

Effects of Whole Body Vibration on Posture and Kinesthetic Perception

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Many patients who present themselves to the chiropractic office suffer from musculo-skeletal disorders. More and more research confirms what we know to be true from our own daily anecdotal knowledge. There is hardly a modality that works better for these conditions than chiropractic. Yet there are a number of modalities that can enhance the benefits of adjustments.

One of these modalities is just finding its way into the healthcare field in America, after having been used and researched for the last four decades in Russia and Europe—Whole Body Vibration.

In a number of articles over the next few months, I will outline the scientific reasoning behind WBV and how it can be beneficial to the chiropractic practitioner's practice.

I will start with a brief review of the neurological control of posture. The definition given in Wikipedia –Posture, standing reads as follows: Although quiet standing appears to be static, modern instrumentation shows it to be a process of rocking from the ankle in the sagittal plane. Standing posture is often likened to an inverted pyramid.

Standing posture relies on dynamic rather than static balance. Our Center of Mass (COM) is in front of the ankle. A static pose would cause us to keel over on our face. In addition, we are constantly subjected to external perturbations such as breeze and internal perturbations from respiration. Erect posture requires adjustment and correction. Traditionally, our correction was explained by the spring action of our muscles. This is a local mechanism that takes place without the intervention of the Central Nervous System (CNS). Recent studies, however, show that spring action, by itself, is insufficient to prevent a forward fall. Also, human sway is too complicated for spring action to be the sole mechanism.

According to current theory, the CNS continually monitors our direction and velocity below our conscious awareness. Our vertical body axis alternates between forward and backwards tilts. Before each tilt reaches the tip-over point, the CNS counters with a signal to reverse direction. Sway also occurs in the hip and there is a slight winding and unwinding of the lower back.

An analogy would be a ball that is volleyed back and forth between two players and is not allowed to touch the ground. The muscle exertion required to maintain an aligned

standing posture is crucial but minimal. A little goes a long way. Electromyography has detected slight activity in the muscles of the calves, hips and lower back.

Although the pendulum model is a good approximation, a time series of postural sway shows much more variation than is seen in a physical pendulum. In the past, the variation was attributed to random effects. A more recent interpretation is that sway has a fractal structure. A fractal pattern consists of a motif repeated at varying levels of magnification. The levels are related by a ratio called the fractal dimension. It is believed that the fractal pattern offers a range of fine and gross control tuning. Fractal dimension is altered in some motor dysfunctions.

This is one of the best definitions I have read and, therefore opted to re-use it in this context. WBV introduces a significant additional stimulus to the CNS in order to challenge the postural reflexes. Utilizing WBV on many of my patients over the last year, I have found a number of them are making significant gains in their spatial awareness and proprioceptive responses. This is particularly true for the geriatric patient and, in particular, those that have not exercised for years. Patients with chronic postural distortions also derived tremendous benefit and excelled in their improvement.

Doctors practicing with somatic release may be familiar with the term somato-motor amnesia. Many of these patients' postural senses have become overwhelmed by the aberrant stimuli of faulty positioning. WBV helps patients to key in on their own bodies on a subconscious level. Integrating the stimulus of WBV into the treatment protocol increases assists the patient in becoming more aware of their position in the three dimensional room. Many experience an improved sense of balance, all of which facilitates becoming more limber and flexible.

All of these above mentioned changes are, of course, benefits of regular exercise. Moving our limbs through the three dimensional room helps to gain better control over our whole body. Yet many of our patients may not be able to go to a gym or other exercise facility for a multitude of reasons.

Having a WBV unit in the chiropractor's office, therefore, becomes a feasible choice. Standing on a vibrating platform creates a safe and user-friendly environment to introduce a postural challenge into the above described neuromuscular control system. If the patients are assisted by a therapist and taken through a series of exercise while standing on the plate, they are performing neuromuscular re-education and the office is well justified in billing for such a service.

WBV can be a tremendous asset to the chiropractic care of our patients. It relaxes the patients, helps them to get ready for an adjustment and prepares their neurological systems to accept the input provided by the articular manipulation. It is difficult to imagine a better preparation for the chiropractic adjustment.

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