Spondylolysis and Spondylolisthesis

A common cause of low back pain in adolescent athletes that can be seen on X-ray is a congenital condition 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. This occurs in 6% of the population overall, and can frequently be confused with a stress fracture. Fractures are much less common, and usually occur in gymnasts or other young athletes that specifically do repetitive hyperextension (backbends). Occasionally this can be an acute fracture, but only in the setting of significant trauma. The vast majority of these conditions are picked up on X-Ray after a sprain. During growth, if the congenital defect 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 is a hereditary aspect to spondylolysis. An individual is born with a weakness in the bone at L5 and therefore may be vulnerable to this condition. Significant periods of rapid growth may encourage slippage.

Overuse | Some sports, such as gymnastics, diving, and occasionally weight lifting and football (particularly offensive line), 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 can be a stress fracture on one or both sides of the vertebra. In many people, spondylolysis and spondylolisthesis are present, but without any obvious symptoms, until the athlete injures the back. 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 has a congenital defect, or “cracks” or fractures, the condition is called spondylolysis. The X-ray confirms the bony abnormality. Sometimes this requires a CT scan.

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.
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### TREATMENT

**Nonsurgical Treatment** | Initial treatment for spondylolysis, whether congenital or stress fracture, 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. Physiotherapy and core strengthening exercises usually resolve symptoms. 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.

Occasionally, and only in the case of an acute fracture, a back brace may be recommended. This can require bracing for three months.

**Surgical Treatment** | Surgery may be needed if slippage progressively worsens or if back pain or leg 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, using bone graft, and an internal brace of screws and rods to hold together the vertebra as the fusion heals.