Posture Evaluations, Part 1

By Jeffrey Tucker, DC, DACRB

Like you, I keep looking for better ways to help patients out of their ill-health predicaments. Specifically, I look for that deep meaning of what the person’s musculoskeletal system is trying to say to me while I look at their posture.

My hope is to fulfill their expectation of me to improve their life and condition. I’ve always felt that if I learned enough about posture and functional anatomy, then my question, "Why does this person have pain?" would be answered.

So much gets revealed to me through posture evaluations. Standing in front of us is a person - usually feeling pain, loss, fear and anger, and with or without acceptance of the distortions they have become. I understand; I have fear about losing my ability to be a recreational athlete and move around without pain. The loss of physical function terrifies me. Looking into the eyes of my patient while I begin to look at their posture creates a "real moment."

Observing someone walking is what we call gait analysis. Observing someone performing a squat or a lunge is observing functional anatomy. When I watch someone walk, I see it as the path they have taken in life. When I watch someone squat, I can write an entire corrective exercise program to improve their functional posture. My intention in this article series is to paint a picture of what posture can tell us about the muscle system. Think of this series as the Cliff’s Notes for my version of Posture 101.

The most authentic journey of sharing in my chiropractic career occurred this past year. I had the privilege of teaching an entire postgraduate diplomate course in rehabilitation. My assignment was in San Jose, Calif., and gave me the opportunity to teach to one of the brightest groups of young doctors I have ever met. Most participants were certified in ART and many had other specialty certifications. I realized one thing that has not changed since I was in chiropractic college: how little doctors really understand posture evaluations! Let’s take a look at just some of the things posture can tell you.

What Posture Can Tell You
• Hypertrophied sternocleidomastoid. You will notice a groove medial to the SCM at the angle of the jaw. This indicates an overactive SCM muscle.
• Forward head posture. This indicates posterior weight shift.
• Upper extremity internal rotation/round shoulders. This indicates weakness of the middle trapezius; overactive pectorals, latissimus dorsi, teres major. This may be associated with a fixed thoracic kyphosis.
• Rounded shoulders. This indicates overactive pectorals and upper trapezius muscles.
• Increased muscle bulk on one side of the forearms. This may indicate the dominant hand side.
• Appearance of gothic shoulders. This may indicate overactive upper trapezius and/or be associated with underactive lower scapular fixators (lower trapezius and serratus anterior).
• A bump in the contour of the upper trapezius. This may indicate an overactive levator scapulae muscle.
• Scapulae winging. This may indicate an inhibited or underactive serratus anterior muscle.
• Flattening of space between medial scapulae border and the spinous processes. This indicates underactive rhomboids.
• Flattening of the fibers of the middle deltoid. This may indicate underactive deltoids.
• Flattening of the supraspinatus region. This may indicate an underactive supraspinatus muscle.
• Hypertrophied thoracolumbar erector spinae. This may indicate hip extension hypomobility. The thoracolumbar fascia is a deep investing membrane which covers the deep muscles of the back of the trunk. It is made up of three layers: anterior, middle and posterior. The anterior layer is the thinnest and the posterior layer is the thickest. Two spaces are formed between these three layers. Between the anterior and middle layer lies the quadratus lumborum muscle. The erector spinae muscle is enclosed between the middle and posterior layers. Above, it passes in front of the serratus posterior superior and is continuous with a similar investing layer on the back of the neck. In the thoracic region, the lumbodorsal fascia is a thin fibrous lamina which serves to bind down the extensor muscles of the vertebral column and to separate them from the muscles connecting the vertebral column to the upper extremity. It contains both longitudinal and transverse fibers and is attached, medially, to the spinous processes of the thoracic vertebrae; laterally to the angles of the ribs.
• Anterior pelvis tilt (APT). This indicates overactive hip flexors/erector spinae. APT often coincides with forward head posture. Some of the contributors include poor body mechanics, pregnancy and weight gain. Visual signs are increased curvature of lumbar region. Palpatory signs are hypertonic (tight) postural musculature including the iliopsoas, erector spinae, quadratus lumborum and rectus
femoris. Pain is often felt in the low back, pelvis, hips and thighs.

- Pelvis torsion (PI/AS in combination). This indicates a SIJ dysfunction.
- Increased lumbar lordosis. This may indicate overactive hip flexors and erector spinae muscles. This may be associated with underactive/inhibited glute maximus and abdominals. Visually, you may notice that the patient has a protruding abdomen.
- Lateral shift of the pelvis. This is often caused by poor body mechanics when sitting or standing unevenly. The visual signs are one hip that is higher than the other. Palpatory signs are hypertonic quadratus lumborum muscle, which is the primary lateral flexor of the low back. Pain is felt on the side where the pelvis is higher, in the muscle belly and attachment sites. Underactive glute medius is typically found on the anterior ilium side and is associated with decreased core strength.
- Sway back or flat back. Deep, short lumbar lordosis = tight hip flexors and/or erector spinae.
- Hip hiking or an elevated iliac crest without rotation. This indicates quadratus lumborum overactivity. The QL is one of the most commonly overlooked muscular sources of low back pain. It functions as a stabilizer of the lumbar spine and can act as a hip hiker and a lateral flexor of the lumbar spine.
- An underactive gluteus medius muscle. This can be associated with a kinetic chain dysfunction. The knee will adduct (femur internal rotation), the tibia will abduct, and the navicular drops, causing eversion and a forward talus. There will be a lengthened posterior tibialis and the set-up for plantar fascitis. Treatment includes strengthening the glute medius and lengthening the adductors and TFL.
- Asymmetrical thigh adductor notching on medial thighs. This may indicate overactive adductors on the side of the higher notch.
- Asymmetrical hamstrings. This may indicate overactive hamstrings. Remember that the adductor magnus can extend the leg and adduct the leg. Overactivity can lead to SIJ problems. An overactive biceps femoris (short head) can cause fibula dysfunctions, which leads to ankle dysfunction, which leads to plantar fascitis. The biceps femoris is easy to evaluate for muscle length. With the patient prone-lying, bend the right hip to 90 degrees. Try to straighten the leg. Females should be able to get to 90 degrees. Males should be able to achieve 80 degrees. Less than these benchmarks indicates overactivity and will require stretching.
- Altered tone from upper to lower quadrants of recti. This indicates a possible faulty breathing pattern.
- Flattened superolateral quadrant of the buttock. A glute maximus asymmetry can indicate inhibited/underactive gluteals. Check the sacroiliac joints for dysfunction if you observe this. It also indicates possible overactive hip flexors, and/or rectus abdominus, and/or piriformis muscle.
- Absent/decreased VMO. This indicates an inhibited vastus medialis oblique muscle.
Flattening of tibialis anterior muscle. There will be less bulk at the outer quadrant of the shin. This indicates a possible L5 nerve syndrome.

Groove or prominence of the iliotibial band. This indicates an overactive TFL/ITB. An overactive TFL/ITB may be associated with a lateral deviation of the patellae.

Flattened heel, flat foot. Hypotonic foot muscles may be due to impaired foot/ankle proprioception; altered balance between gastrocsoleus and tibialis anterior; impaired knee proprioception (internal knee derangement).

Short, broad Achilles tendon. This indicates overactive gastrocsoleus muscles.

Squared-shaped heel. This indicates posterior weight-bearing.

Pointed-shaped heel. This indicates anterior weight-bearing (rounded heel shape is normal).

Posture Evaluation Guides Treatment Decisions

When I went to chiropractic college in the early ’80s, I was taught very little about static posture evaluation. I do remember being taught to measure the height of the iliac crests; a line across the occipital region and ear lobes; an imaginary line drawn across the tops of shoulders; and the inferior angle of the scapula. That was about the full extent of posture assessment. In my own development as a chiropractor, I took the postgraduate diplomate programs in rehabilitation and started to appreciate visual static anatomy, and later I learned functional anatomy.

Evaluation of static posture is meant to be a screening test. It gives us an initial impression of certain key muscle imbalances. We will still need to confirm these imbalances with other tests, such as functional movements. Advice about proper posture is central to treatment. Certainly the initial examination should include the posture assessment. I think every patient encounter is an opportunity to discuss and fine tune our client’s posture. One of the most valuable pieces of advice is regarding sitting and lifting posture.

When performing a posture assessment, be as accurate as you can and keep chart notes to make your posture evaluation a reproducible measurement. Posture evaluations become an objective measurement that can drive treatment decisions. I perform posture evaluations on every visit because posture can reveal the need for specific muscle stretching, muscle strengthening requirements and orthotics. That’s why I use posture as an outcomes assessment tool. Improving posture may decrease pain, enhance self-esteem, improve muscle control, improve performance, provide injury prevention, increase protection and "bracing" for the back, and provide a more stable center of gravity and a more stable platform for sports movements.
DeJarnette was certainly one of my earliest influences. He described excessive lateral sway in the static posture evaluation as a sacroiliac joint distortion and excessive P-A sway as a pelvis distortion. Byl in 1991 described excessive anterior-to-posterior body sway on an unstable surface or poor single-leg-standing balance as correlated with low back pain. Poor balance has been correlated with future LBP (Takala, 2000).

Patients intuitively understand the value of improved posture, and correcting posture allows them to be part of the recalibration and treatment process. Taking the time to practice posture evaluations has taught me insights of immense value in patient care. That’s why this series starts with basic principles. In future articles, I will discuss normal alignment of the body and how the kinetic chain operates as an integrated functional unit.

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