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.