Dynamic Chiropractic

ERGONOMICS / POSTURE / SLEEP HABITS

The Problem With Prolonged Sitting

EVALUATING POSTURAL ADAPTATIONS & PATTERNS OF DYSFUNCTION.

Jeffrey Tucker, DC, DACRB

We need to constantly talk to our patients about spending less time sitting and about what can go wrong with poor sitting postures. The fact is we sit too long in repetitive malpositions. Prolonged and repetitive sitting leads to tight hip flexors, tight hamstrings and tight calves. If the external hip rotators get tight, this leads to restriction in hip-joint range. A tight anterior chain of muscles causes limitation of lumbar spine extension; a stiff thoracic spine; and protracted and elevated scapulae (with weak lower trapezius and serratus anterior). Forward shoulders can cause an overstretched, tight, and weak posterior rotator cuff and a "poked chin" posture associated with weak deep neck flexors and overactive SCM and suboccipitals. It's easy to see the connection to chronic upper trapezius, levator scapula and rhomboid muscle dysfunction.

A Chain of Biomechanical Consequences

I'm not sure if most patients actually think they sit too much, let alone think of prolonged sitting as being linked to their multiple strains and pains. Just as bad as sitting in a slumped posture is the weight shift or rotation of the pelvis to one side. The majority of patients have a preferred lead hand (right-hand dominant) while sitting and standing. This right-hand dominance, coupled with diaphragm anatomy, promotes a left anterior pelvis and a right anterior torso preference.

A slightly rotated (shifted) pelvis, coupled with the loss of the normal lumbar lordosis while sitting, leads to increased lumbar spine stiffness and altered neural input into the entire lumbopelvic hip complex – especially the glutes, thighs and erectors. Prolonged sitting allows the glutes to "shut down"'; in a right-hand-dominant person, we typically see this happening in the left glute medius / minimus and the right glute max.

The left hamstrings become tight (long in length, but they feel too tight) with increased muscle tone on the right adductor magnus and decreased muscle tone on the left abdominal obliques. This is all due to pelvic malpositions that alter muscle length-tension relationships around the pelvis, which alters gait (especially hip extension) during walking or running. The result? An increased risk of lumbopelvic hip strain, lower extremity strain, etc.

Sitting pelvic imbalances (sitting more towards one pelvis) cause lumbar rotation compensations, just as hunched posture creates cervical and thoracic spine stiffness, shoulder imbalance and winged scapulae – all made worse more on one side with even a slight asymmetrical shift in the sitting, standing and walking positions.

Evaluating Postural Dysfunction

I consistently start my examination by observing a patient's static posture. I view posture as a whole functional unit, rather than individual muscles acting on individual segments. After a quick static posture evaluation, I then ask the patient to perform active range of motion. If I find a lack of active motion, I may perform passive range of motion to see if the two are equal, as they should be.

I then move to functional movement analysis. This concept of watching the patient perform a squat, lunge or shoulder mobility drill, etc., can only be understood if we know the normal movement pattern or what the benchmark movement pattern is expected to be.

I follow this up with the use of standard orthopedic tests and modified tests such as Ober's test, Thomas' test, Janda's basic movement pattern tests (hip extension, hip abduction, trunk curl-up, etc.) for further understanding of the muscle, joint, ligament and fascial interactions. Doctors who understand the myokinetic chain links and the fascial plane links will have a better understanding of human biomechanics.

Figuring out the position of the pelvis is my main focus during the static evaluation because the

concept of the pelvis to the top (head, neck, TM), and the pelvis to the bottom (ankle, feet, knees) is real and accepted. Understanding what position the ilium and sacrum are in leads to a better understanding of what muscles need to be retrained (during exercise) so we can move better in everyday life.

With the patient standing in bare feet and as little clothing on as comfortable, look at them in the A-P position, side position and P-A position. Take notice of these positions:

- Head-neck: Forward head translation, lateral flexion? Is the lateral flexion in the upper cervical or lower cervical?
- Shoulders: Which shoulder is elevated? Is the scapula tipped or winged? Are the shoulders rounded?
- Hands and arms: Internal rotation, external rotation, excessive elbow flexion or extension?
- Torso: Asymmetrical translation in the pelvis or torso? Do you see lateral flexion, right or left? Scoliosis, kyphosis or lordosis?
- Hip: Internal rotation, external rotation?
- Knee: Genu varum, genu valgum?
- Feet: Toe out, toe in? Pronation, supination?

Observe these synergist muscles for asymmetry: TFL, QL, piriformis, iliocostalis lumborum, hamstrings, rectus abdominis, levator scap / upper traps, SCM, and pectoralis minor / major. These are the typical overactive synergist muscles.

Next Steps in Evaluation

If you suspect imbalance in the pelvis (i.e., one side anterior and rotated), then when you perform the static posture evaluation in the frontal plane, notice if one shoulder is rotated or elevated. Ask yourself why this is happening. The pelvis may have set off a compensatory weakness in the lower scapular fixators (lower trapezius and serratus anterior), and hypertonic upper trapezius and/or levator scapulae. You can correlate this visual finding with asymmetrical shoulder range of motion or an arm abduction test that may help you decrease the patient's risk of a shoulder impingement problem.

Visualize the placement of the scapulae. Prolonged slumped sitting promotes rounded shoulder appearance, protracted and abducted scapulae. This can relate to hypertonic rhomboids, which presents as chronic trigger points in the rhomboids and a weakness in the serratus anterior (winging or tipping) muscles. You can ask the patient to perform a push-up test and see if the scapulae wing out. Winging of the scapula is related to a serratus anterior inhibition … and guess where the serratus anterior has fascial links to? The pelvis, via the thoracolumbar and obliques.

Notice if the patient has internally rotated arms. Normally, the palms should face each other and the thumbs should face straight ahead. Prolonged slumped and shifted sitting causes one shoulder to go farther anterior. Become aware of which shoulder / arm is forward. The forward arm or shoulder may indicate hypertonicity in the pectorals, lats and subscapularis. This would allow for a weakness in the middle trapezius muscle.

In the sagittal plane, look for the obvious forward head. This indicates weakness of the deep neck flexors and is associated with hypertonicity of the SCM and/or suboccipitals. Notice that one side is usually tighter than the other, depending on pelvic position. You can correlate this finding with Janda's supine neck flexion test and your palpation findings.

When I find a forward head, I like to assess the suboccipital muscle tension and the upper cervical segments using the supine cervical flexion rotation (CFR) test. The test is performed with the

patient supine. The doctor flexes the cervical spine fully in order to block rotational movement below the atlantoaxial articulation; then passively rotates the head left and right, determining ROM and end-feel. A firm end-feel with limited ROM presumes limited rotation of the atlas on the axis.

Evidence suggests that performing the CFR test on patients with cervicogenic headache reveals an average of 25-28 degrees of A-A rotation to the side of the headache, as compared to an average rotation of 44 degrees in asymptomatic patients. Patients with migraine and other types of headaches may also be limited in CFR motion, averaging 42 and 35 degrees, respectively, in either direction. This test has an overall diagnostic accuracy of 85-91 percent.

Limited rotation to one side may be due to tightness of the contralateral suboccipital muscles, and not necessarily impaired C1-2 rotation. You can differentiate this with your palpation.

Palpation of the suboccipitals while the patient is sitting down and standing up often reveals a change. Demonstrate this to your patient by having them feel their own suboccipital muscles: Teach the patient to place their pelvis in a proper position while standing or sitting. If tension eases (from the forward head), then you know the tension is secondary to forward-drawn posture from the pelvis related to poor sitting or standing posture.

OCTOBER 2014