



*Surgical & Non-Surgical Care. Sports Medicine. Physical Therapy.*

**Volume 8, Issue 6, January 2017**

## **EXAMINATION OF THE SPINE AND EXTREMITIES: LUMBAR SPINE (Part 2)**

Beginning in January of this year, we began a series of newsletters examining the spine and the extremities one joint/region at a time. Beginning with the foot and working our way upward, the "Examination of the Spine and Extremities Series" is designed to provide a brief overview of the anatomy of each respective joint, an underlying review of its motion and dynamics, and likewise provide an explanation of some of the more common pathologies experienced in that particular joint.

**Bones:** 5 vertebrae and the sacrum:

**Ligaments:** Anterior Longitudinal Ligament, Posterior Longitudinal Ligament, Ligamentum Flava, Numerous Transverse & Spinous ligaments

**Muscles:** Multifidus, Psoas, Transversalis, Longissimus, Iliocostalis



### **Spine Neutral**

The spine is made up of a column of 24 individual vertebrae, 5-7 fused vertebrae in the sacrum, and 3-5 rudimentary vertebrae in the coccyx. Particular to the 24 individual vertebrae, the spine is designed to maintain posture and support an axial (i.e. top down) load. To do this, the spine has three distinct sections through which it distributes load. Specifically looking again at the lumbar spine, its anterior curvature is known as a lordotic curve.

Again, curvature in the spine is designed as an effective method of load transfer. When the spine is in an ideal curved (i.e. neutral) position, this curvature evenly distributes load throughout each vertebra and disc. However, when the spine is consistently loaded or positioned outside of this neutral position, either excessively straight (picture to the right) or excessively curved, individual vertebrae and individual discs can be substantially overloaded and predisposed to injury. In the picture above, the curved line lays out what should be an ideal spine neutral position. As a result of an excessively straightened spine, you can also clearly see the arrow pointing to the subsequent disc herniation at L4-L5.



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#### **ON-SITE ORTHOPEDIC CLINICS EACH WEEK**

- No Charge
- Open to patients of all ages
- Appointments (918) 346-7800

**Collinsville Public Schools**  
Monday/Wednesday  
2:00pm—3:30pm

**Coweta Public Schools**  
Wednesday  
2:45pm—3:30pm

**Edison Preparatory School**  
Monday/Thursday  
2:45pm—3:30pm

**Glenpool Public Schools**  
Tuesday  
2:45pm—3:30pm

**Kellyville Public Schools**  
Wednesday  
Noon—12:45pm

**Regent Preparatory School**  
Wednesday  
Noon—12:45pm

**Rejoice Christian School**  
Monday/Wednesday  
2:00pm—3:30pm

**Victory Christian School**  
Tuesday  
2:45pm—3:30pm

**Wagoner Public Schools**  
Wednesday  
2:45pm—3:30pm

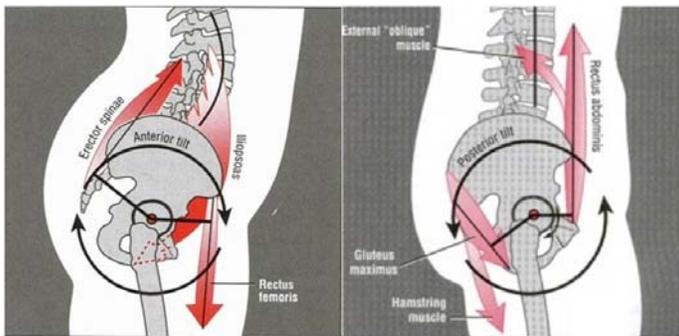
\*Hosted by CSO Athletic Trainers and Physician Assistants.

## Hip Mobility

As described in the November 2016 Edition, the hip, pelvis, and the lumbar spine all move in sequence and in rhythm together. Where pelvis moves, the spine will follow...and vice versa. The same is also true of the hip. Consider the following:

### **Muscle-Driven Anterior Pelvic Tilt**

As seen in the diagram below, the iliopsoas, rectus femoris, and erector spinae muscles all affect the position of the pelvis during standing. When these muscles are strong/tight, they rotate and pull the pelvis forward and downward and increase the curvature stress on the lumbar spine.



### **Muscle-Driven Posterior Pelvic Tilt:**

In the picture on the right (above), the rectus abdominus, external oblique, gluteus maximus, and hamstring muscles all attach to the pelvis as well. When these muscles are strong/tight, they tend to rotate and pull the pelvis rearward and upward, thus straightening the spine and eliminating its ability to effectively disperse force.

Either way, muscle imbalances and muscle tightness in the hip can predispose a patient to a lumbar spine injury. Therefore, if you've noticed pain or soreness in your back and your work duties often require consistent postures or movements, it may be time for you to have your back evaluated by a orthopedic physician or athletic trainer. Early interventions can make a significant difference and protect your spine.

## Core Stability

Core stability is just what it sounds like, the ability of the hip, pelvic, and abdominal muscles to hold the core in its ideal, neutral position; i.e. provide stability to the core. More often than not, imbalances in stability often come from repetitive movements. In other words, if you sit at a desk all day, your quads and posterior spine muscles get tight and pull your pelvis forward. On the other hand, if you are constantly bending and lifting, your hamstrings and gluteal muscles tend to tighten and pull your pelvis rearward. Ideally, the balance is to be strong and flexible in both, thus positioning your spine in neutral and holding your core stable in that neutral position.

As most people are imbalanced in some way, shape, or form, flexibility in the hips and workouts in a neutral (i.e. gently curved) spine position can be great for clearing up these imbalances.

### **Anterior Core Flexibility:**

Hip Flexor Stretch



Quad Stretch



### **Posterior Core Flexibility:**

Hamstring Stretch



Glute Med/Piriformis Stretch



### **Core Stability Exercises:**

Planks



Bridges



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