What are Spondylolysis and Spondylolisthesis?

Spondylolysis is a defect in the pars interarticularis (which literally means the “piece between the articulations”). Spondylolysis is a defect in the bone connecting the superior and inferior facets and can be unilateral (involving one side) or bilateral (involving both sides) (See Figure 3). Although the defect can be found at any level, the most common vertebra involved is the 5th Lumbar vertebra (or L5) (See Figure 4).
In cases of bilateral spondylolysis, the posterior joints can no longer provide stability and forward slipping of the L5 vertebra over the sacrum (for example) can result. This slip is called spondylolisthesis.

What are the causes?

The cause of spondylolysis is yet to be determined. Researchers and doctors believe that certain genetic factors can contribute to spondylolysis as well as over-use in sports and poor biomechanics. The most common cause of spondylolisthesis is spondylolysis but there are other causes. Children born with underdeveloped facet joints may develop spondylolisthesis. More rarely, any infection or tumour affecting the posterior bony ring, including the facet joints can also cause instability and spondylolisthesis.

What are the signs and symptoms?

Most players with spondylolysis, and even some children with spondylolisthesis have no symptoms, and may continue to play football unaware that they have the condition.

For those players with symptoms, back pain is probably the most common symptom and often presents during a growth spurt or after a hard or prolonged training session (see Figure 5). There is often a history of minor back injuries at football. Most players continue to have good range of motion of their back and are able to play. Generally, the spondylolysis is not due to a particular injury, but as a result of years of cumulative stress of the back.

Sometimes a player can develop a poor posture or awkward walking style. This can be due to spondylolisthesis causing muscle spasm in the lower back, making the back stiff.

How can the player prevent spondylolysis and spondylolisthesis from occurring?

There is little a player can do to prevent a spondylolysis or spondylolisthesis. Over training during growth phases should be avoided, as well as training or playing through pain in the lower back, which has not been diagnosed. If a player is incidentally found to have spondylolysis but with no symptoms, there is no need to restrict the player’s activity. The probability of a non-painful spondylolysis developing into a slip is not high enough to justify restriction of activities (Brunker and Khan, 2007).
What can your sports injury professional do?

If a player presents with any of the aforementioned symptoms, a sports doctor will order an x-ray of the lumbar spine to rule out spondylolysis. If a spondylolysis is diagnosed, treatment will be directed towards reducing the back pain by use of anti-inflammatory medications and stretching and strengthening exercises for the back and abdominal muscles. A physiotherapist may also apply sports massage techniques and educate the player on correct posture (see Figure 6).

Figure 6: Sports Massage Techniques.

In the most severe cases, where there is severe trauma and muscle spasm, a bone scan may be performed to check if there is a fracture.

In patients with spondylolisthesis, the treatment depends on several factors, including age, sex and the severity of the slip. The younger child has a higher chance of further slip with growth. The treatment for spondylolisthesis is similar to the treatment for spondylolysis - physiotherapy to strengthen the back and abdominal muscles, stretching exercises for the tight muscles, postural education and sports massage techniques. The symptoms generally last longer and more time off from training and playing soccer is needed. A sports doctor will continue to monitor the player's symptoms and check on the severity of the slip with x-rays. If the patient responds to conservative treatment and the pain resolves, the player may return to sport. If the pain does not improve, or if follow-up x-rays demonstrate further slip, surgery may be needed. Surgery consists of fusing the L5 to the S1 vertebrae to prevent further slipping.

The sports doctor will monitor the player's symptoms and advise the player on when to return to training and playing.