Reawakening the Spine

The human spine is a segmental structure, consisting of 7 cervical, 12 thoracic, 5 lumbar, 5 sacral [fused], and 4 coccygeal [fused] vertebrae. Of course, the sacral and coccygeal "vertebrae" are considered part of the pelvic girdle as sacrum and coccyx.

A basic vertebra is comprised of a bony block and a bony ring. The block is sandwiched between spinal disks. The ring houses the precious spinal cord. The ring consists of 2 pedicles, 2 lamina, 1 spinous process, and 2 transverse processes. Processes are levers that attach to muscles. Each vertebra has 4 facets [joints], 2 superior, 2 inferior attached on the lateral posterior side of the vertebral body. A thoracic vertebra has 4 more facets attaching to the ribs. The angle of orientation of the facets changes with each level of vertebra. The facet angle influences the direction of movement.

Much can be told of function by the structure itself.

Lumbar vertebrae are massive for weight bearing. The facets have a sagittal orientation allowing little rotation, but a lot of flexion, extension.

Thoracic vertebrae are smaller than lumbar, larger than cervical vertebrae. We have 4 more demi-facets per vertebrae to attach our ribs. These are more facets to become hypomobile and restrict spinal movement. Ribs are the armor of our vital organs. The spinous processes are sharply angled down to prevent excessive backbending.

Cervical vertebrae are the smallest, designed for mobility of our head. Facets are angled at 45 ° from the horizontal for the most range of motion..

The spine is a load bearing structure. It is designed to carry the weight in a tripod configuration. The disks bear weight in the front and the facet joints bear the weight in the back. The lumbar disks are massive, in compassion to the other disks, and are designed to bear 80% of the weight [facets: 20%]. The cervical disks, much smaller, are designed to carry 50% of the weight [facets: 50%].

We can consider that, normally, each vertebra can move in all directions. The manual therapist and the yogi use the image of the vertebra floating [or stuck] in any direction. We categorize each vertebra movement as flexion [nutation], extension [counter-nutation], rotation, and side bending. Some vertebras are restricted more than others. This is called the relative flexibilities/inflexibilities of the spine.

In our culture we have a stiff thoracic spine with relatively hypermobile cervical and lumbar spines. The thoracic vertebral attachments to the ribs and their sharply downward facing spinous processes decrease vertebral range of motion. In addition, the consistent slump sitting, forward bending movements, and forward head postures contribute to the stiffer, tenser mid backs. The thoracic spine does not move as much in relative terms. The mid cervical and the lumbar spine move too easily into excessive injurious facet compression.

The mechanical stress of prolinged sitting tightens our hips, dulls our spine, and tenses our neck and shoulder muscles. Cultures that don’t use chairs, but rather sit on the floor, as we did as infants and toddlers, maintain normal ranges of motion in their hips and spines. We sit too much in our culture with all the time we spend in cars, at computer workstations, and in easy chairs. Dull sitting causes prolonged spinal flexion and posterior pelvic tilt. Most chairs do not support the pelvis towards neutral or the lumbar spine out of flexion.

Uneven prolonged compressions in weight bearing lumbar disks push the fluid of the disk posteriorly. The front of the vertebral body pinches more, so the fluid migrates backwards,

pressing against the posterior lateral wall of the disk, where the posterior longitudinal ligament is not. There is [3x] increased interdiscal pressure in these lumbar disks when sitting in chairs [compared to standing.] Eventually lateral posterior disk wall degenerates under this pressure causing herniation. The bulge lowers the height of the disk. And decreased disk height lessens space between adjoining vertebrae. This abnormal compression or pressure on the facets causes bone spurs [osteophytes]. These bone spurs then can impinge upon the nerve root, causing more pain.

Activities spent bending forward activate the muscles of the back. Vacuuming, gardening, even slumping forward sitting over a keyboard, peering into a monitor will tense your back muscles. This tone can lead to stiff soft tissue as well as decreased vertebral movement, especially towards extension.

The spine and pelvis in extension [as in standing] normally compress vertebral facet joints for stability. The spine may not be lengthening in upright standing postures because of the poor grounding of lower extremities and the pelvis shifted forward and rotated anteriorly. This places abnormal compressive stress on the facet and sacro-ilial joint surfaces. Joint dysfunction and joint degeneration [arthrosis] result from this unskillful posture.

In summary, many spines are subjected to excessive compression or either the facets or disks, or even both. The muscular guarding, fibrosis, and degenerative structural changes are the results. We are unaware of our spines. We lose the suppleness, fluidity, and skill of youthful spines. We end up with dull, lifeless spines with excessive compression in isolated spots.

Yoga has been defined as conscious skillful movement. We must use the skills of grounding, centering, and lifting to keep the mechanical stresses normal, therapeutic, and healing. Together grounding and centering create the necessary prerequisites for the skill of lengthening the spine. In upright, the spine needs to be fluid, yet stable. The movement is dispersed throughout the individual vertebrae. Each vertebra moves in varying degrees relative to its neighboring vertebra.

In standing, excessive movement at a few vertebrae causes abnormal mechanical compression stress, and eventually structural degeneration at those facet joints. Often the excessive movement is towards compression. An unskillful backbend excessively compresses one vertebra onto another, injuring the involved joint surfaces. A vertebra can become stuck or be sticky at the facet from this excessive movement. A heavy, collapsed stance can cause or perpetuate this kind of injury. When the thoracic spine is dull and stiff towards flexion [kyphosis], extension tends to come from the mid cervical and lumbar. When the thoracic spine can lift and extend, it distributes the excessive movement out of the mid cervical and lumbar spines. Normally, each vertebrae moves in its appropriate range to contribute towards the total movement of the spine. The mechanical stresses of this movement are therapeutic.

We need to counter the dullness created by prolonged sitting in collapsed spinal flexion [vertebral posterior translation/ nutation]. Backbends move the vertebrae in an anterior translation and counter-nutation. Backbends energize the spine not only to translate forward and counter nutate, but also to lift, assuming the ground and center are in place. An energized spine can move segmentally in all the appropriate directions, in a skillful, fluid, and stable manner. The mechanical stresses of skillful spinal movement are necessary for bone, joint, and soft tissue health. Also the fluid stable spine needs to be an effective foundation for normal movements of the head and upper extremities.

In yogic terms, the spine is our center, from which skillful movement originates. Skillful movement does not start on the surface, meaning the muscular system. But the energy from our centers moves towards the periphery in the intended directions, allowing us posture and movement..

Passive backbends [chest openers] over a blanket roll or round bolster are very effective in minimizing the relative inflexibility of the thoracic spine relative to the hypermobile lumbar and cervical spines. Vertebrae are mobilized segmentally into anterior translation, nutation, and counter-nutation . If one pauses on the expanding inhale, then one can release into the forces that the bolster provides during the next exhale. During a chest opener, the bolster presses into the toned back musculature. This pressure lessens the tension of these muscles. From the soft tissue, eventually the bolster pressure moves into the individual vertebrae applying specific vectors of force for translation and rotation.

For a beginning chest opener,

•First roll one wool or tight woven cotton blanket into a firm 5"-6" cylinder.

•Lie over the roll in the shoulder blade spine. Make sure the student holds their head at the occiput, with elbows up [shoulder width apart], and shoulder blades away from ears.

•Pull your head away from trunk, lengthening your cervical spine as it backbends, as your head lowers towards the ground

•Lift your hips up to lower the head all the way to the floor.

•Be careful to keep the head on the floor, and the neck long so not to overarch the mid cervical spine.

•Slowly lower the hips with the long neck and head on the floor, as you exhale.

• Lift hips up, move along roll to bottom tips of the shoulder blades, slowly lower the hips, exhaling.

•Raise hips, moving body along roll to ribs below shoulder, and then lower hips, exhaling.

•Raise hips, moving body along roll to lowest ribs/upper lumbar spine, then lower hips, exhaling. (Bring arms out to the floor, elbows straight, palms up, pressing gently down with elbows.)

(Dig heels of feet into the floor, pulling the pelvis towards heels, to lengthen lumbar spine.)

•Raise hips, push roll under tailbone. Press elbows into floor to arch upper back, straighten knees, push thighs down.

•Bend knees to heels under knees. Press down through elbows and heels of feet to lift hips and spine upwards into bridge pose.

•Take roll out from underneath you, and slowly roll spine down to floor one segment at a time.

•Bend knees and hug into chest.

•Twist by lowering and bending onto one arm, then press that arm down onto knees as you reach with opposite arm to other side.

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