Dynamic Chiropractic

CHIROPRACTIC (GENERAL)

Creating Body Awareness to Slow Down the Aging Process (Part 2)

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Input to the brain from the information gatherers includes the vestibular system, the visual system and the somatosensory system (muscle spindles, GTO, joint proprio- and mechanoreceptors, cutaneous receptors).[1] The central nervous system takes ("inputs") this information and 1) determines a reference value of body position; 2) formulates a motor plan; and 3) provides updates.

The CNS "output" is the motor response or "what we see" and is based on existing central motor programs for the 1) immediate avoidance of danger; 2) execution within the individual's biomechanical and neurophysiological abilities; and 3) feed-forward system. The complex regulation of postural control by the central nervous system via input from the visual, vestibular and somatosensory systems is often overlooked in our chiropractic examination. Proprioception is the CNS determining relative position of the limbs / trunk while balancing. Motor control or neuromuscular function determines the outcome.

The American College of Sports Medicine's *Guidelines for Exercise Testing and Prescription*[2] recommend conducting a sensory organization test to assess the three sensory systems (visual, vestibular, and somatosensory) that contribute to postural control by manipulating the visual and support surface conditions. Many practitioners have been doing this with the one-legged standing test with the eyes open and the eyes closed. If a balance discrepancy is noted, we have lots of ways to train for balance using labile / unstable surfaces: conforming surfaces (stability pads, balance trainers, etc.); balance boards (single-plane fulcrum); wobble boards (half-sphere, single-axis, multi-plane); stability / physio balls; and multi-axis, single-plane and multi-axis, multi-plane tools. We even have a good progression for perturbations:

1. Narrow base of support.
2. Reduce a portion of the base of support.
3. Raise the center of gravity.
4. Move the center of gravity outside the base of support.
5. Combinations of the above.
6. The above combined with unstable surfaces.

To help assess movement patterns, I use the Functional Movement Screen (FMS), and I further evaluate the sensory systems using a computerized analysis device that allows me to understand balance (the critical component of performance) from an even more dynamic point of view. The information gathered from these "tools" allows us to more effectively enhance the restoration of balance.

More simply put, observational measures can be used to predict kinesthetic awareness. For example, how well does a patient maintain postural control while standing on one foot? How well do they maintain postural control while standing on one foot with their eyes closed? If you are able to stand for less than 10 seconds, it means that your body has degenerated to a 60-70-years-old level. In other words, you may be only 40 years old, but your body has aged a lot faster.

We can look at balance enhancement as anti-aging. The degradation of balance is actual aging. Training is anti-aging. Injuring is aging. It's important to objectify this information, and we can do so with these and other assessment tools.

Regardless of the type of assessment, it is important to pay attention to any postural imbalances or deviations so they do not become irreversible, resulting in habitual movement dysfunctions and possible injury. It is imperative to correct imbalances as early as possible, particularly before any heavy weight training / loading occurs.

Since the three sensory systems – visual, vestibular and somatosensory – contribute to postural control and can be manipulated by changing the visual (eyes open, eyes closed, one eye open / one eye closed) and support surface conditions (my preference is a stability trainer), our profession should assess these. We are already good at assessing range of motion and flexibility; now let's continue to get good at strength / resistance, cardio and dynamic balance control (the impact of the visual, vestibular and somatosensory systems on posture).

Let's take this information and make it real for our daily practice. For example, on day one, I find it very helpful to make sure I observe sitting posture as part of my examination. In a previous article, I

discussed sitting posture.[3] As practitioners, we need to take into account what patients are sitting on because the furniture they choose may not be ideally suited for them based on anatomical differences in leg / torso length and the amount of support / stability it provides.

For example, according to Kendall, et al., a chair "should be of a height that allows the feet to rest comfortably on the floor and thereby avoid pressure on the back of the thighs."[4] In addition, there should be about a 90 degree angle at the hips and knees.

Generally, maintaining the normal spinal curves is considered to be beneficial during sitting; however, a common tendency for most people is to assume a forward-head posture (FHP) along with kyphosis of the thoracic spine.[5] FHP has been shown to increase the incidence of neck and shoulder pain, along with alterations in shoulder muscle activity.[6] As a result, individuals who regularly sit with FHP may be more prone to conditions like rotator-cuff injuries and shoulder impingement syndrome upon starting exercise programs if not properly assessed and corrected. Therefore, helping patients maintain (at the very least) a normal head position while sitting can be a beneficial part of designing an appropriate exercise program.

For example, someone with a posterior pelvic tilt when seated will most likely not be able to get true lumbar extension or proper hip flexion. Therefore, a compensation to this pelvic position might be thoracic flexion and a forward-head position. However, if we focus only on the symptom (thoracic flexion and forward head) rather than the underlying dysfunction (posterior pelvis), we are doing our patient a disservice. Along with the sitting posture observation, ask your patient to perform a functional test called "sitting to standing." This allows you to determine if the person is getting up out of a chair leading with their chin forward and/or a flexed lumbar spine, which is a compensation based on what you find in the static postural assessment of forward-head posture.

Once the patient is standing, I like to perform static posture evaluations and movement assessments.[7] Over the years, I have used many low-tech assessments / observations of human movement during activities of daily living. Some assessment tools throughout my years of practice include simple gait analysis, the "timed up and go," the overhead squat assessment, the FMS and more recently, high technology like the gait analysis system. Through it all, the most important part is the patient's awareness of their body movements and postures. I have said I use mirrors when introducing exercise / movement to my patients. However, based on motor learning principles, I withdraw the use of this sensory input once patients are able to recognize and correct their own postural alignment.

In summary, I believe we should provide anti-aging strategies that focus on keeping the elderly living in their homes as independently as possible for as long as possible. Let's learn how to assess the "input" systems and use the different mechanisms of sensory deprivation, such as altering head positions, constantly changing the visual field, and removing the visual field, as well as different shoes / no shoes; and get good at improving the "output" responses to maintain the reflexive and coordinative movement and balance structures. It's all about reducing the number of variables in poor movement, optimizing motion and balance, and improving the quality of the aging process.

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