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.

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.

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.

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.

Last reviewed: October 2007

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

The Pediatric Orthopaedic Society of North America (POSNA) is a group of board eligible/board certified orthopaedic surgeons who have specialized training in the care of children's musculoskeletal health. One of our goals is to continue to be the authoritative source for patients and families on children's orthopaedic conditions. Our Public Education and Media Relations Committee works with the AAOS to develop, review, and update the pediatric topics within OrthoInfo, so we ensure that patients, families and other healthcare professionals have the latest information and practice guidelines at the click of a link.

AAOS does not endorse any treatments, procedures, products, or physicians referenced herein. This information is provided as an educational service and is not intended to serve as medical advice. Anyone seeking specific orthopaedic advice or assistance should consult his or her orthopaedic surgeon, or locate one in your area through the AAOS "Find an Orthopaedist" program on this website.

Related Topics
- Spinal Fusion (http://orthoinfo.aaos.org/topic.cfm?topic=A00348)
- Stress Fractures (http://orthoinfo.aaos.org/topic.cfm?topic=A00112)