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Spondylolysis and Spondylolisthesis

The most common cause of low back pain in adolescent athletes that can be seen on X-ray is a stress fracture in one of the bones (vertebrae) that make up the spinal column. Technically, this condition is called spondylolysis (spon-dee-low-lye-sis). It usually affects the fifth lumbar vertebra in the lower back and, much less commonly, the fourth lumbar vertebra.

If the stress fracture weakens the bone so much that it is unable to maintain its proper position, the vertebra can start to shift out of place. This condition is called spondylolisthesis (spon-dee-low-lis-thee-sis). If too much slippage occurs, the bones may begin to press on nerves and surgery may be necessary to correct the condition.

Cause

Genetics

There may be a hereditary aspect to spondylolysis. An individual may be born with thin vertebral bone and therefore may be vulnerable to this condition. Significant periods of rapid growth may encourage slippage.

Overuse

Some sports, such as gymnastics, weight lifting, and football, put a great deal of stress on the bones in the lower back. They also require that the athlete constantly overstretch (hyperextend) the spine. In either case, the result is a stress fracture on one or both sides of the vertebra.

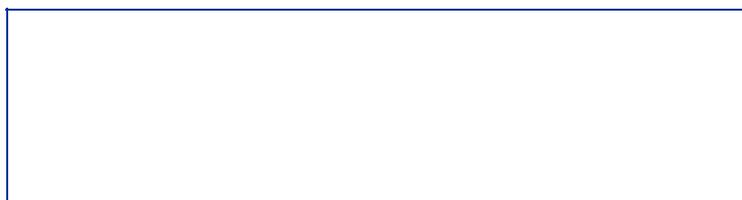
- In many people, spondylolysis and spondylolisthesis are present, but without any obvious symptoms.
- Pain usually spreads across the lower back and may feel like a muscle strain.
- Spondylolisthesis can cause spasms that stiffen the back and tighten the hamstring muscles, resulting in changes to posture and gait. If the slippage is significant, it may begin to compress the nerves and narrow the spinal canal.

[Top of page](#)

Diagnosis

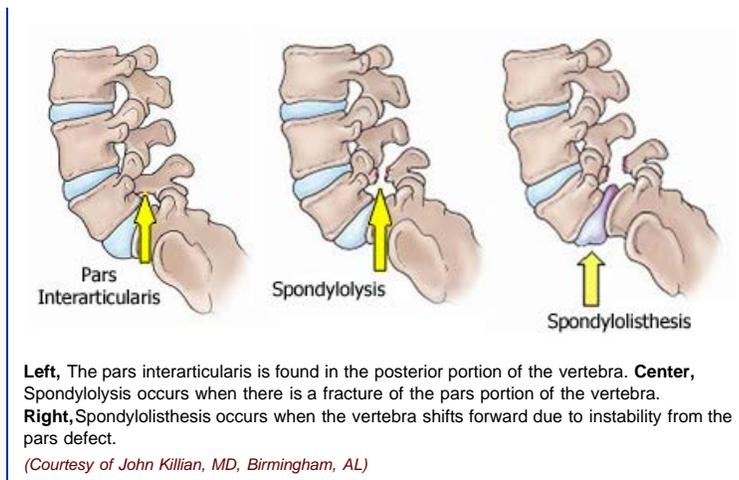
X-rays of the lower back (lumbar) spine will show the position of the vertebra.

The pars interarticularis is a portion of the lumbar spine. It joins together the upper and lower joints. The pars is normal in the vast majority of children.

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If the pars "cracks" or fractures, the condition is called spondylolysis. The X-ray confirms the bony abnormality.

If the fracture gap at the pars widens and the vertebra shifts forward, then the condition is called spondylolisthesis. Usually, the fifth lumbar vertebra shifts forward on the part of the pelvic bone called the sacrum. The doctor measures standing lateral spine X-rays. This determines the amount of forward slippage.

If the vertebra is pressing on nerves, a CT scan or MRI may be needed before treatment begins to further assess the abnormality.

[Top of page](#)



This lateral X-ray of the lumbosacral spine demonstrates the forward shift in the fifth lumbar vertebra on the sacrum (L5-S1 spondylolisthesis).

(Courtesy of Texas Scottish Rite Hospital for Children)

Treatment

Nonsurgical Treatment

Initial treatment for spondylolysis is always nonsurgical. The individual should take a break from the activities until symptoms go away, as they often do. Anti-inflammatory medications, such as ibuprofen, may help reduce back pain.

Occasionally, a back brace and physical therapy may be recommended. In most cases, activities can be resumed gradually and there will be few complications or recurrences. Stretching and strengthening exercises for the back and abdominal muscles can help prevent future recurrences of pain.

Periodic X-rays will show whether the vertebra is changing position.

Surgical Treatment

Surgery may be needed if slippage progressively worsens or if back pain does not respond to nonsurgical treatment and begins to interfere with activities of daily living. A spinal fusion is performed between the lumbar vertebra and the sacrum. Sometimes, an internal brace of screws and rods is used to hold together the vertebra as the fusion heals.

[Top of page](#)

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Reviewed by members of POSNA (Pediatric Orthopaedic Society of North America)

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