

# **Sports that demand repetitive bending and twisting can lead to spondylolysis.**

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While competitive athletes often have stronger core musculature than the general population, the rigors of everyday training can still exact a heavy toll on the lumbar spine. And if the athlete has an anatomical predisposition for injury, inappropriate biomechanics or an overly aggressive training program, low back pain can quickly create serious problems.

Two of the most susceptible groups are younger patients who develop an overuse condition, and the weekend warrior, who is susceptible to overuse and direct trauma. Regardless of the patient population and method of injury, your evaluation and treatment approach should adhere to the basic principles of taking a patient history, using appropriate diagnostics and custom designing a treatment plan.

Older athletes, particularly weekend athletes, are prone to overuse injuries due to age and deconditioning. Another common condition is muscle-related overuse injury, such as muscle strains. Most of these injuries can be treated symptomatically with rest, NSAIDs and activity modification.

Disc herniations are uncommon in younger age groups. When they do surface, it's best to treat these problems non-surgically. Athletes with a disc herniation often present with back pain, spasms and radiculopathy. A physical exam and radiographs can rule out a stress fracture. An MRI is the imaging study of choice for these cases.

Most patients with disc herniation can be managed with medications, physical therapy and epidural injections, unless you note pronounced muscle weakness. If these fail, surgery is often effective relieving symptoms. After symptoms resolve, most athletes can resume normal participation in sports. The main concern in younger athletes with a herniated disc is the risk of re-herniation. This risk is difficult to fully define, and the prognosis is based on severity of the initial herniation.

## **Confirming Spondylolysis**

One of the most common lumbar spine injuries among adolescent athletes is pars fracture, often referred to as spondylolysis. Pars fractures are most problematic in gymnastics, football, diving, karate, dance and any sport that demands repetitive lumbar extension and twisting. In a 1995 study, almost half of all adolescent athletes presenting at a sports medicine clinic for back pain had a spondylolytic stress fracture.<sup>1</sup>

Spondylolysis can strike at any age, but it's more common among children and adolescents as a result of their developing spines. Because the pars is the weakest part of the vertebra, the excessive strain caused by repetitive sport motions can exacerbate the condition. A pars fracture often results from a rapid increase in training intensity, incorrect training technique or inappropriate sports equipment.

Athletes with this condition frequently present at the start of the season with complaints of back pain, muscle spasms, hamstring tightness and leg pain. Spondylolysis is largely believed to be a true stress fracture, due to overuse and fatigue of the pars.

Patients with a pars defect or fracture may complain of pain and stiffness in the center of the low back, particularly on backward bending. Activity typically worsens the pain, while rest may alleviate it. During a physical exam, patients generally demonstrate restricted lumbar range of motion, pain on palpation, and a positive straight leg raise (SLR) test in the seated or lying position for back or leg pain. Often, the most impressive finding is tight hamstrings, typically more prominent on the affected side. Each of these physical findings is the body's reactive mechanism to protect the injury.

Take a thorough history and query the patient regarding sports and daily activities, and determine which positions worsen symptoms. Examine posture, skin sensation, muscle strength and reflexes. Plain radiographs are often not diagnostic for spondylolysis, unless the stress fracture is complete. Lateral or oblique radiographs are usually helpful to view the fracture.

With young patients, there is rarely a true radiculopathy, since the disc is often in great shape and there is no slippage leading to nerve compression. However, if there is radiculopathy present, it could be due to irritation of the nerve as it passes under the pars.

Because of the unreliability of radiographs, additional studies must confirm the diagnosis. By far, the study of choice is a bone scan, in which chemical tracers are injected into the blood stream, which collect in areas of extra bone stress and show up on special X-rays.

Other tests that can help diagnose a pars fracture are computed tomography (CT) scans, which can help determine if the fracture is new or old, and an MRI, which can enlighten the treatment team regarding the health of nearby discs and other tissues that don't show up on X-rays.

## **Managing Pars Fracture**

Rest and activity modification can resolve many cases of spondylolysis. If the bone scan is positive, brace treatment with a custom anti-lordotic thoracolumbar sacral orthosis (TLSO) can provide support.

The anti-lordotic brace removes pressure on the pars to allow the area to heal. Braces should be worn during the day and removed for sleeping. Patients usually wear the brace for 6 weeks, and they should refrain from aggravating activities. Some athletes may

continue wearing the brace during sports activity for a year or more—the brace allows participation in contact sports such as football. In gymnastics, some maneuvers are limited.

You can order repeat studies to confirm that the fracture is healed. Once healed, prescribe a physical therapy program for reconditioning. The goal of physical therapy is to improve strength and control in the back and abdominal muscles, so the strain of sport movements isn't transferred to the vertebra. The most appropriate movements to ease symptoms depend on the athlete's sport, technique, training program and biomechanics. Hamstring stretching may also be indicated.

Spondylolysis doesn't usually progress in adolescents. However, a small fraction of patients don't respond to rest and conservative treatments, and may require surgery as they get older. Surgical intervention for spondylolysis that eventually develops into spondylolisthesis falls into two categories.

**Laminectomy.** In cases of nerve compression where cartilage in the healing bones exerts pressure and irritation on nerves that exit the spine a laminectomy may be necessary to remove bone and tissue surrounding the defect.

**Spinal fusion.** A patient may need to have two vertebra fused together into one solid segment after a laminectomy, if a spinal segment becomes loose or unstable. Surgeons graft bone over the unstable segment and may install metal hardware to affix the fusion.

Postoperative rehab is similar to nonsurgical management. An initial rest period is followed by modified core strengthening exercises under strict guidance. Patients may wear a back brace or support belt during the initial postop stage.

Modalities, such as heat, cold, ultrasound and e-stim, can modulate pain during treatment. Complement this treatment with thorough education on positioning, training, sports equipment and biomechanics to prevent recurrence of symptoms. Finally, a home program builds on the gains in flexibility, posture, endurance and core strength. Full return to activity can take up to 6 months.

Spondylolysis is a common and potentially serious condition that can strike down your most active, healthy patients. When you approach athletes with back pain, keep this condition in mind, particularly if they fit the age and sports-history profile.

## Reference

1. Micheli, U., & Wood, R. (1995). Back pain in young athletes. *Archives of Pediatrics & Adolescent Medicine*, 149, 15-18.

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