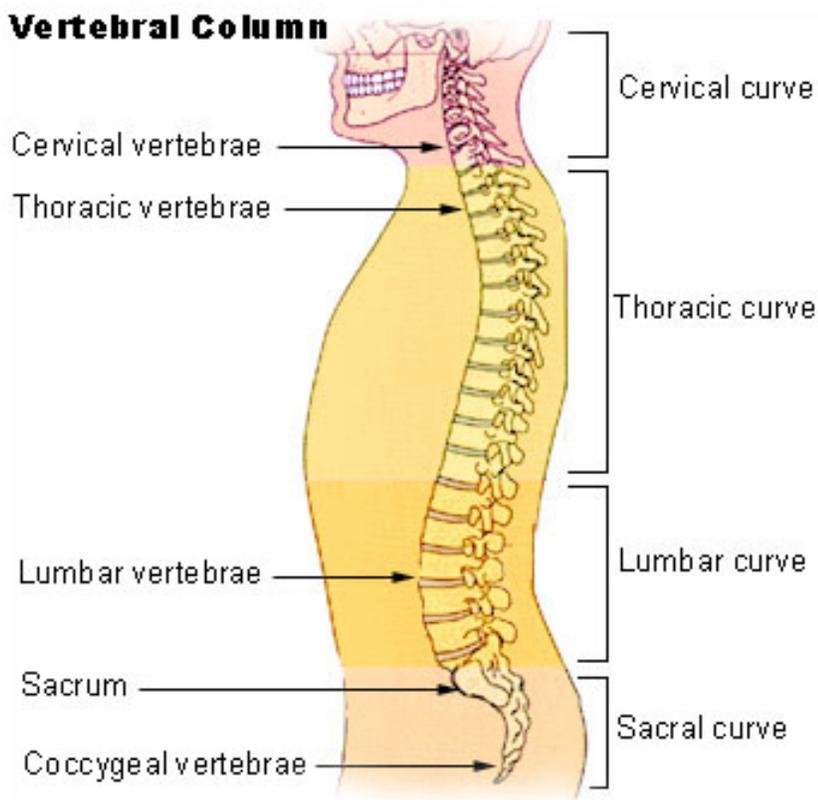


PELVIC TILT AND THE NEUTRAL SPINE

Many people who have participated in fitness classes may have heard instructors describe how to keep their backs safe from injury. Phrases such as "pelvic tilt," "lumbar lordotic curve," "neutral spine" are heard, but not always described or defined.

The spinal column is a structure consisting of 33 bones (**vertebrae**) stacked on top of each other. If one were to stand over the stack of vertebrae, looking downward, one would see that the bones form a hole reaching the length of the spinal column. It is through this hole, the **intervertebral foramen**, that the spinal cord passes. In between each vertebra is an **intervertebral disc**, a structure consisting of a gelatinous core surrounded by a stronger exterior, together acting as a shock absorber for the spine.

The spine is divided into regions: the 7-bone **cervical** region (near the neck), the 12-bone **thoracic** area (below the neck, reaching downward toward the middle of the back), the 5-bone **lumbar** region (the lower back), the five fused bones within the **sacral** region (base of the spine), and the three to four bones making up the **coccyx** (tailbone). The lumbar and sacral regions of the spine are shaped into curves, or arches, forming what is known as the lumbar lordotic curve. These arches, along with the arches found in the cervical and thoracic curves, help to absorb weight just as a coil would help absorb shock if weight was placed upon it.



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When the back's curves are in their natural positions, they form the "neutral spine." Muscles in the back and surrounding areas may influence the neutral spine, maybe due to weakness, overuse, injury, a musculoskeletal disorder, weight distribution, a developmental issue, or combinations of these. When the lower back's lumbar lordotic curve is accentuated, or increased, by tilting the top of the pelvis forward, problems may result, especially if the back is held in this position repeatedly and/or for an extended period of time. Some of these problems include:

- Compression of intervertebral discs - A condition which can impede nutrient flow within the disc, leading to its deterioration and subsequent loss of protective shock absorbent qualities
- Rubbing together of vertebrae - Two vertebrae meet together at a vertebral joint. The surfaces of the bones may rub together, building up friction, which can lead to discomfort and pain.
- Narrowing of the intervertebral foramen - Narrowing of the foramen can cause impingement on the very sensitive spinal cord, leading to pain.
- Ligament injury - The over-arching can put too much strain on the ligaments surrounding the vertebral column, leading to discomfort

A person whose lumbar region tends to over-arch may wish to practice pelvic tilts. A pelvic tilt is typically performed when lying on one's back, with the knees bent, feet flat on the floor. The abdominal muscles are contracted, pulling inward, to direct the lower back downward until it is flat against the floor. Maintaining this position during supine (on the back) exercises can help reduce pain associated with over-arching the back, and may also improve abdominal strength to help reduce over-arching.

Although the pelvic tilt may be helpful to reduce symptoms associated with lordosis (overarching of the low back), an individual may wish to eventually practice working the body's core muscles in a neutral spine position when sufficient strength, flexibility, control, and stability of the spine occur.

In gaining control of the lumbar lordotic curve, a person should be aware of how a variety of muscles can affect this region: the hip flexors, the gluteals, the abdominals and the hamstrings.

The **gluteals** (muscles in the buttocks) decrease the curve when contracted, pushing the top of the pelvis backward. The gluteals are engaged during squats, lunges and other lower body exercises.

The **abdominals** (located in front of the abdomen) also decrease the arch when contracted, by tipping the pelvis back. Abdominal muscles too weak to oppose the shift can cause an increased arch due to the forward tilting of the pelvis. The abdominals are worked in crunches, bridges, and other mid-section exercises.

The **hamstrings** (a set of three muscles located behind each thigh) also have an effect on decreasing the curve when they are contracted. When the hamstrings are inflexible, they may prevent the pelvis from moving in a normal manner during forward flexion (bending over), leading to an increased arch. This latter situation is one reason why hamstring flexibility is given so much attention in fitness classes. Hamstrings are contracted when the leg flexes at the knee, such as during leg curls and other lower body exercises.

The **hip flexors** (on the front of the body, located at the top of the thighs), when contracted, increase the lumbar lordotic curve. Hip flexors are contracted when the legs are extended, such as during single leg lifts. The largest of the hip flexor muscles is the psoas major, as seen in the below diagram.

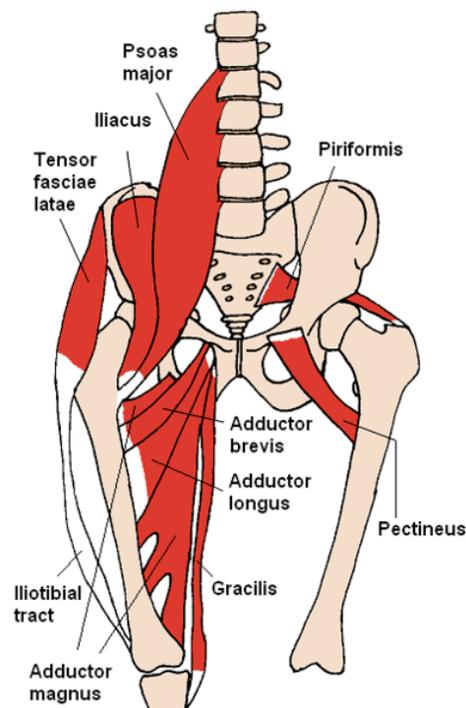


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