a "grandmother's disease". It has been predicted that by the year 2020 half of all Americans older than 50 will be at risk for developing fractures from osteoporosis. An estimated 10 million Americans over the age of 50 taking into account over eighty million women and two million men have osteoporosis. Approximately 1.5 million people suffer from osteoporosis-related fractures each year. Over than 700,000 vertebral fractures occur each year in the United States as the result of osteoporosis. Another 34 million individuals have low bone mass or "osteopenia" which places them at risk for osteoporosis and fractures.

For most individuals osteoporosis is a "silent disease" because bone loss is not usually associated with symptoms. Osteoporosis can affect any bone in the body. When it afflicts the spine it can result in vertebral collapse or fracture. This further leads to complications such as severe back pain, spinal stenosis, a loss of vertical height, abnormal posture, and spinal deformity. Most women reach peak bone mass at approximately 20-25 years of age. After that they gradually lose bone density. With 5-10 years after menopause many women will lose an additional 20% of their bone mass.