Guidelines for Pediatricians

Spondylolysis

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Low back pain is a common complaint in the pediatric population with a wide range of etiologies. A thorough history and exam are imperative to distinguish benign from serious pathology, although a specific diagnosis may not always be determined. Chronic back pain, worsening pain, pain in young children or pain with systemic symptoms warrants further evaluation for pathologic causes.

Spondylolysis is a common cause of low back pain in pre-adolescent and adolescent athletes and is almost exclusive to this age group. Spondylolysis is a stress fracture of the pars interarticularis of the vertebral arch, occurring most commonly in the 5th lumbar vertebra (L5). It can be unilateral or bilateral. Bilateral defects can lead to spondylolisthesis, or slippage of the vertebra. Spondylolysis is hypothesized to be caused by microtrauma from repetitive hyperextension and rotation of the lumbar spine occurring in the growing skeleton. Consequently, sports or positions with repetitive hyperextension movements such as football lineman, butterfly swimmers, gymnasts, dancers, and volleyball and tennis players are at increased risk.

Patients with spondylolysis classically present with worsening low back pain that is most prominent in extension. Onset is typically insidious, though some patients may recall a specific inciting incident. Pain can progress from being present only with activity to occurring with activities of daily life or at rest. On physical exam there may be midline or paraspinal lumbar tenderness with possible radiation into the glutes. Range of motion of the lumbar spine may be limited, especially in extension, and tight hamstrings are often present. Pain is exacerbated with lumbar extension and intensifies with extension on a single leg (Stork testing). An AP and lateral lumbar x-ray is routinely the first step in the evaluation of spondylolysis, however radiographs are often normal. An oblique view, looking for the “scotty dog” defect of spondylolysis, is no longer routinely recommended due to a significant increase in radiation with these views without much increase in diagnostic sensitivity. If history is concerning for spondylolysis and x-rays are normal, an MRI or SPECT scan may be used depending on physician or facility preference. MRI may be preferable as it avoids radiation, however it can require special sequencing that may not be standard in all institutions.

Treatment for acute or subacute spondylolysis varies by provider but typically includes some period of rest (4-12 weeks), followed by physical therapy. Bracing with a soft lumbar corset or more rigid brace may be utilized for additional pain control or to encourage activity limitation, although evidence to support bracing is weak. Rehabilitation focusing on hamstring flexibility, core strengthening and stabilization of the lumbar spine are generally initiated before return to activity. For individuals with chronic spondylolysis where no edema is seen on advanced imaging, a shorter period of rest with earlier rehabilitation may be recommended. Individuals who do not adhere to rest or return to sports too quickly are at risk for poor healing and chronic low back pain.

Spondylolisthesis is a potential complication of spondylolysis. Presentation is similar to spondylolysis however radicular pain may be present if the slipped vertebra is compressing a spinal nerve. In severe slips, a step off may be appreciated with palpation of the lumbar spine, especially with spinal flexion. The degree of translation on standing lateral x-ray is graded from 1-4 with 1 being the most mild at <25%. Grade 2 is 26-50%; grade 3 is 51-75%; and grade 4 is 76-100%. The initial treatment for low grade spondylolisthesis is conservative with rest and physical therapy, however referral to an orthopedic spine surgeon should be considered for grade 3 and 4 lesions or those with neurological symptoms. Significant worsening of the slip over time is not typical, however annual X-rays to assess for progression should be considered, especially in those with significant growth potential.
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Low back pain is a common issue for many young athletes, but it is not something that should be ignored as it can be a sign of a more serious problem. Back pain may originate from the muscles, bones, or ligaments or even the mechanics of how the back is moving. One of the most common causes of back pain in young athletes is spondylolysis. Spondylolysis is a stress fracture of a small bony segment in the back of the lumbar spine called the pars interarticularis. It is thought to be caused from repetitive hyperextension or twisting of the back. Therefore it is more common in sports where arching the back is routine like dance, diving, gymnastics, volleyball and tennis.

Typical signs and symptoms of a spondylolysis are chronic low back pain in the center or just off to the sides that begins without an injury and is worse with arching the back. Some individuals may feel stiffness in their back. To diagnose a spondylolysis, x-rays are usually taken but unfortunately can often be normal. Therefore advanced imaging with an MRI or a bone scan is often required to confirm the diagnosis and to determine if the stress fracture looks new or old.

Treatment includes rest, especially rest from arching the back, pain control and rehabilitation. Some physicians may recommend ibuprofen or acetaminophen as needed for pain. A back brace may be recommended until pain improves. There is no set period of rest but it typically ranges from 4-12 weeks. After rehabilitation, the athlete can be progressed back into sport gradually as tolerated. On average, it can take 3-5 months to fully return to sports. Returning to sports or physical activity too soon can worsen the pain, create a chronic problem and require more time off from sports.

Some individuals with spondylolysis on both sides of the low back can have forward slippage of the vertebra which is called spondylolisthesis. The presentation of spondylolisthesis is similar to spondylolysis but the slippage can occasionally push on or irritate a nerve in the back which can cause numbness and tingling down into the leg. Spondylolisthesis is usually seen on x-ray although a CT or MRI may be obtained to evaluate the slippage in more detail. The treatment varies based on the degree of slippage. In mild cases, the patient is managed similarly to a spondylolysis with rest and physical therapy. In high grade spondylolisthesis, which is rare, referral to an orthopedic surgeon is needed. However, with proper treatment, the majority of patients with spondylolysis and spondylolisthesis are able to return to sport. While kids are still growing they are at risk of further slippage of the vertebra, so even after recovery physicians may obtain x-rays periodically to monitor them.

Tips for Parents:
- Kids with good conditioning and flexibility are at lower risk for injury.
- Have your child stretch regularly and warm up before activity.
- Schedule an appointment with your doctor if your child has fever with back pain, is limping, is missing their sport, has numbness or tingling down their legs, has issues controlling their bowel and bladder, or has pain that wakes them up at night.
- Don’t ignore low back pain, especially if the pain persists over a week.
- Follow up with your doctor if your child has worsening pain.