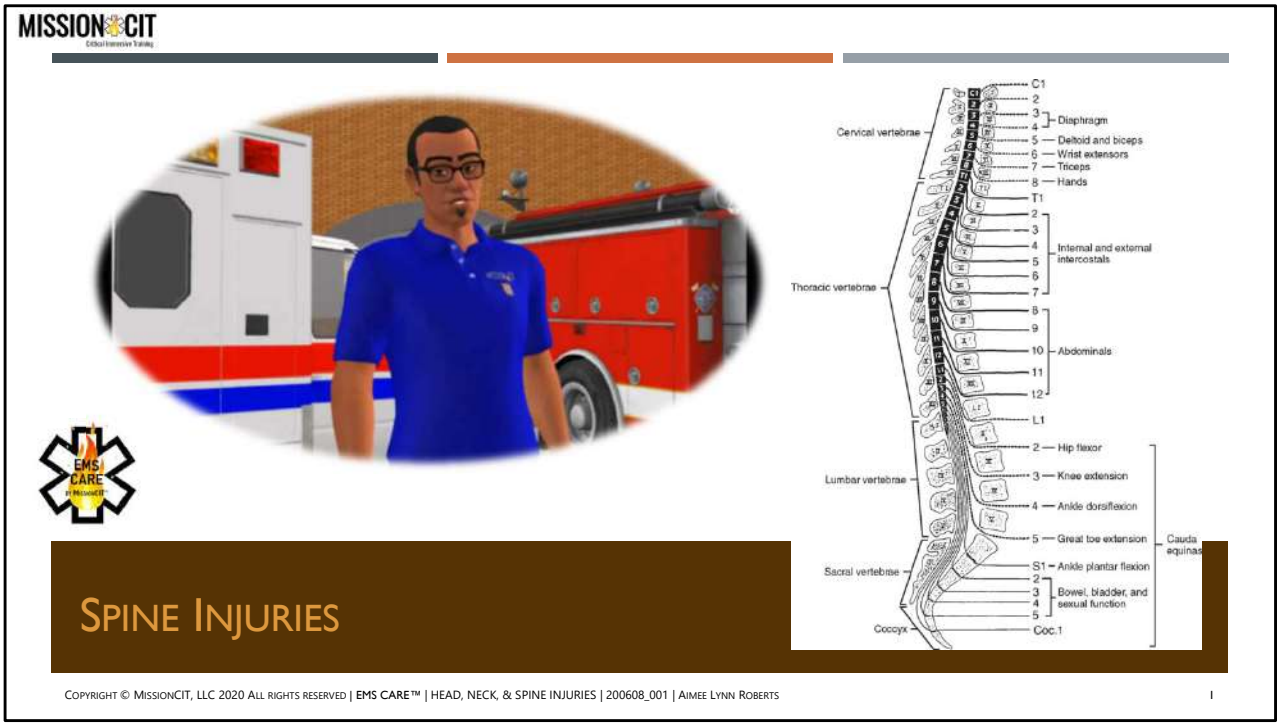


Thank you Missah and welcome back. Our lesson on Spine Injuries will present an overview of the various types, mechanism of injuries, their assessment, and finish up with a note on geriatric patients.

Let's briefly review the spinal cord anatomy to start the lesson. Medical providers divide the spinal cord into four distinct regions. Knowing the area in which the injury is located is often the key to developing an assessment, emergency treatment, and preparation for transport.

The four spinal cord regions are:

- The cervical region: This is the topmost portion, where the brain connects to the spinal cord, and the neck connects to the back. This region consists of eight vertebrae, commonly referred to as C1 to C8.
- The thoracic region: This section forms the middle of the spinal cord.
- The lumbar region: This is a lower region, where your spinal cord begins to bend. And the last region is
- The sacral spine: This is the lower, triangle-shaped region, with five vertebrae. While the lumbar spine's vertebrae bends inward, the vertebrae of the sacral region bend slightly outward. There is no actual spinal cord in this section, it is made up of nerve roots which exit the spine at their respective vertebral levels.

So, before we continue with the rest of the lesson, if you like to read as you listen, you can click on the link below for the text of my narration.

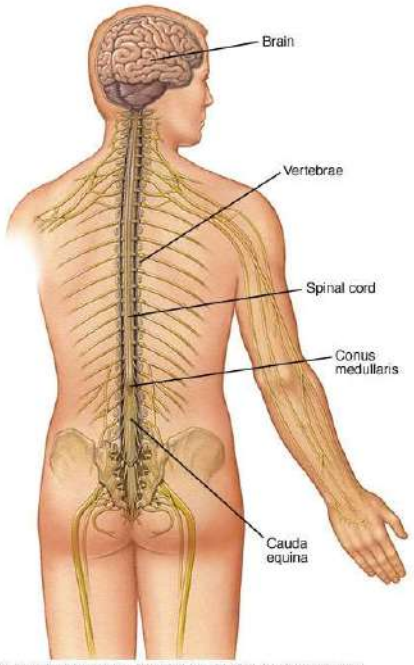
Good Studying.

Good Studying.

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Spinal Cord Injuries (SCI) | Classifications

- Complete
- Incomplete
  - Anterior cord syndrome
  - Central cord syndrome
  - Brown-Sequard syndrome



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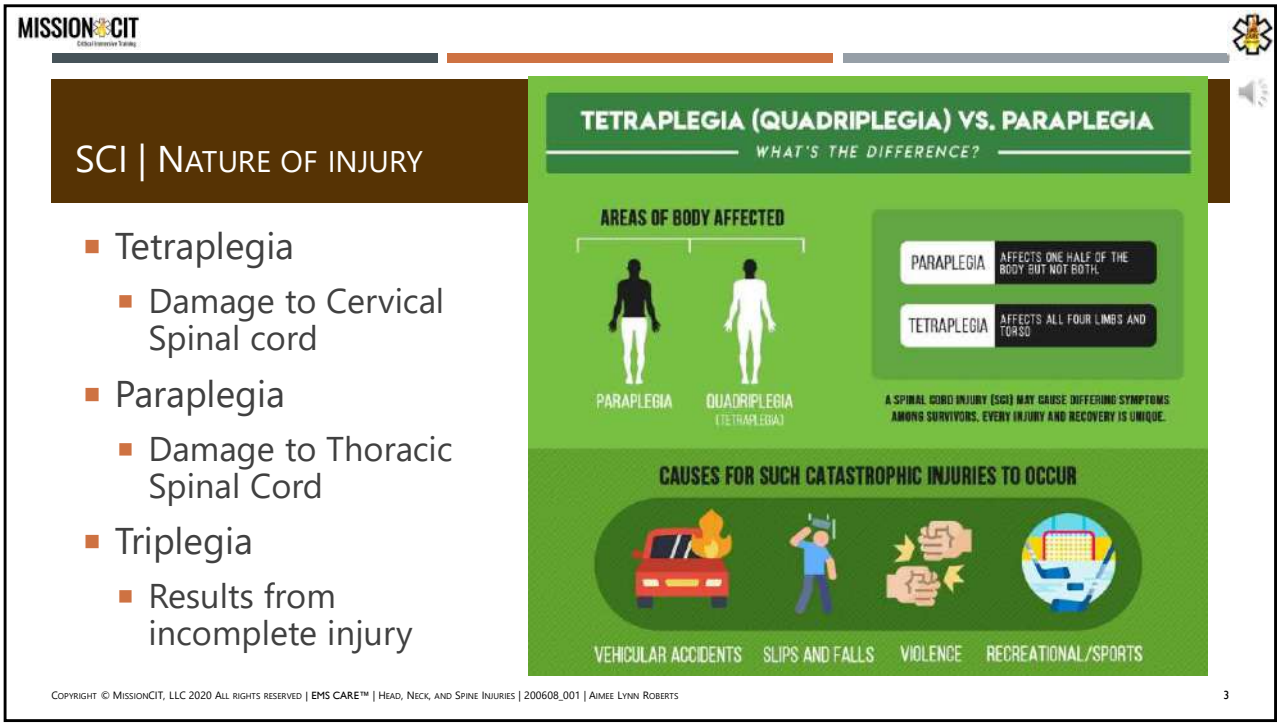
So, there are various types of spinal cord injury (SCI) that vary by degree and location. The two major classifications are:

- Complete SCIs are the most serious and occur when the spinal cord is injured, eliminating the brain's ability to send signals below the injury site.
- Incomplete SCIs commonly result from compression or damage being inflicted that reduces the brain's ability to send signals below the injury site.

Common types of incomplete or partial spinal injury are:

- Anterior cord syndrome: This type of injury, to the front of the spinal cord, damages the motor and sensory pathways. The patient may retain some sensation, but struggle with movement.
- Central cord syndrome: This is an injury to the center of the cord, and damages nerves that carry signals from the brain to the spinal cord. Loss of fine motor skills, paralysis of the arms, and partial impairment—usually less pronounced—in the legs are common.

Brown-Sequard syndrome: This variety of injury is the product of damage to one side of the spinal cord. The injury may be more pronounced on one side of the body; for instance, movement may be impossible on the right side, but may be fully retained on the left.



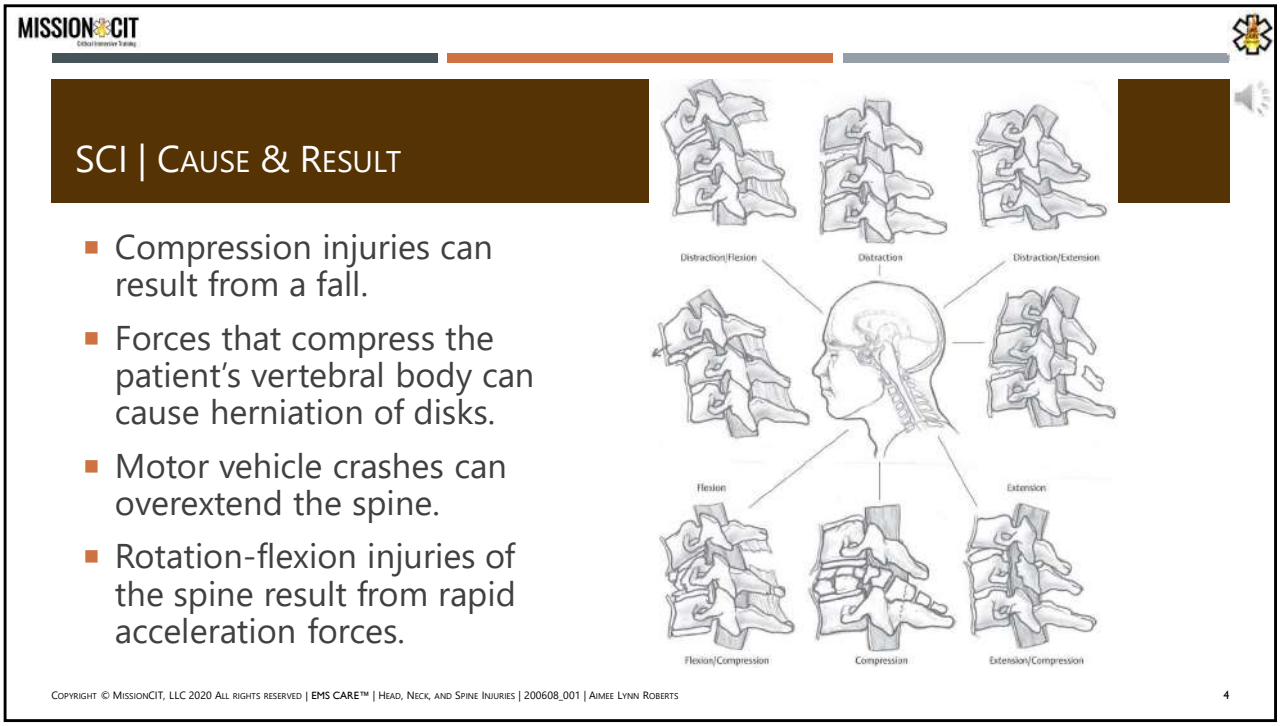
The nature of an SCI may be classified as.

Tetraplegia or Quadriplegia: The result of damage to the cervical spinal cord, and typically the most severe. Hence, producing varying degrees of paralysis of all limbs. And generally eliminating the ability to move below the site of the injury. Tetraplegia may also produce difficulties with bladder and bowel control, respiration, and other routine functions.

Paraplegia occurs when sensation and movement are removed from the lower half of the body, including the legs. These injuries result from damage to the thoracic

spinal cord.

Finally, Triplegia causes a loss of sensation and movement in one arm and both legs, and is typically the product of an incomplete spinal cord injury.



The cervical, thoracic, and lumbar portions of the spine can be injured in a variety of ways.

- Compression injuries can result from a fall or a direct blow to the crown of the skull, coccyx, or on the top of the head.
- Forces that compress the patient's vertebral body can cause herniation of disks, subsequent compression on the spinal cord and nerve roots, and fragmentation into the spinal canal.
- Motor vehicle crashes or other types of trauma can overextend (hyperflex) the cervical spine and

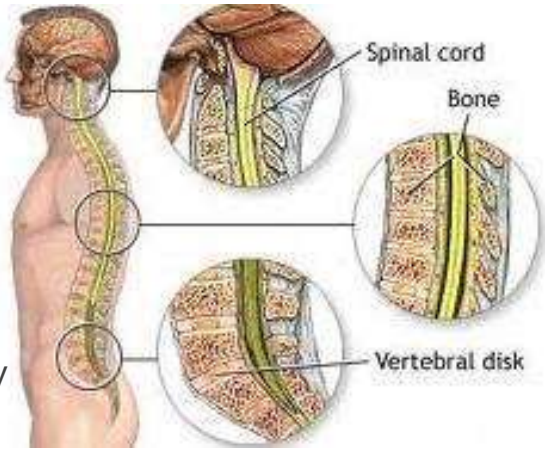
damage the ligaments and joints.

- Rotation-flexion injuries of the spine result from rapid acceleration forces.

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SCI | Cause & Result (cont.)

- When the spine is pulled along its length (hyperextension), it can cause fractures
- Any one of these unnatural motions can result in fractures or neurologic deficit.
- When bones of the spine are altered from traumatic forces, they can fracture or move out of place.



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It's apparent that any unnatural motion can result in fractures or neurologic deficit.

For example, when the spine is pulled along its length (hyperextension), it can cause fractures in the spine as well as ligament and muscle injuries.

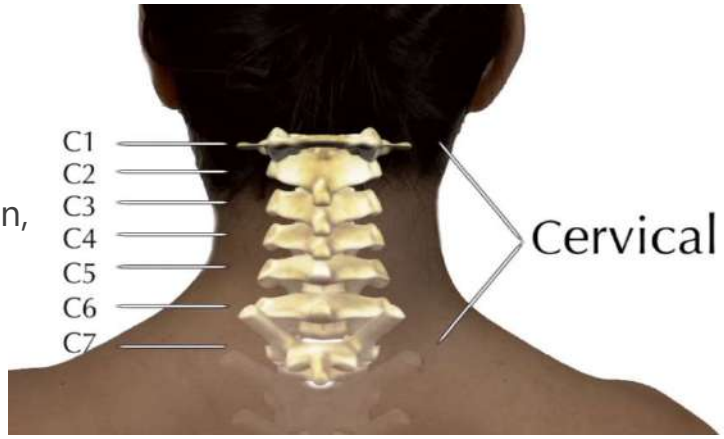
So, when bones of the spine are altered from traumatic forces, they can fracture or move out of place. Examples are:

- When injuries pinch, pull, or penetrate the spinal cord, permanent damage may occur.

- Common findings include pain and tenderness on palpation.
- If you suspect these types of injuries, take extra precautions when stabilizing the spine.

SCI Mechanisms

- Assume possible cervical-spine injury based upon MOI.
- Resulting compression, flexion, rotation
- Traumatic
- Non-traumatic



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Injuries to the spine must be considered whenever there is serious trauma to any part of the body. The spine is injured most often by compression or excessive flexion, by extension, or rotation from falls, by diving injuries, and by motor-vehicle collisions.

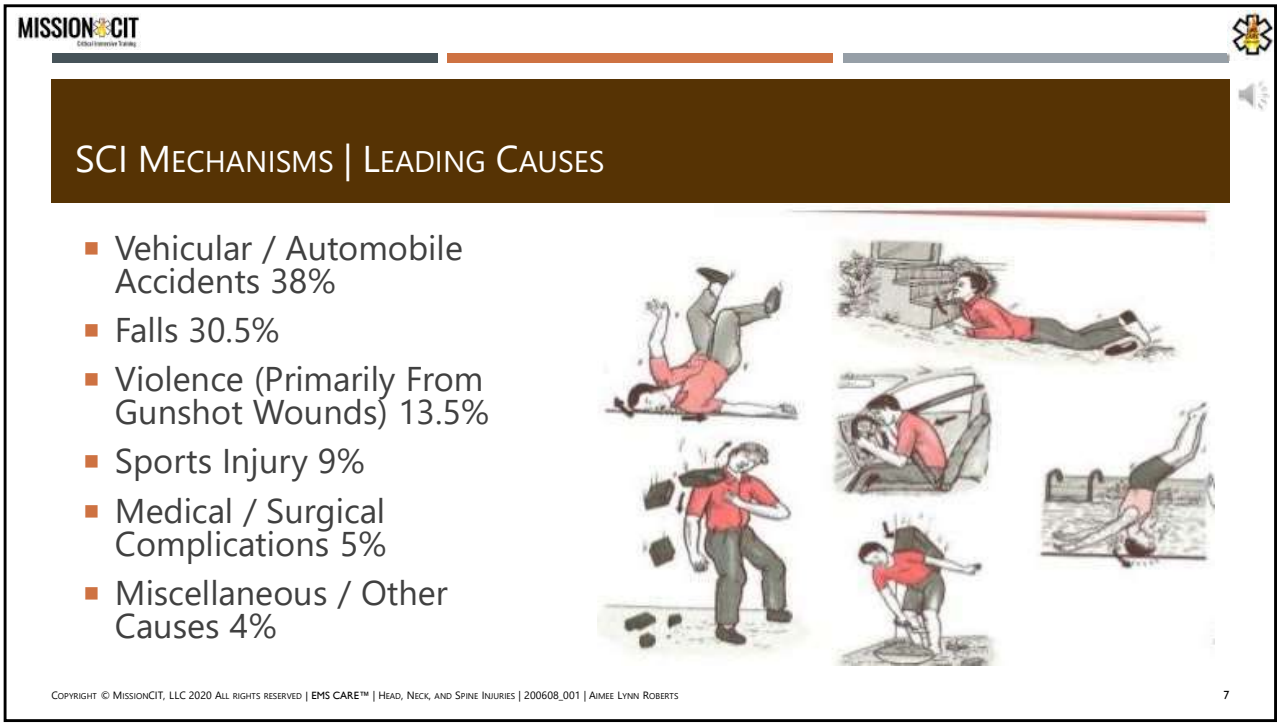
Spinal cord injuries may result from damage to the vertebrae, ligaments or disks of the spinal column or to the spinal cord itself.

A traumatic spinal cord injury may stem from a sudden,

traumatic blow to your spine that fractures, dislocates, crushes or compresses one or more of your vertebrae. It may also result from a gunshot or knife wound that penetrates and cuts your spinal cord.

Additional damage usually occurs over days or weeks because of bleeding, swelling, inflammation and fluid accumulation in and around your spinal cord.

A nontraumatic spinal cord injury may be caused by arthritis, cancer, inflammation, infections or disk degeneration of the spine.



The leading causes of Spinal Cord Injuries according to the National Spinal Cord Statistical Center are:

- Vehicular Accidents 38%
- Falls 30.5%
- Violence, Primarily from Gunshot Wounds 13.5%
- Sports Injury 9%
- Medical or Surgical Complications 5%
- Miscellaneous and Other Causes 4%

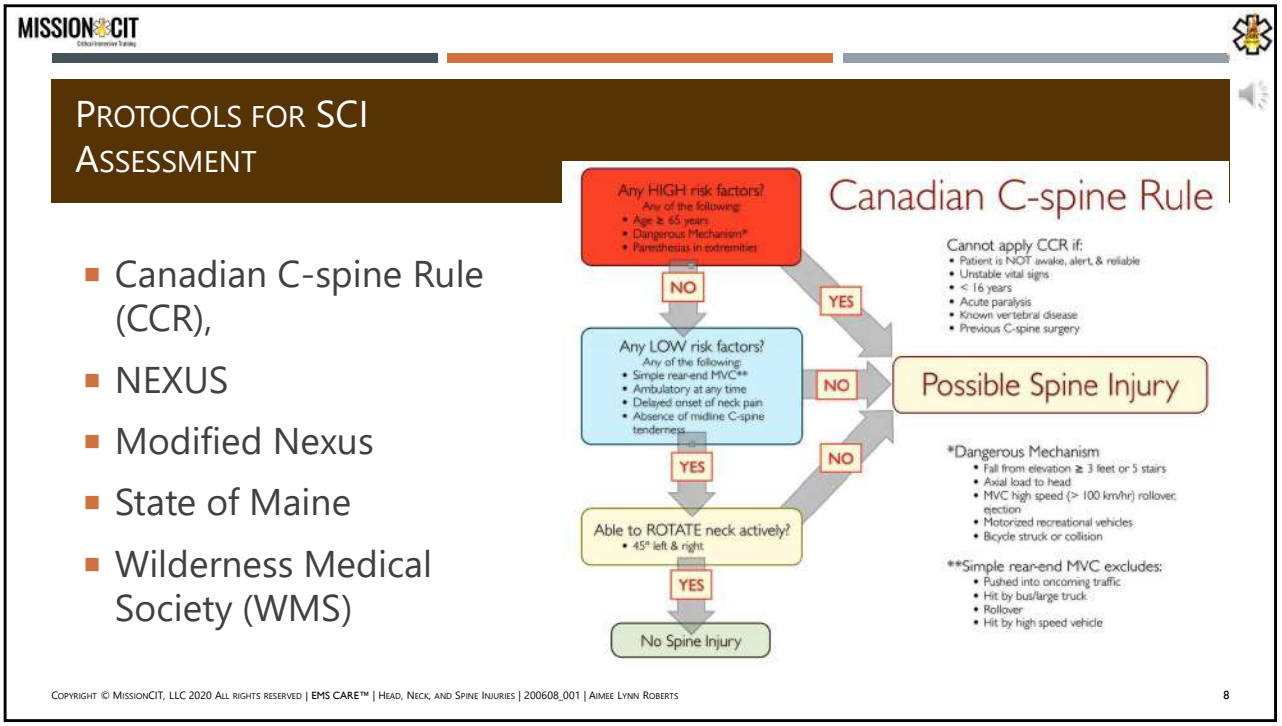
Examples are:

- high risk Falls from greater than 1 meter or down

more than 5 stairs.

- Axial loading or compression injuries such as those that occur in diving injuries,
- High-speed motor-vehicle crashes, especially with rollover or ejection of the patient,
- Energy that forces movement of the spine beyond its normal range of motion,
- Whiplash,
- Motorized Recreational Vehicles, and
- Bicycle collisions.

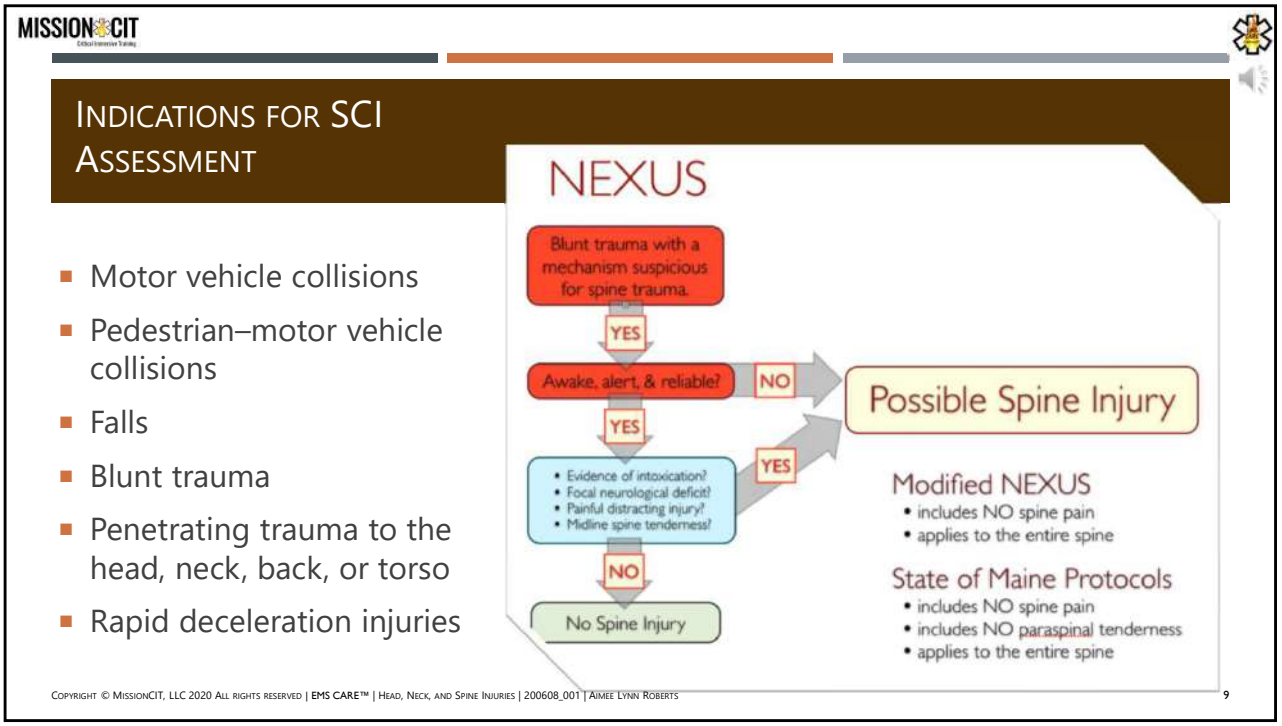
It is important to be vigilant about suspected SCI if a vehicle was involved.



There are five commonly used protocols for ruling out possible spine injuries in the field:

- the Canadian C-spine Rule (CCR),
- the National Emergency X-Radiography Utilization Study (NEXUS) low-risk criteria (NEXUS),
- the modified Nexus criteria,
- the State of Maine criteria (also based on the NEXUS criteria),
- and the Wilderness Medical Society (WMS) algorithm (a combination of the CCR and NEXUS).

There are similarities and all are backed by solid research and in common use. Follow the local protocol for your organization.

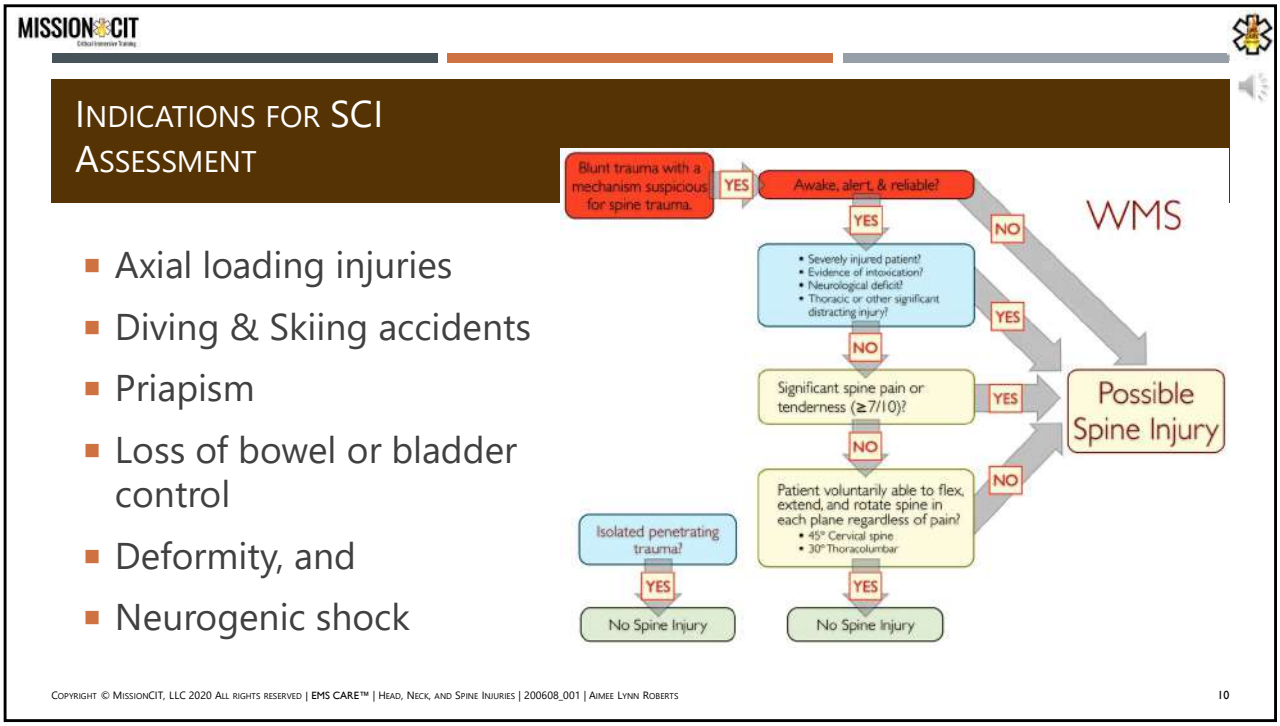


Always suspect a possible head or spinal injury with:

- Motor vehicle collisions
- Pedestrian–motor vehicle collisions
- Falls
- Blunt trauma
- Penetrating trauma to the head, neck, back, or torso
- Rapid deceleration injuries
- Hangings
- Axial loading injuries
- Diving accidents
- Priapism

- Loss of bowel or bladder control
- Deformity, and

Neurogenic shock

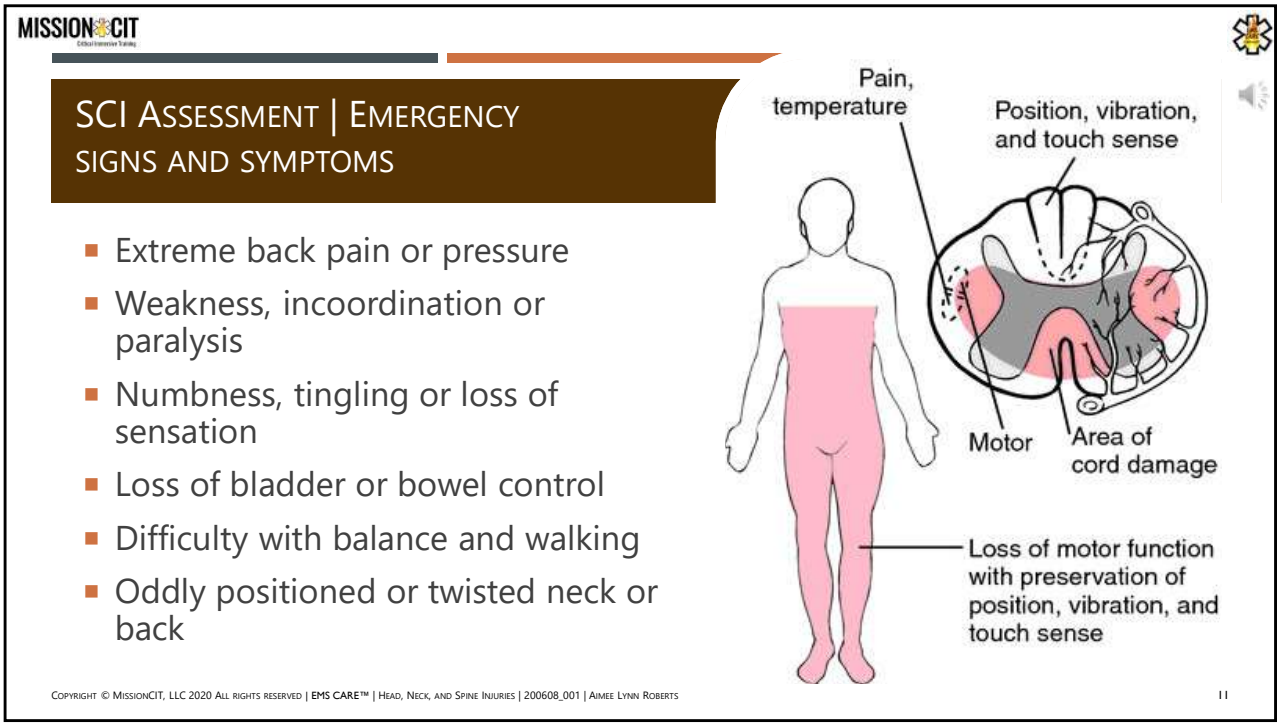


Continuing with indications to suspect a possible head or spinal injury. Take note of these symptoms:

- Axial loading injuries
- Diving accidents
- Skiing accidents
- Priapism
- Loss of bowel or bladder control
- Deformity, and
- Neurogenic shock.

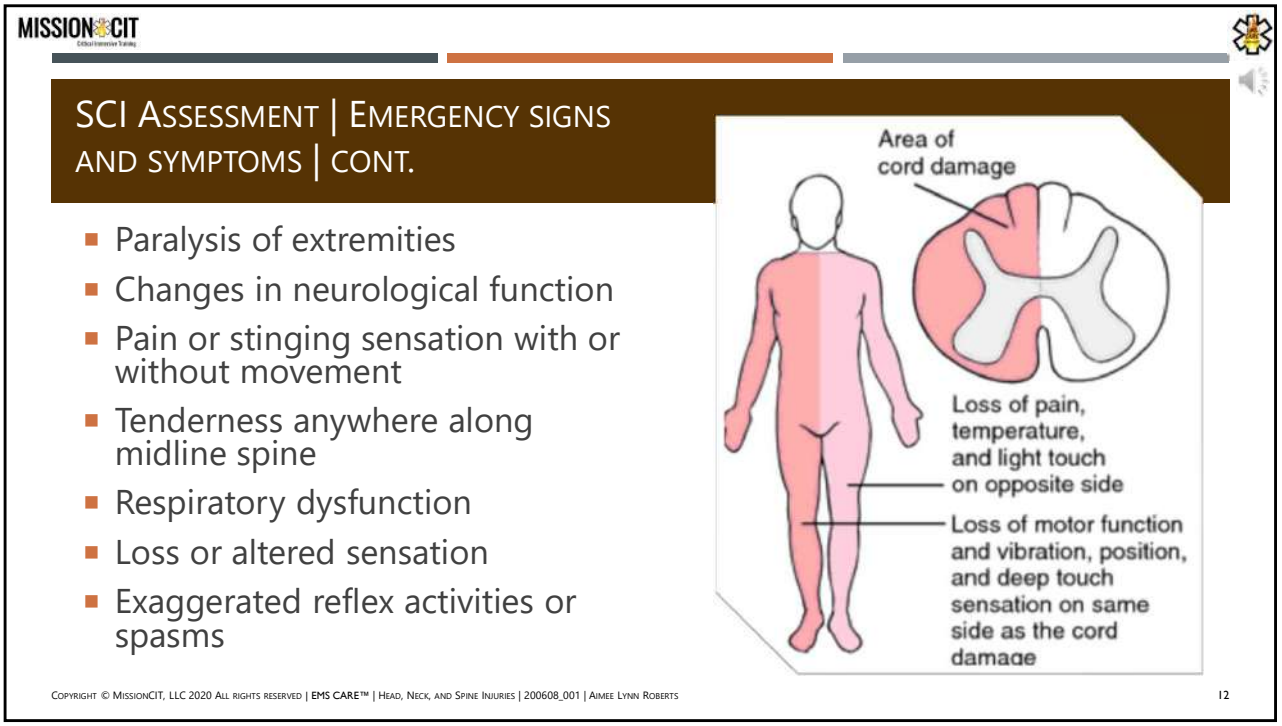
This slide presents the Wilderness Medical Society (WMS) algorithm. No matter where you are, sometimes

we all feel like we are out in the wilderness. So, this is an excellent protocol to consider.



Take note of these emergency signs and symptoms of a spinal cord injury after an accident may include:

- Extreme back pain or pressure in the patient's neck, head, or back.
- Weakness, incoordination, or paralysis in any part of your body.
- Numbness, tingling or loss of sensation in the patient's extremities.
- Loss of bladder or bowel control.
- Difficulty with balance and walking.
- An oddly positioned or twisted neck or back.



Continuing, the emergency signs and symptoms of a spinal cord injury after an accident may also include:

- Paralysis of extremities.
- Changes in neurological function.
- Pain or stinging sensation with or without movement.
- Tenderness anywhere along midline spine.
- Respiratory dysfunction including poor chest wall expansion, decreased air entry, pallor and cyanosis.
- Loss or altered sensation, including the ability to feel heat, cold and touch, and

- Exaggerated reflex activities or spasms.



According to the NIH, SCIs disproportionately affect the elderly, especially men. Approximately 60% of these injuries are sustained traumatically through falls, but nontraumatic causes including infections, tumors, and medication-related epidural bleeding have also been documented.

Keep in mind that fractured spines in older adults are often caused by falls or spontaneous fractures of brittle bones that, in turn, cause falls.

So that's it for this Lesson. Missah will join you for the

next session.

Good studying.