Low Back Pain

Almost everyone may develop low back pain at some point in their life and this can be due to both acute or chronic causes. Acute causes of back pain can result from Psoas Syndrome or somatic dysfunctions of the lumbosacral spine. Psoas Syndrome is due to prolonged sitting that causes the psoas muscle to shorten in a flexion position. The fundamental dysfunction seen is loss of the normal lumbar lordotic curvature. Somatic dysfunctions of the lumbosacral spine follow the Fryette's Laws of Motions. Do not forget the lumbar mechanics in relation to the sacrum. If a lumbar dysfunction is present, L5 will rotate opposite to the Sacrum and a sacral axis will be on the same side that L5 side-bends. Be able to differentiate chronic causes of low back pain as well. Spinal stenosis is due to narrowing of the spinal canal often seen with degenerative causes such facet joint hypertrophy. Spondylosis results from arthritis of the spine. Spondylolysis is a fracture or defect of the pars interarticularis and is associated with the Scotty Dog sign on oblique X-ray imaging. Spondylolisthesis is the anterior displacement of the vertebral body that may develop subsequent to Spondylolysis and is visualized with Lateral X-Ray imaging. Soft tissue injury from direct trauma resulting in inflammation to the iliolumbar ligament is known as Iliolumbar Ligament Syndrome. Patients develop unilateral low back pain with severe pain located along the posterior iliac crest. Because the ligament attaches at L4 and L5, chronic vertebral instability and aggravation to this ligament may result in a lumbar herniation. A lumbar herniation is when the nucleus pulposus protrudes outward from the encircling annulus fibrosus typically due to posterior-lateral weakening of the posterior longitudinal ligament at the lower lumbar segments. Remember that the nerve root affected is the nerve root below the affected disc. (Herniation of the L4-L5 disc causes compression of the nerve root of L5). Lastly, Cauda Equina Syndrome is an emergent medical condition due to central disc herniation or space-occupying lesions that compress the cauda equina and its surrounding structures. Patients may develop sciatica, saddle anesthesia, reduced sphincter tone, and even loss of bowel/bladder function. This syndrome requires stat surgical decompression and glucocorticoid therapy to prevent irreversible neurological damage.

PLAY PICMONIC

Acute

Psoas Syndrome

Sewn-ass

Psoas Syndrome is a leading cause of back pain secondary to shortening of the psoas muscle. It is typically caused by prolonged sitting or hunched posture, however any cause of psoas shortening including viscero-somatic and somato-somatic reflexes can result in Psoas Syndrome. The psoas muscle originates from various locations of the vertebrae T12 through L4 and inserts at the ipsilateral lesser trochanter of the femur. Shortening the distance between these two points causes several problems. Typically, a Type II non-neutral somatic dysfunction is seen at L1, L2 with sidebending and rotation toward the hypertonic psoas. Additionally, the patient will develop exaggeration of the lumbar lordotic curvature. The pelvis will shift to the opposite side and contralateral piriformis spasm can occur. This results in pain with standing, walking and decreased ability to extend the affected hip.

Somatic Dysfunction of the Lumbosacral Spine

Sumo-tic Dysfunctioning with Lumber-sack Spine

The primary motion of the lumbar spine is flexion and extension with limited side bending and rotation. This is due to anatomical alignment of the superior facets of the vertebra in a backwards and medial orientation. Lumbar vertebrae follow Fryette's Laws of Motion with somatic dysfunctions occurring in flexion, rotation, and sidebending. In addition, the motion at L5 will impact the motion of the sacrum sitting below in two ways. First, rotation of L5 will result in sacrum rotation in the opposite direction. Second, side-bending of L5 will result in activation of the sacral oblique axis on the ipsilateral side. This rule is vital in diagnosing somatic dysfunction of the lumbosacral spine and is tested heavily. So remember, if a somatic dysfunction is present at L5, don't forget to check for a sacral somatic dysfunction as it will most likely exist.

Chronic

Spinal Stenosis

Spine of Stone

Spinal Stenosis is narrowing of the spinal canal typically due to degenerative changes such as facet joint hypertrophy, loss of intervertebral disc height, or thickening of the ligamentum flavum. As a result of the narrowing, it may cause nerve root compression. A patient may develop shooting pain that worsens with extension, standing, or lying supine, and improves with forward bending. Treatments include OMT and conservative therapy with surgical laminectomy

as a last resort.

Spondylosis
Spiny-low-sis
Spondylosis is essentially arthritis of the spine. It can be visualized radiographically as intervertebral disc space narrowing, arthritic changes within facet joints, and ankylosing, or stiffening, of adjacent vertebral bodies.

Spondylolysis
Spiny-lala-sis
Spondylolysis is due to a fracture or defect of the pars interarticularis. Patients may be asymptomatic but if symptoms develop, they may include low back and buttocks pain extending to the posterior thigh that increases with extension. In addition, they may develop stiff legs, tight hamstrings, as well as a waddling gait. Spondylolysis is diagnosed using an oblique X-ray in order to visualize the pars interarticularis. Commonly tested is the Scotty Dog sign on X-ray with its “collar” representing the fracture itself. Remember, there is no displacement of the vertebrae in spondylolysis. If there is displacement, then you have a Spondylolisthesis.

Spondylolisthesis
Spiny-low-sis-thesis
Spondylolisthesis is anterior displacement of a vertebral body relative to the one below. It is typically seen at the lower lumbar segments including L4 and L5. Symptoms are similar to that seen in Spondylolysis. Physical examination will reveal a “step sign” of anterior displacement during palpation of the spinous processes. Unlike Spondylolysis, Spondylolisthesis is diagnosed with a Lateral X-ray to visualize the anterior slippage of the vertebral body. The displacement is classified as Grades 1-4 depending on the amount of slippage that has occurred. Grade 1: 0-25%, Grade 2: 25-50%, Grade 3: 50-75%, and Grade 4: >75%.

Iliolumbar Ligament Syndrome
Island-lumber Ligament
The iliolumbar ligament is one of the three vertebropelvic ligaments that help stabilize the spine to the pelvis. They connect and strengthen L4 and L5 to the crest of the iliac bone. Tearing or inflammation of the iliolumbar ligament from soft tissue injury is called Iliolumbar Ligament Syndrome with patients developing unilateral low back pain along the posterior iliac crest. Constant irritation to the ligament may even result in a lumbar disc herniation.

Herniated Nucleus Pulposus
Herniated Disc
A herniated nucleus pulposus results from narrowing of the posterior longitudinal ligament. This ligament runs vertically, anterior to the spinal canal and posterior to the vertebral bodies. A posterior-lateral herniation of the nucleus pulposus is frequently seen at the lower lumbar segments between L4-L5 because the width of the ligament here is about half the width at L1 and a small width produces less structural support. The nerve root affected will be that of the vertebrae segment below the herniation. For example, a L4-L5 herniation will cause compression at the L5 nerve root. Patients may develop low back pain, numbness, tingling, as well as shooting pain down the leg below the knee that increases with prolonged flexion and is relieved with extension. Both sensory and reflex deficits may present in a dermatomal fashion. They will also have a positive Straight Leg Test on the side of the herniation. The gold standard to diagnose a herniation is with MRI. Treatment ranges from conservatives measures to surgical fixation if necessary.

Emergent

Cauda Equina Syndrome
Cod Horsetail
Cauda Equina Syndrome is a serious condition caused by a massive central disc herniation or space-occupying lesion that causes a compression of the cauda equina and subsequent pressure on the surrounding nerve roots. Patients will develop sharp electric low back pain, unilateral or bilateral sciatica, decreased deep tendon reflexes, saddle anesthesia, decreased rectal sphincter tone, and, ultimately, loss of bowel and bladder function. This syndrome requires glucocorticoids treatment and emergent surgical decompression of the cauda equina. Failure to decompress after loss of bladder control may result in irreversible neurological damage and paralysis.