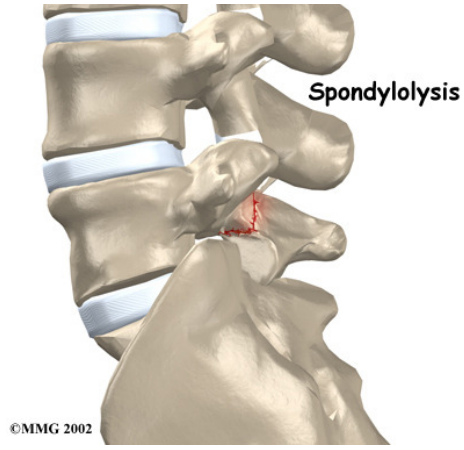
SpineFAQs Spondylolysis

What is Spondylolysis (Pars Fracture)?

Spondylolysis happens when a crack forms in the bony ring on the back of the spinal column. Most commonly, this occurs in the low back. In this condition, the bone that protects the spinal cord fractures as a result of excessive or repeated strain. The area affected is called the *pars interarticularis,* so doctors sometimes refer to this condition as a *pars defect*. This condition appears in six percent of children. It mainly affects young athletes who participate in sports in which the spine is repeatedly bent backwards, such as gymnastics, football, and karate. Although spondylolysis can affect people of any age, children and adolescents are most susceptible. This is because their spines are still developing, and the pars is the weakest part of the vertebra. Placing extra strain on this area of the spine during childhood increases the chance that a pars defect will occur.

What causes this problem?

Spondylolysis is thought to be caused by repeated strains that damage the lower spine over time. The repeated strains can eventually lead to an overuse injury in the pars interarticularis. The most common location for this to occur is in the lowest vertebra of the spine, which doctors call L5. This vertebra connects the spine to the pelvis. However, a problem with the pars can occur in any lumbar vertebra. It rarely happens in more than one vertebra at a time.



The vertebra initially responds to the abnormal strain by adding new bone cells around the injured area. But if the injuries happen faster than the body can keep up with needed repairs, a crack may form in the weakened bone. This is called a *stress fracture*. This type of fracture occurs in the pars, the area of bony ring between the pedicle and lamina. The crack may affect only one side of the bony ring. However, it is equally common for the defect to

occur on both sides. When this happens, the vertebra is no longer held firmly in place by the facet joints on the back of the ring. As a result, the vertebra is free to slip forward over the one below. This slippage, which is closely related to spondylolysis, is called spondylolisthesis

Spondylolysis commonly occurs in young gymnasts who regularly practice backbends as part of their routines. Football linemen and dancers are also prone to spondylolysis. Symptoms sometimes appear when an athlete quickly ramps up his or her training intensity, applies incorrect technique, or uses poor equipment.

What are the symptoms?

People with spondylolysis may feel pain and stiffness in the center of the low back. Bending fully backward increases pain. Symptoms typically get worse with activity and go away with rest. Doctors refer to this type of back pain as *mechanical pain* because it most likely comes from excess movement between the vertebrae. Individuals may eventually experience pain that radiates down one or both legs. This pain may come from pressure and irritation on the nerves that exit the spinal canal near the fracture. When nerve pressure in the low back causes leg pain, doctors refer it as *neurogenic pain*.

The cause of this nerve pressure is a result of the body's attempt to heal the stress fracture. Over time, the healing process may cause a bump of extra cartilage to grow at the site where the bones are trying to heal the overuse injury. If too much cartilage builds up, this bump may intrude into the opening where the nerves exit the spine. The bump may squeeze the nerve. This can produce pain and weakness in the leg. Reflexes become slowed. The person may also notice a pins and needles sensation in the skin where the spinal nerve travels.

How do you diagnose the problem?

Diagnosis begins with a complete history and physical exam. I will ask questions about your symptoms and how the problem is affecting your daily activities. You will be asked about your involvement in sports and your level of performance. I may suspect a problem with spondylolysis in football linemen, gymnasts, and those in similar sports that require intensive levels of

performance. I will also want to know what positions or activities make your symptoms worse or better.

Next I will examine you by checking your posture and the amount of movement in your low back. I will check to see which back movements cause pain or other symptoms. Your skin sensation, muscle strength, and reflexes are also tested.

I will order several X-rays of your low back. An angled, or *oblique*, view is often used to check for a pars fracture. I trace around the vertebral body and bony ring on the X-ray film. The outline normally forms an image that looks like a small dog. When a crack is present, however, the dog will appear to have a collar around its neck. This is referred to as the *Scotty dog* sign. It confirms a diagnosis of spondylolysis.

Small defects in the bone may not show up on X-ray. Also, a recent stress fracture won't always appear on X-ray. As a result, I may order a *bone scan* to get the most accurate information. This involves injecting chemical "tracers" into your blood stream. The tracers then show up on special spine X-rays. The tracers collect in areas of extra stress to bone tissue, such as a stress fracture of the pars interarticularis.

Computed tomography (a CT scan) may be ordered. This is a detailed X-ray that lets us see slices of the body's tissue. The image can show if the edges of the fractured bone have begun growing together. The scan shows whether the fracture is new or old, so I can decide which treatments will help the most.

When more information is needed, I may order a *magnetic resonance imaging* (MRI) scan. The MRI machine uses magnetic waves rather than X-rays to show the soft tissues of the body. It can help in the diagnosis of spondylolysis. It can also provide information about the health of nearby intervertebral discs and other soft tissues that don't appear on X-rays.

What treatment options are available?

I often begin by prescribing non-surgical treatment for spondylolysis. This is because symptoms from these stress fractures often resolve with rest or bracing. In some cases, I simply monitor their patients' condition to see if symptoms improve. An X-ray may be taken every few months to check how

well the area is healing. I usually ask that you rest your back by limiting your activities. The purpose of this is to help decrease inflammation and calm muscle spasm. You may need to take some time away from your sport, especially if it requires repeated back bending. This gives your back a chance to heal. Most patients who follow these measures get better. Patients are rarely counseled to completely discontinue participating in their sport, and only in severe cases.

If I feel that the problem is due to a recent fracture, you may be placed in a rigid back brace or cast for three to four months. Keeping the spine from moving can help ease pain and inflammation. It can also improve the chances the bones will grow back together. Most people who require a brace or cast overcome symptoms and are able to eventually get back to activities free of pain. This can happen even when follow-up tests show that the bones haven't completely healed.

Patients occasionally work with a physical therapist. After evaluating your condition, a therapist can assign positions and exercises to ease your symptoms. The therapist may design an exercise program to improve the strength and control of your back and abdominal muscles. By watching you perform your sport activity, your therapist can suggest style, technique, or equipment changes to improve your performance and prevent future problems.

Do I need surgery?

Most patients with spondylolysis do not require surgery. When symptoms are not relieved with nonsurgical treatments, however, patients may require surgery. The main types of surgery for spondylolysis include

> **Laminectomy -** Nerve compression can cause considerable pain and symptoms. If too much cartilage builds up where the fractured bones are trying to heal, the nerve that passes near the injured bone may get squeezed, as described earlier. To fix this, a section of the bony ring is removed to take pressure off the nerve. The procedure to remove the lamina from the bony ring and release pressure on the nerve is called laminectomy.

Posterior Lumbar Fusion - A spinal *fusion* may be required after I perform a laminectomy procedure. Fusion is recommended when a *spinal segment* (a set of vertebrae) has become too loose or unstable. A spinal fusion allows two or more bones to grow together, or fuse, into one solid bone. This keeps the bones and joints from moving. In this procedure, I lay small grafts of bone over the problem area on the back of the spine. I also apply metal plates/rods and screws to prevent the two vertebrae from moving.

Pars fracture repair – This is another method of surgically correcting your problem if the bracing fails to alleviate your pain. In his situation, I usually put screws and metal hooks in your back to stabilize the fracture, then add bone graft to allow the fracture to heal. Repair does not cause adjacent bones to fuse together.