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Spondylolisthesis

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- [What is spondylolisthesis?](#)
- [What causes spondylolisthesis?](#)
- [What are the risk factors for spondylolisthesis?](#)
- [What are the symptoms of spondylolisthesis?](#)
- [How is spondylolisthesis diagnosed?](#)
- [What is the treatment for spondylolisthesis?](#)
- [Can spondylolisthesis be prevented?](#)
- [What are the complications of spondylolisthesis?](#)
- [What is the outlook for spondylolisthesis?](#)
- [Spondylolisthesis At A Glance](#)
- [Patient Comments: Spondylolisthesis - Symptoms](#)
- [Patient Comments: Spondylolisthesis - Causes](#)
- [Patient Comments: Spondylolisthesis - Effective Treatments](#)

What is spondylolisthesis?

Spondylolisthesis (spon + dee + lo + lis + thee + sis) is a condition of the [spine](#) whereby one of the

vertebra slips forward or backward compared to the next vertebra. Forward slippage of one vertebra on another is referred to as anterolisthesis, while backward slippage is referred to as retrolisthesis. Spondylolisthesis can lead to a deformity of the spine as well as a narrowing of the spinal canal (central **spinal stenosis**) or **compression** of the exiting nerve roots (foraminal stenosis).

What causes spondylolisthesis?

There are five major types of lumbar spondylolisthesis.

1. **Dysplastic spondylolisthesis:** Dysplastic spondylolisthesis is caused by a defect in the formation of part of the vertebra called the facet that allows it to slip forward. This is a condition that a patient is born with (**congenital**).
2. **Isthmic spondylolisthesis:** In Isthmic spondylolisthesis, there is a defect in a portion of the vertebra called the pars interarticularis. If there is a defect without a slip, the patient has spondylolysis. Isthmic spondylolisthesis can be caused by repetitive **trauma** and is more common in athletes exposed to hyperextension motions including gymnasts, and football linemen.
3. **Degenerative spondylolisthesis:** Degenerative spondylolisthesis occurs due to arthritic changes in the joints of the **vertebrae** due to **cartilage** degeneration. Degenerative spondylolisthesis is more common in older patients.
4. **Traumatic spondylolisthesis:** Traumatic spondylolisthesis is due to direct trauma or **injury** to the vertebrae. This can be caused by a **fracture** of the pedicle, **lamina** or facet joints that allows the front portion of the vertebra to slip forward with respect to the back portion of the vertebra.
5. **Pathologic spondylolisthesis:** Pathologic spondylolisthesis is caused by a defect in the bone caused by abnormal bone, such as from a **tumor**.

What are the risk factors for spondylolisthesis?

Risk factors for spondylolisthesis include a **family history** of back problems. Other risk factors include a history of repetitive trauma or hyperextension of the lower back or lumbar spine. Athletes such as gymnasts, weight lifters, and football linemen who have large forces applied to the spine during extension are at greater risk for developing isthmic spondylolisthesis.

What are the symptoms of spondylolisthesis?

The most common symptom of spondylolisthesis is **lower back pain**. This is often worse after **exercise** especially with extension of the lumbar spine. Other symptoms include tightness of the hamstrings and decreased **range of motion** of the lower back. Some patients can develop pain, numbness, tingling or **weakness** in the legs due to **nerve compression**. Severe compression of the nerves can cause loss of control of bowel or bladder function, or **cauda equina syndrome**.

How is spondylolisthesis diagnosed?

In most cases it is not possible to see visible signs of spondylolisthesis by examining a patient. Patients typically have complaints of pain in the back with intermittent pain to the legs. Spondylolisthesis can often cause muscle spasms, or tightness in the hamstrings.

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Spondylolisthesis is easily identified using plain radiographs. A lateral X-ray (from the side) will show if one of the vertebra has slipped forward compared to the adjacent vertebrae.

Spondylolisthesis is graded according to the percentage of slip of the vertebra compared to the neighboring vertebra.

1. Grade I is a slip of up to 25%,
2. grade II is between 26%-50%,
3. grade III is between 51%-75%,
4. grade IV is between 76% and 100%, and
5. Grade V, or spondyloptosis occurs when the vertebra has completely fallen off the next vertebra.

If the patient has complaints of pain, numbness, tingling or weakness in the legs, additional studies may be ordered. These symptoms could be caused by stenosis or narrowing of the space for the nerve roots to the legs. A [CT scan](#) or [MRI scan](#) can help identify compression of the nerves associated with spondylolisthesis. Occasionally, a [PET scan](#) can help determine if the bone at the site of the defect is active. This can play a role in treatment options for spondylolisthesis as described below.

What is the treatment for spondylolisthesis?

The initial treatment for spondylolisthesis is conservative and based on the symptoms.

- A short period of rest or avoiding activities such as lifting and bending and athletics may help reduce symptoms.
- [Physical therapy](#) can help to increase range of motion of the lumbar spine and hamstrings as well as strengthen the core [abdominal muscles](#).
- Anti-inflammatory medications can help reduce pain by decreasing the [inflammation](#) of the muscles and nerves.
- Patients with pain, numbness and tingling in the legs may benefit from an [epidural steroid \(cortisone\) injection](#).
- Patients with isthmic spondylolisthesis may benefit from a hyperextension brace. This extends the lumbar spine bringing the two portions of the bone at the defect closer together and may allow for healing to occur.

For patients whose symptoms fail to improve with conservative treatment surgery may be an option. The type of surgery is based on the type of spondylolisthesis. Patients with isthmic spondylolisthesis may benefit from a repair of the defective portion of the vertebra, or a pars repair. If an MRI scan or PET scan shows that the bone is active at the site of the defect it is more likely to heal with a pars repair. This involves removing any scar tissue from the defect and placing some bone graft in the area followed by placement of screws across the defect.

If there are symptoms in the legs the surgery may include a decompression to create more room for the exiting nerve roots. This is often combined with a fusion that may be performed either with or without screws to hold the bone together. In some cases the vertebrae are moved back to the normal position prior to performing the fusion, and in others the vertebrae are fused where they are after the slip. There is some increased risk of injury to the nerve with moving the vertebra back to

the normal position.

Can spondylolisthesis be prevented?

Spondylolisthesis cannot be completely prevented. Certain activities such as gymnastics, weightlifting and football are known to increase the stress on the vertebrae and increase the risk of developing spondylolisthesis.

What are the complications of spondylolisthesis?

Complications of spondylolisthesis include [chronic pain](#) in the lower back or legs, as well as numbness, tingling or weakness in the legs. Severe compression of the nerve can cause problems with bowel or bladder control, but this is very uncommon.

What is the outlook for spondylolisthesis?

The outlook for patients with spondylolisthesis is good. In most cases patients respond well to a conservative treatment plan. For those with continued severe symptoms, surgery can help alleviate the leg symptoms by creating more space for the nerve roots. The back pain can be helped through a [lumbar fusion](#).

Spondylolisthesis At A Glance

- Spondylolisthesis is a forward or backward slippage of one vertebra on an adjacent vertebra.
- Causes of spondylolisthesis include trauma, degenerative, tumor, and birth defects.
- Symptoms of spondylolisthesis include lower back or leg pain, hamstring tightness, and numbness and tingling in the legs.
- Most people with spondylolisthesis can be treated conservatively, without the need for surgery.
- Patients who fail to improve with conservative treatment may be a candidate for surgery.

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