Fractures of the Thoracic and Lumbar Spine

A spinal fracture is a serious injury.

The most common fractures of the spine occur in the thoracic (midback) and lumbar spine (lower back) or at the connection of the two (thoracolumbar junction). These fractures are typically caused by high-velocity accidents, such as a car crash or fall from height.

Men experience fractures of the thoracic or lumbar spine four times more often than women. Seniors are also at risk for these fractures, due to weakened bone from osteoporosis.

Because of the energy required to cause these spinal fractures, patients often have additional injuries that require treatment. The spinal cord may be injured, depending on the severity of the spinal fracture.

Understanding how your spine works will help you to understand spinal fractures. Learn more about your spine: Spine Basics (topic.cfm?topic=A00575)

Cause

Fractures of the thoracic and lumbar spine are usually caused by high-energy trauma, such as:

- Car crash
- Fall from height
- Sports accident
- Violent act, such as a gunshot wound

Spinal fractures are not always caused by trauma. For example, people with osteoporosis, tumors, or other underlying conditions that weaken bone can fracture a vertebra during normal, daily activities.

Types of Spinal Fractures

There are different types of spinal fractures. Doctors classify fractures of the thoracic and lumbar spine based upon pattern of injury and whether there is a spinal cord injury. Classifying the fracture patterns can help to determine the proper treatment. The three major types of spine fracture patterns are flexion, extension, and rotation.

Flexion Fracture Pattern

Compression fracture. While the front (anterior) of the vertebra breaks and loses height, the back (posterior) part of it does not. This type of fracture is usually stable and rarely associated with neurologic problems.

Axial burst fracture. The vertebra loses height on both the front and back sides. It is often caused by a fall from a height and landing on the feet.

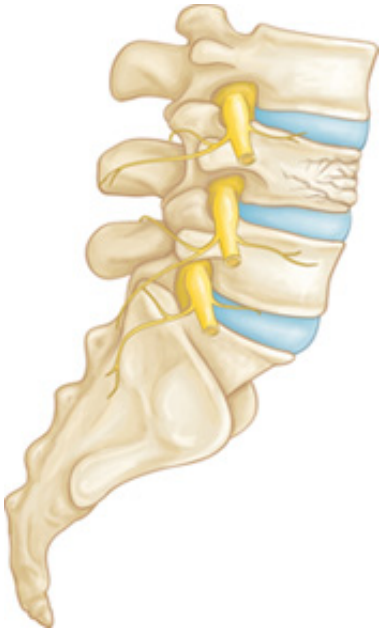
Extension Fracture Pattern

Flexion/distraction (Chance) fracture. The vertebra is literally pulled apart (distraction). This can happen in accidents such as a head-on car crash, in which the upper body is thrown forward while the pelvis is stabilized by a lap seat belt.

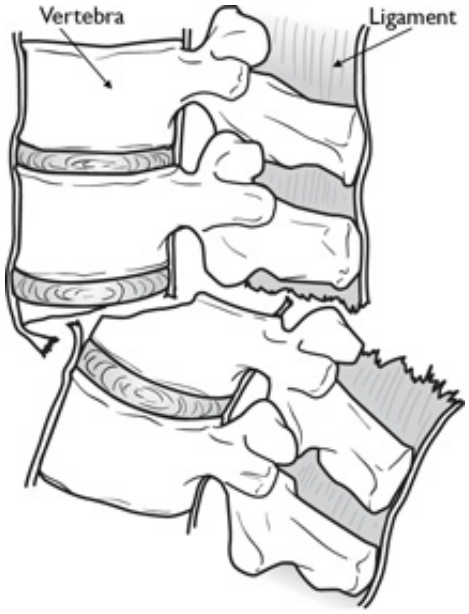
Rotation Fracture Pattern

Transverse process fracture. This fracture is uncommon and results from rotation or extreme sideways (lateral) bending, and usually does not affect stability.

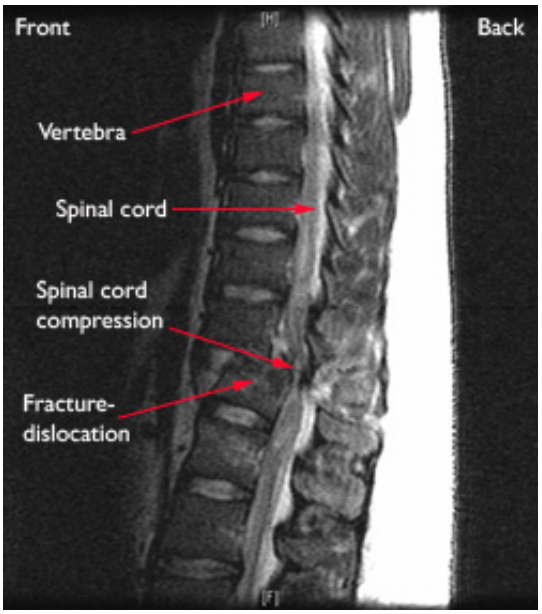
Fracture-dislocation. This is an unstable injury involving bone and/or soft tissue in which a vertebra may move off an adjacent vertebra (displaced). These injuries frequently cause serious spinal cord compression.



A compression fracture of the lumbar (lower) spine.



A side-view of a fracture-dislocation of a thoracic vertebra.



A magnetic resonance imaging (MRI) scan of a fracture-dislocation in the thoracic spine. Note the disruption of the spinal cord.

Symptoms

The primary symptom is moderate to severe back pain that is made worse by movement.

When the spinal cord is also involved, numbness, tingling, weakness, or bowel/bladder dysfunction may occur.

In the case of a high-energy trauma, the patient may have a brain injury and may have lost consciousness, or "blacked-out." There may also be other injuries — called distracting injuries — which cause pain that overwhelms the back pain. In these cases, it has to be assumed that the patient has a fracture of the spine, especially after a high-energy injury (motor vehicle crash).

Examination

Emergency Stabilization

At first evaluation, it may be difficult to assess the extent of injuries to patients with fractures of the thoracic and lumbar spine.

At the accident scene, EMS rescue workers will first check vital signs, including the patient's consciousness, ability to breathe, and heart rate. After these are stabilized, workers will assess obvious bleeding and limb-deforming injuries.

Before moving the patient, the EMS team must immobilize the patient in a cervical (neck) collar and backboard. The trauma team will perform a complete and thorough evaluation in the hospital emergency room.

Physical Examination

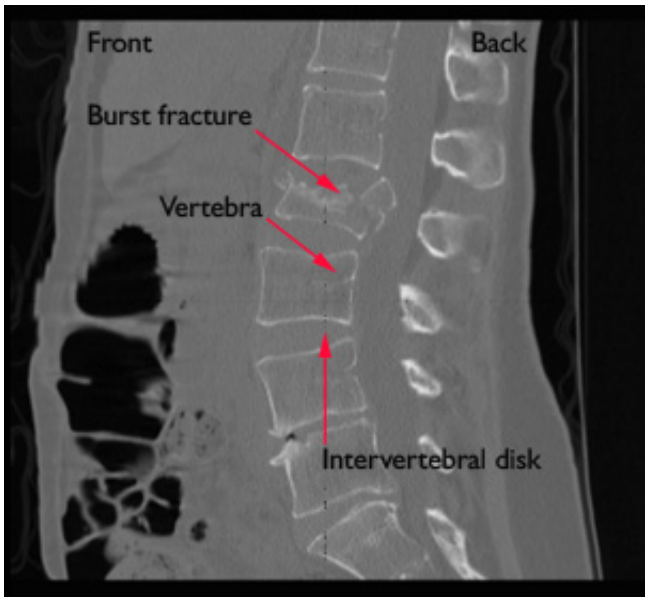
An emergency room physician will conduct a thorough evaluation, beginning with a head-to-toe examination of the patient. He or she will inspect the head, chest, abdomen, pelvis, limbs, and spine.

A CT scan taken from the side of a fracture-dislocation in the thoracic spine.

Investigation, Tests

Neurological tests. The doctor will also evaluate the patient's neurological status. This includes testing the ability to move, feel, and sense the position of all limbs. In addition, the doctor will test the patient's reflexes to help determine injury to the spinal cord or individual nerves.

Imaging tests. After the physical examination, a radiologic evaluation is required. Depending on the extent of injuries, this may include x-rays, computed tomography (CT) scans, and magnetic resonance imaging (MRI) scans of multiple areas, including the thoracic and lumbar spine.



A CT scan taken from the side of a burst fracture in the lumbar spine.

Treatment

The treatment plan for a fracture of the thoracic or lumbar spine will depend on:

- Other injuries and their treatment
- The particular fracture pattern

Once the trauma team has stabilized all other life-threatening injuries, the doctor will evaluate the spinal fracture pattern and decide whether spine surgery is needed.

Flexion Fracture Pattern

Nonsurgical treatment. Most flexion injuries (compression fractures, burst fractures) can be treated in a brace for 6 to 12 weeks. By gradually increasing physical activity and doing rehabilitation exercises, most patients avoid post injury problems.

Surgical treatment. Surgery is typically required for unstable burst fractures that have:

- Significant comminution (fracture fragments)
- Severe loss of vertebral body height
- Excessive forward bending or angulation at the injury site
- Significant nerve injury due to parts of the vertebral body or disk pinching the spinal cord

These fractures should be treated surgically with decompression of the spinal canal and stabilization of the fracture. Decompression involves removing the bone or other structures that are pressing on the spinal cord. This procedure is also called a laminectomy.

To perform the decompression, your surgeon may decide to access your spine with an incision either on your side or on your back. Each approach allows for safe removal of the structures compressing the spinal cord, while preventing further injury.

Extension Fracture Pattern

The treatment plan for extension injuries will depend on:

- Where the spine fails
- Whether the bones can be fit together again (reduction) using a brace or cast

Nonsurgical treatment. Extension fractures that occur only through the vertebral body can typically be treated nonsurgically. These should be observed closely in a brace or cast for 12 weeks.

Surgical treatment. Surgery is usually necessary if there is an injury to the posterior (back) ligaments of the spine. In addition, if the fracture falls through the disks of the spine, surgery should be performed to stabilize the fracture.

Rotation Fracture Pattern

Nonsurgical treatment. Transverse process fractures are predominantly treated with gradual increase in motion, with or without bracing, based on comfort level.

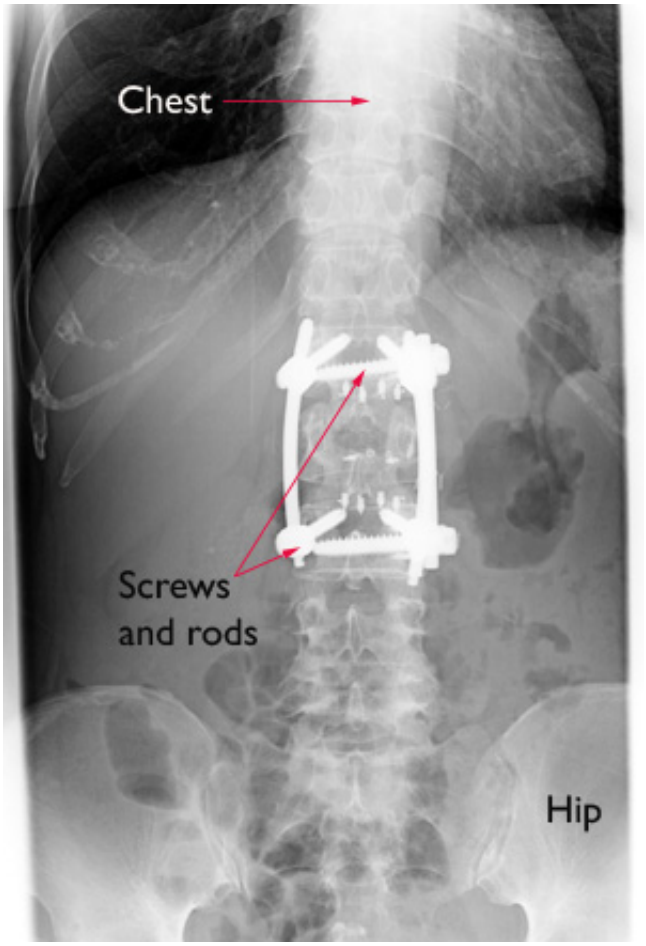
Surgical treatment. Fracture-dislocations of the thoracic and lumbar spine are caused by very high-energy trauma. They can be extremely unstable injuries that often result in serious spinal cord or nerve damage. These injuries require stabilization through surgery. The ideal timing of these surgeries can often be complicated. Surgery is sometimes delayed because of other serious, life-threatening injuries.

Surgical Procedure

The ultimate goal for surgery is to achieve adequate reduction (fitting the bones together), relieve pressure on the spinal cord and nerves, and allow for early movement.

Depending on the fracture pattern, your surgeon may decide to do the procedure through an anterior (front), lateral (side), or posterior (back) approach, or a combination of all three.

Many types of instruments are used in surgery, including metal screws, rods, and cages to stabilize the spine.



An x-ray taken from the front shows metal screws and rods used to stabilize the spine after a burst fracture.

Complications

There are several complications associated with fractures of the thoracic and lumbar spine. One potentially fatal complication is blood clots in the legs, which may develop from immobility. These clots can travel to the lungs and cause death (pulmonary embolism). Pneumonia and pressure sores are also common complications of spinal fractures.

There are also specific surgical complications, including:

- Bleeding
- Infection
- Spinal fluid leaks
- Instrument failure
- Nonunion

Complications can be reduced by early treatment, mechanical methods (lower leg compression stockings), and medication to protect against clots, as well as proper surgical technique and postoperative programs.

Long-Term Outcomes

Regardless of whether the patient is treated with surgery, rehabilitation will be necessary after the injury has healed.

The goals of rehabilitation are to reduce pain, regain mobility, and return the patient to as close to preinjury state as possible. Both inpatient and outpatient physical therapy may be recommended to meet these goals.

Issues that may complicate these goals include inadequate reduction of the fracture, neurologic injury (paralysis), and progressive deformity.

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Related Links

Spine Basics (http://orthoinfo.aaos.org/topic.cfm?topic=A00575)

OrthoInfo
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