THE COMPLETE GUIDE TO POSTURAL NEUROLOGY

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POSTURAL NEUROLOGY

Why implement Postural Neurology into your practice? Quite simply, every musculoskeletal problem is at some level a neurologic problem. Neurology dictates movement, structure, and function of your Posture System, overseeing and refining every single movement that you do on a daily basis.

Focusing solely on end organ dysfunction is out dated. It is an outdated system of healthcare to look at one part of the body, the site of injury or pain, and make assumptions about that patient's health and ability to function.

The shift has happened from segmental rehabilitation to whole posture patterns and optimized full body function. Compartmentalized thinking is not adequate for a system as dynamically developed and functionally processed as the human body. It simply won't cut it.

Consider these two questions. What system controls and coordinates all other systems of the body? The Neurologic System. What system provides the physical framework for all other systems of the body to resist gravity and function within our environment? The Posture System.

The Posture System is never static. Even when we think we are still, the body is making tiny movements every millisecond to stabilize the body efficiently in space. The Posture system is never static, nor is the neurologic system. Every single micro movement of the body to stabilize the Posture System was interpreted then initiated by the neurologic system. Postural Neurology is the refined integration of these systems.

Postural Neurology is defined as the network of neural impulses to support proper functional alignment of the Posture System. The purpose of Postural Neurology is to develop plasticity of proper structural alignment through brain based treatment protocols.

The Posture System is affected by every single neurologic impulse that arrives to and leaves from the brain. Understanding this intricate connection and knowing how to optimize Postural Neurology in practice is brilliantly profound for getting superior clinical results in your practice with your patients.

WHY POSTURAL NEUROLOGY?

Postural Neurology was created to fill a need for patients and a need for posture professionals. Patients need experts who understand Postural Neurology as it applies to common case presentations. There is a world of patients who are functional, but not optimal.

Understanding Postural Neurology helps you help your patients at a higher level. The majority of healthcare professionals completely neglect the brain, the most important anatomical structure for optimized human function. The brain controls important anatomical structure for optimized human function.

Brain-based postural correction is also a part of living and how we actively engage the Posture System with every movement that we make to hold our body upright against gravity within the environments that we live and function. When we consider brain-based postural correction on a daily basis, think of two key concepts. The first is how can you achieve the intended action most efficiently. The second is how can you perform the action in a way that is most useful to the brain.

Efficiency is determined by performing movements and actions with the least exchange of energy possible. The best way to conserve energy is with proper alignment of Posture System. When postural distortion patterns are present, the body utilizes more energy to hold the patient upright while performing dynamic movements. This inefficiency of movement drives the system to fatigue faster.

Movements that are useful to the brain are complex and rewarding. The brain is designed to produce movement, and yet as a society we are completely sedentary. There is no reward to sedentary, lifeless, repetitive movements. So much of what we do as human beings is subconscious because we don't need to think about it. We continue to use old motor patterns instead of refining new ones. The brain craves complexity and is rewarded from complex movements.

The Neuron Theory has served as the theoretical basis for the great advances in our current understanding of the functions of the nervous system. The Neuron Theory emerged at the end of the 19th century from the work of Santiago Ramon y Cajal, suggesting that nerve tissue is composed of individual cells, which are genetic, anatomic, functional and trophic units (Fodstad, 2001).

Each neuron needs three things to function: sufficient gas exchange of oxygen and carbon dioxide, glucose for nourishment, and sufficient connection and communication between other neurons, or synaptic activation.

If more practitioners understood the neuron theory and the need for activation, they would change how they practice. Treatments plans would go from being solely repetitive passive inputs to integrating complex active movement patterns to drive neurons and build neuroplasticity of the Posture System. Which is exactly why at the American Posture Institute we are proposing the importance of brain-based postural correction.

WHY DO WE HAVE A BRAIN?

The most fundamental reason that human beings have a brain is to create refined movement. The complex circuitry of the brain is wired to move for purposes of survival in the environment in which we live. Human survival requires movement. A high functioning brain anticipates movement through prediction, produces a motor action, and refines that movement to be efficient and effective.

Why does the brain work the way that it does? Put simply, the human brain works the way it does and is the size it is due to the main evolutionary process separating human beings from all other organisms. The brain works the way that it does because humans are bipedal and able to stand upright against gravity.

The act of standing and walking upright is the most sophisticated and complex movement on planet earth. Due to the intricate circuitry necessary to control this sophisticated movement, the human brain has grown as a part of our human evolution history to support the body's ability to move in an upright position and respond to the infinite amount of stimulation that being upright provides within our environment.

The pre-adaptation that occurred prior to the growth spurt of the human brain was becoming bipedal with an upright posture. This is traced back to the first bipedal ancestor, Lucy, who after being discovered, was reported to have lived 3.2 million years ago. At this time, it was reported that humans had the same visual, vestibular, and bodily functions as we do now, but until this point in evolutionary history, the brain was smaller in size and less developed.

We are neurologically and physiologically designed to be great movers and great thinkers. Good posture is a healthy brain, and human movement is predicated on your brain's ability to map movement correctly and stabilize your body in a coordinated way against gravity.

Understanding neurologic evolution is evidence that Certified Postural Neurologists are leading the next generation of healthcare professionals. A serious epidemic of postural de-evolution is among us, and Certified Postural Neurologists are the most trained professionals to reverse postural decline.

NEUROLOGY 101

Neurology functions as a system of inputs and outputs to and from the central nervous system and the peripheral nervous system. The central nervous system is a complex of nerve tissues within the brain and spinal cord that controls the activities of the body. The peripheral nervous system consists of the expansive network of nerves and ganglia outside of the spinal cord and the brain.

Sensory input ascends from the body, or the peripheral nervous system. Depending what type of sensory stimulus it is the tract either decussates, or crosses over in the spinal cord immediately, or ascends up the spinal cord and decussates in the brainstem. Sensory information from the left side of the body is perceived in the right somatosensory cortex.

The somatosensory cortex integrates and processes sensory information. In response to the somatosensory input, the motor cortex then creates an appropriate motor process. Just as the somatosensory cortex processes inputs from the contralateral side of the body, the motor cortex initiates voluntary motor function on the contralateral side of the body.

WHEN SENSORY INPUT ASCENDS TO THE CORTEX, THE CORTEX DOES THREE THINGS:

- The cortex receives afferent input
- Processes what the input means and what to do about it
- Creates efferent motor output.

Motor outputs are initiated in the motor cortex of the frontal lobe. They descend through the corticospinal tract, which decussates in the medulla of the brainstem. The corticospinal tract then descends down the spinal cord to the level of the end organ for innervation.

Sensory input from the right side of the body is processed by the left somatosensory cortex. Motor function of the left side of my body is initiated by the right motor cortex. These voluntary pathways are contralateral. Ascending input is afferent and descending output is efferent.

There are also ipsilateral pathways for the involuntary systems of the body. These involuntary pathways include the autonomic nervous system for life sustaining functions such as respiration, heart rate, digestion, sexual arousal, and pupillary responses to light. These systems are modulated in the brainstem and descend ipsilaterally.

Within the autonomic nervous system is the sympathetic and parasympathetic branches. The sympathetic autonomic nervous system is associated with "fight or flight." It prepares the body for action by increasing heart rate, dilating the pupils and respiratory pathways, increasing blood sugar, and relaxation of the bladder.

The parasympathetic nervous system is the "Rest and Digest" or "Feed and Breed" pathway. It prepares the body for rest and modulates digestion, sexual arousal, salivation, lacrimation or tears, urination and defecation.

The Posture System, like the autonomic nervous system, is ipsilateral. The right frontal cortex controls motor output of the left side of the body, while simultaneously controlling postural stabilization on the right side of the body. Fibers descend from the right cortex to the right pontomedullary reticular formation of the brainstem. The reticulospinal tract descends from the brainstem to the spine to modulate postural tone.

This is the basis of Neurologic function. Postural stabilization and dynamic movements start in the brain. Your patient's postural presentation on their first visit and throughout their treatment plan is a reflection of the function of their nervous system. The primary job of the Postural Neurologist is to identify the "Origin of Postural Distortion" and to utilize brain-based postural correction techniques to improve posture and fine motor output.

NEUROLOGY OF THE POSTURE SYSTEM

The neurology of the Posture System is made up of specific pieces of anatomy that work together to heighten dynamic postural stabilization. Posture is controlled by the integration of descending ipsilateral pathways that work together to position the body upright against gravity.

PONTOMEDULLARY RETICULAR FORMATION:

The pontomedullary reticular formation (PMRF) is the preeminent designer of your posture. The PMRF is located in the brainstem at the intersection of the pons and the medulla. The term "reticular formation" refers to a cluster of cranial nerve nuclei that are housed within the PMRF.

The reticulospinal tracts descend from the pons and the medulla to inhibit flexor tone of the anterior compartment of the body above the T6 spinal level, and to inhibit flexor tone of the posterior aspect of the body below T6. Flexor dominant posture including forward head posture, shoulder anteriority, and trunk flexion is the demise of postural decline.

Within the brainstem are the nuclei of 10 of the 12 cranial nerves. The cranial nerves are the "window" into the function of the brainstem. Intentional activation of the cranial nerves has a strong influence on your posture.

VISUAL SYSTEM:

Patients orient their postural alignment around their ability to see. If the patient is squinting because they can't see up close, their head will project forward into forward head posture. If one eye is more dominant than the other eye, the patient will develop a head rotation to align their dominant eye in the center of their world. And if the patient cannot converge their eyes accurately to midline, they develop a head tilt.

Your visual system is the center of postural orientation. Vision is so important that there are 4 cranial nerves dedicated to it. Cranial nerve 2 controls your ability to see, and cranial nerves 3, 4, and 6 control eye movements. Cranial nerves 3, 4, and 6 live in the brainstem; activation of these cranial nerves through specific eye movements is important for postural correction.

The medial longitudinal fasciculus is a group of visual and vestibular fibers that descend from the brainstem to the cervical spine to control head posture. The job of these descending fibers is to engage postural control of the cervical spine to support upright posture of the head in space with the eyes parallel to the floor.

Very frequently postural distortion patterns of the cervical spine are a result of lack of dysfunction of the visual system that needs to be corrected in order to have long-term postural correction changes of the first posture quadrant.

VESTIBULAR SYSTEM:

The vestibular system is how you balance in space. The semicircular canals and the otoliths are intricate canals of your inner ear that sense any changes of your body posture in relation to gravity. As there is a change of position, the vestibular receptor organs sense the change and instantaneously respond by activating extension on the ipsilateral side of the body.

Remember, flexor dominant posture is the demise of postural decline. The vestibular system activates extension to override flexor dominance and to maintain upright, balanced posture with movement. The cranial nerve nuclei of the vestibular system also live within the brainstem. Integration of vestibular and visual fibers descend from the brainstem to the spinal cord allowing you to move your head in space while keeping your eyes fixated on a target and to activate extension to resist gravity.

When patients suffer from vestibular dysfunction, they commonly feel dizzy, feel like the world is spinning, feel unstable and often lose their balance. Maintaining proper dynamic posture is impossible without training the vestibular system.

CEREBELLUM:

The cerebellum is also very important for postural design, especially dynamic posture. The cerebellum regulates postural control by inhibiting excessive movement of the Posture System. More specifically, the cerebellum controls fine motor output and coordination of complex movements.

When the cerebellum is not firing properly, the patient has jerky, rigid, and excessive movements. They are uncoordinated and have a wide-based postural stance and gait pattern. They also have increased amounts of postural sway preventing them from efficiently resisting gravitational forces.

The cerebellum is intricately connected to the eyes, the spine, and the vestibular system for postural control. They all communicate with one another to stabilize the Posture System. Ascending fibers from the spine inform the cerebellum of necessary dynamic postural changes.

SPINE:

The spine is very important for posture because it transports sensorimotor signals through spinal pathways from the brain to the rest of the body. The spinal cord carries information from the sensory and motor cortices, from the PMRF, and from the visual and vestibular systems. All sensation that occurs in the body is transported through the spinal cord.

Your spine developed to be upright through evolution changes of the size of the pelvis and the position of the foramen magnum. Our ability to walk on two feet and interact with the world as bipedal beings is derived from the shape of our spine. Maintaining proper spinal posture is of utmost importance to health and vitality.

EYES, SPINE, VESTIBULAR CORRECTION PROTOCOLS

To integrate Postural Neurology into your practice, the American Posture Institute recommends following the "Eyes, Spine, Vestibular" model of correction. By working with the eyes, the spine, and the vestibular system you are also activating the sensory cortex of the parietal lobe, the motor cortex of the frontal lobe, the cerebellum for coordination, and the brainstem to inhibit flexor tone.

In this section you will learn key correction strategies for the eyes, the spine, and the vestibular system. You can implement these correction strategies in any practice in the world regardless of equipment and space in your office. It doesn't require a lot of time, nor does it require expensive equipment. The results that you get will far outweigh the minimal investment of your time needed for implementation.

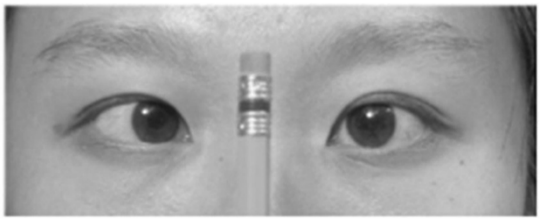
EYE EXERCISES: CONVERGENCE/DIVERGENCE

Your patients' ability to control their eyes will have a dramatic affect on their cervical posture. Always check cervical range of motion pre and post treatment when engaging the visual system. Your patients will see an instant change in cervical range of motion pre and post.

Convergence is your patient's ability to converge, or draw their eyes medially while focusing on a small point such as the point of a pen. You can determine their ability to converge their eyes based on the convergence test. Hold your pen at a 45-degree angle away from the patient about 14 inches.

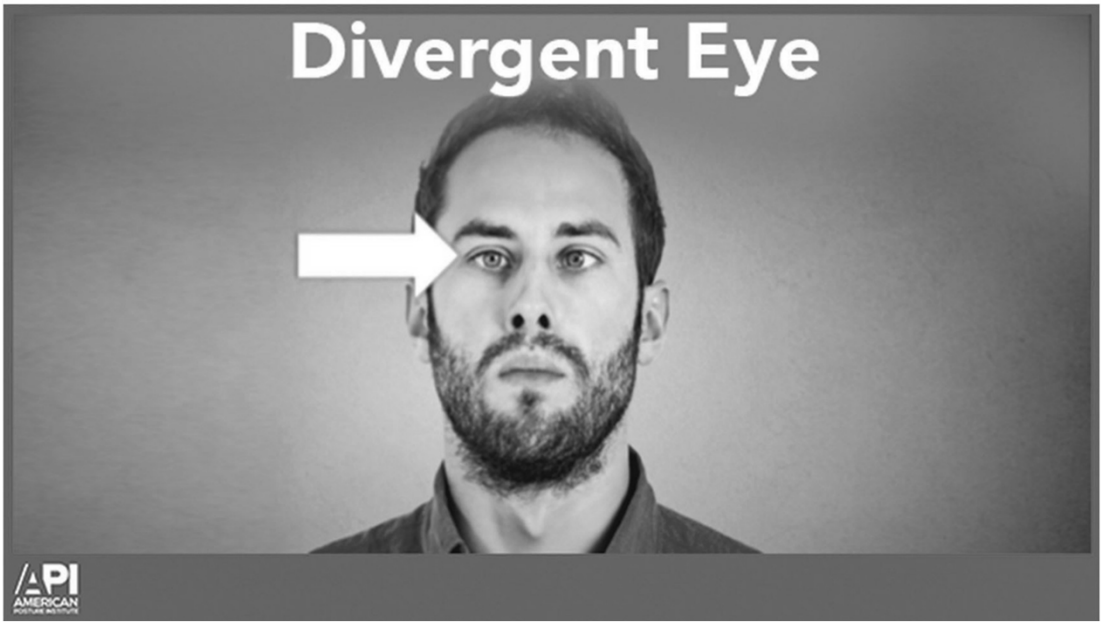
Bring your pen mid line to the center of their eyes. You ask the patient to focus on the pen. Watch them converge their eyes. Are they able to bring both eyes to midline? Very commonly you will see a divergent eye, meaning that one eye converges medially and the divergent eye diverges laterally. The divergent eye is the weak eye in terms of convergence.

How To:



Ask the patient to watch your pen as you bring it closer to them at the midline of their eyes

Evaluate if both eyes converge to the midline



To correct the divergent eye have your patients perform two exercises:

1) Convergence/Divergence 2) Small Eye Circles.

1. CONVERGENCE/DIVERGENCE

is performed just like the test you just did, however the patients will do it themselves. They will hold a pen out in front and bring it midline to the point where they see two pen tips, when they see two tips of the pen they hold their medial gaze for 5 seconds, then slowly diverge the eyes by bringing the pen outward again. The patient can repeat this exercise about 5 times depending upon their level of postural fitness.

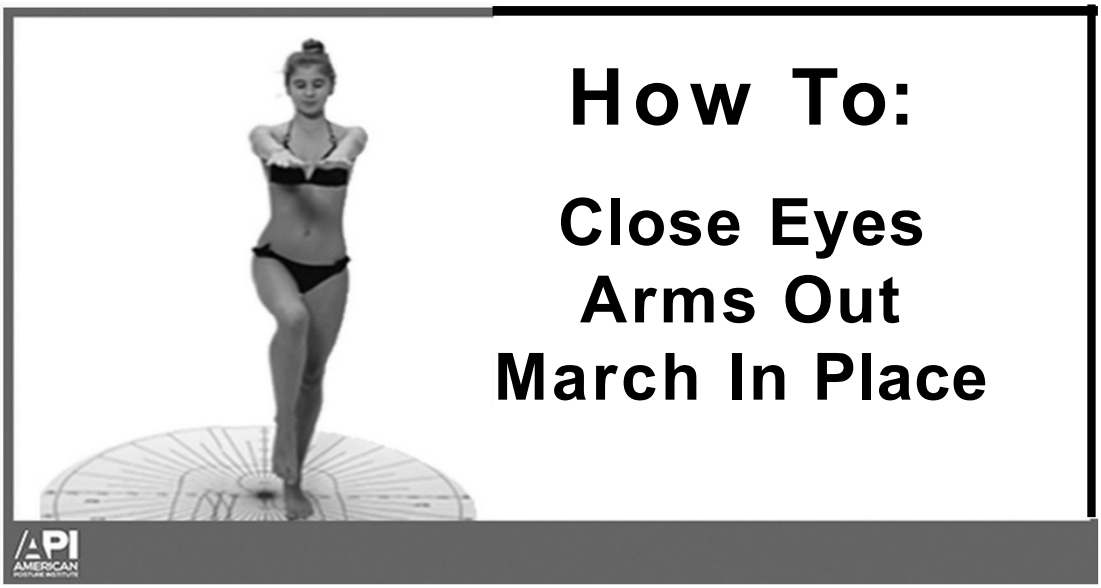
2. SMALL EYE CIRCLES

are also performed by utilizing a pen tip and following the pen tip with the eyes. The patient will follow the pen tip in small circles around their eyes. They will slowly move the pen themselves, following the motion of the pen with their eyes in a small circle. If the left eye was divergent, move the pen tip in front of the right eye and perform eye circles, this creates more convergence for the weak eye. Patients will perform eye circles daily for 30 seconds to 1 minute based upon their level of postural fitness.

VESTIBULAR EXERCISES: BALANCE TRAINING

The vestibular system controls not only your ability to hear and interpret auditory input, but also your balance and equilibrium. To test for vestibular weakness you will perform the Fukuda Test. Have the patient stand in normal posture with their arms out in front. Ask them to close their eyes and to march in place. They should march at a rapid, but controlled pace for about 50 steps.

Before starting the test, have a marker on the floor or have them stand in front of your posture grid. When they open their eyes, compare the stopping position to where they started. The patient will march to the side of their vestibular weakness. So for example, if they marched left, they have a left vestibular deficit.

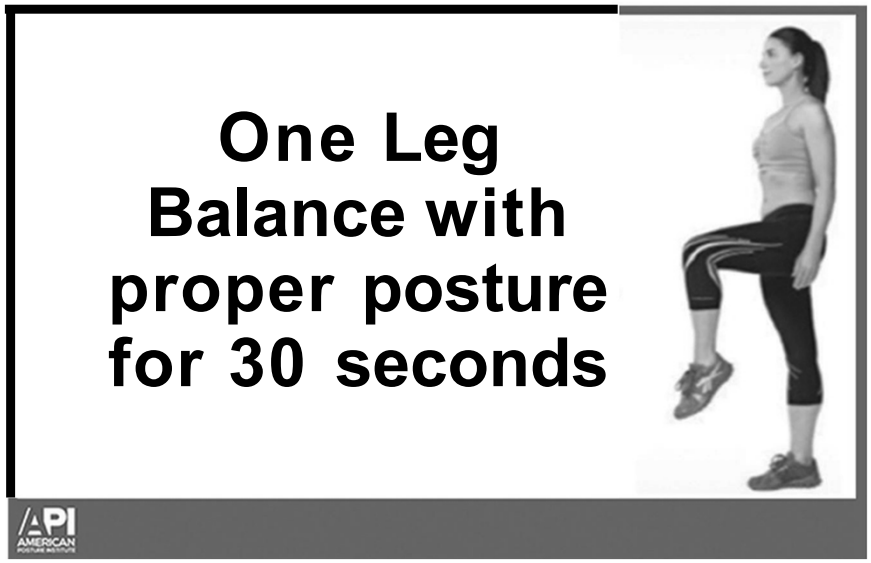


Your patient will focus on the side that was weak during the Fukuda step test to build their postural fitness. You can choose from one of the following options, or do all with different patients.

1) ONE LEG BALANCE:

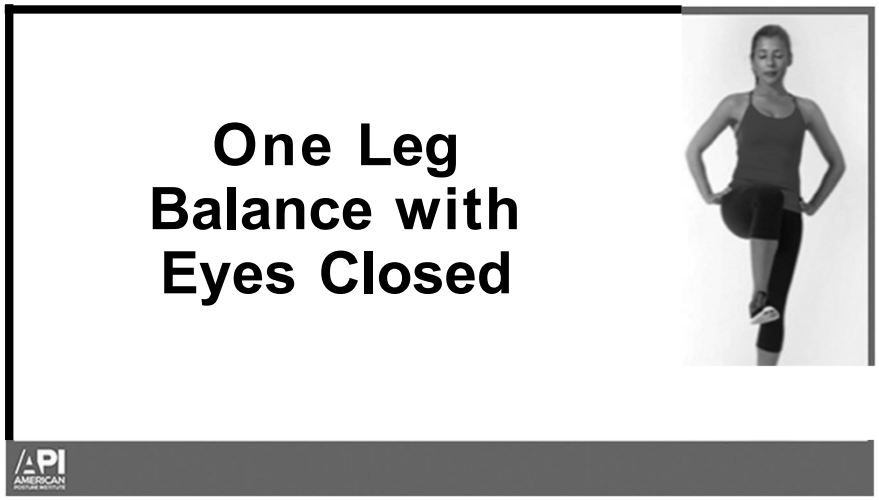
The first exercise is one leg balance. Have the patient stand on one leg with proper posture for 30 seconds. Check their posture to make sure that they are balanced with their shoulders back, head back with their ear aligned over their shoulder, eyes forward and parallel to the horizon, neutral pelvis, a 90 degree angle at the hip and the knee of the raisea leg, and both feet pointing forward.

Please note, if the patient cannot balance for 30 seconds with proper posture, have them hold this position with their hand against the wall for stabilization as tl-iey develop their postural fitness.



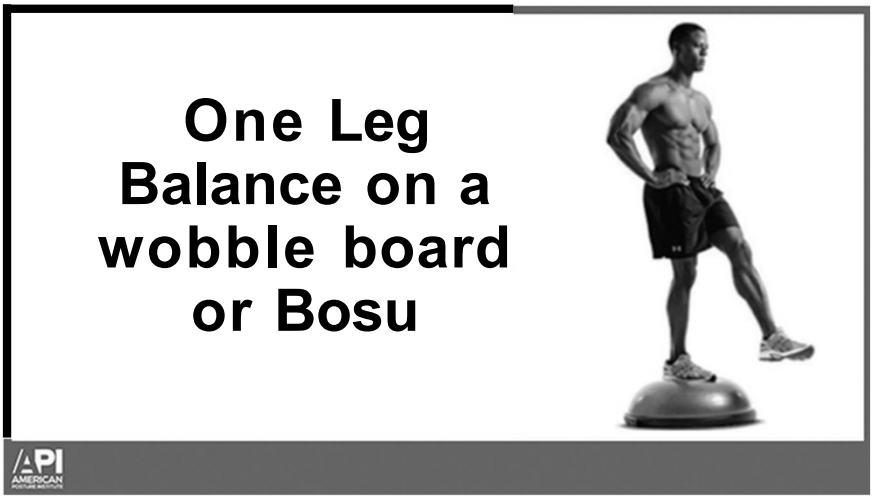
2) EYES CLOSED:

When they can do one-leg balance for 30 seconds with proper posture have them advance by closing their eyes and maintaining their balance for 30 seconds with their eyes closed. Eliminating the visual field of gaze makes the exercise more challenging for the vestibular system.



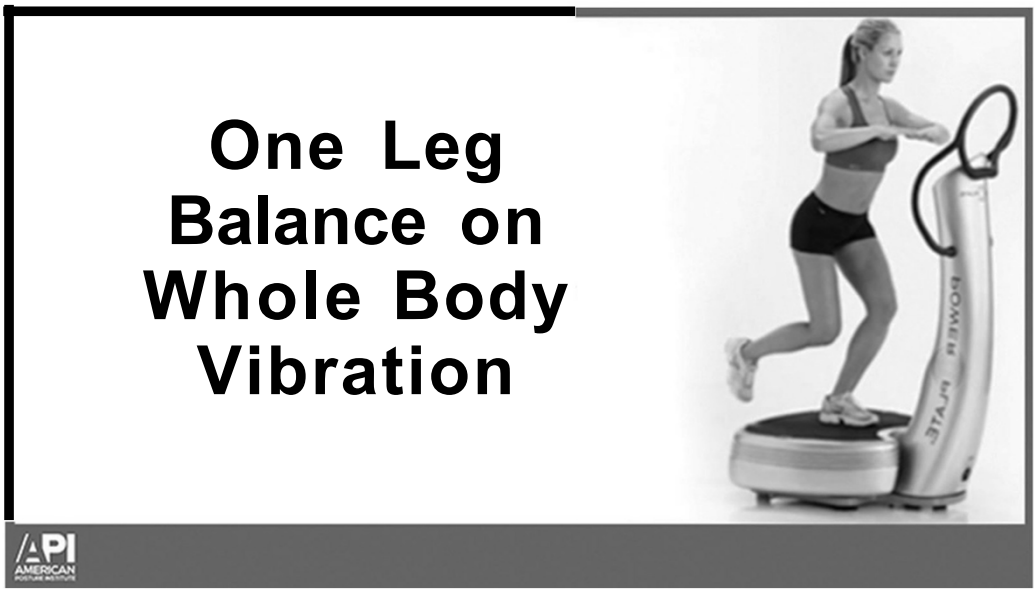
3) WOBBLE BOARD:

The next progression is to perform one-leg balance on a wobble board or on a bosu ball. With the unstable surface the patient engages their vestibular system for upright and balanced dynamic posture. The patient should hold this position for 30 seconds.



4) WHOLE BODY VIBRATION:

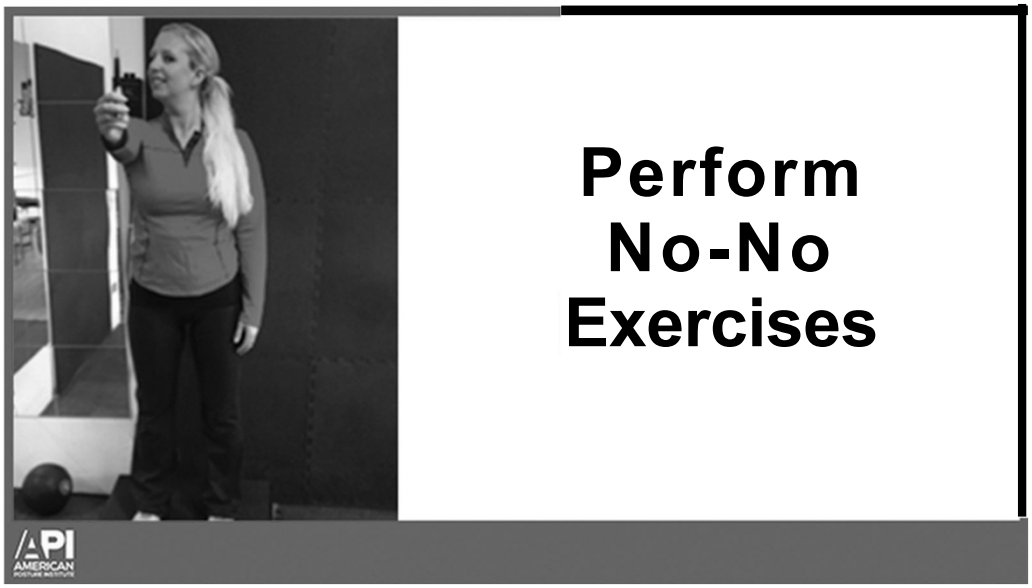
Whole body vibration is a great stimulus for building postural fitness of the vestibular system. If you don't have whole body vibration in your office, you can also get a handheld vibration tool and apply vibration to the weak side, specifically to the hands and feet on that side. If you want your patients to do Vibration Therapy but don't have a vibe plate, you can also create their vestibular training plan for them, then refer them to a local gym or fitness center for utilization of their whole body vibration machines.



5) GAZE FIXATION "NO-NO" EXERCISES:

Another powerful tool to stimulate the vestibular system that is absolutely free is gaze fixation with head movements. Have the patient fixate their gaze centrally on their finger and move the head back and forth. This is called a no-no exercise because they are moving their head back and forth in the horizontal plane as if nodding their head no. The patient performs this for about 5 times. They can perform it while standing, while doing one-leg balance, and while on the whole body vibration plate depending upon their level of postural fitness.

After performing one or multiple of these therapies, re-test the patient by performing the Fukuda Step Test again. They should be able to march in place, or at least demonstrate less horizontal displacement as they march in place.



SPINAL STABILITY FOR SENSORY AND MOTOR INTEGRATION

The spine is the communication pathway for all sensory and motor input and output of the nervous system. The purpose of working with the spine is to optimize sensorimotor integration and to target the midline aspect of the cerebellum called the vermis. The vermis coordinates axial stabilization of the midline structures, primarily the spine.

To determine if there is a midline cerebellar deficit have the patient perform a Romberg's Test where they close their eyes while standing with their hands to their sides and their feet together. If the patient demonstrates postural sway they have a midline cerebellar deficit. The side that they swayed to will be the cerebellum that we are focused on activatimg.

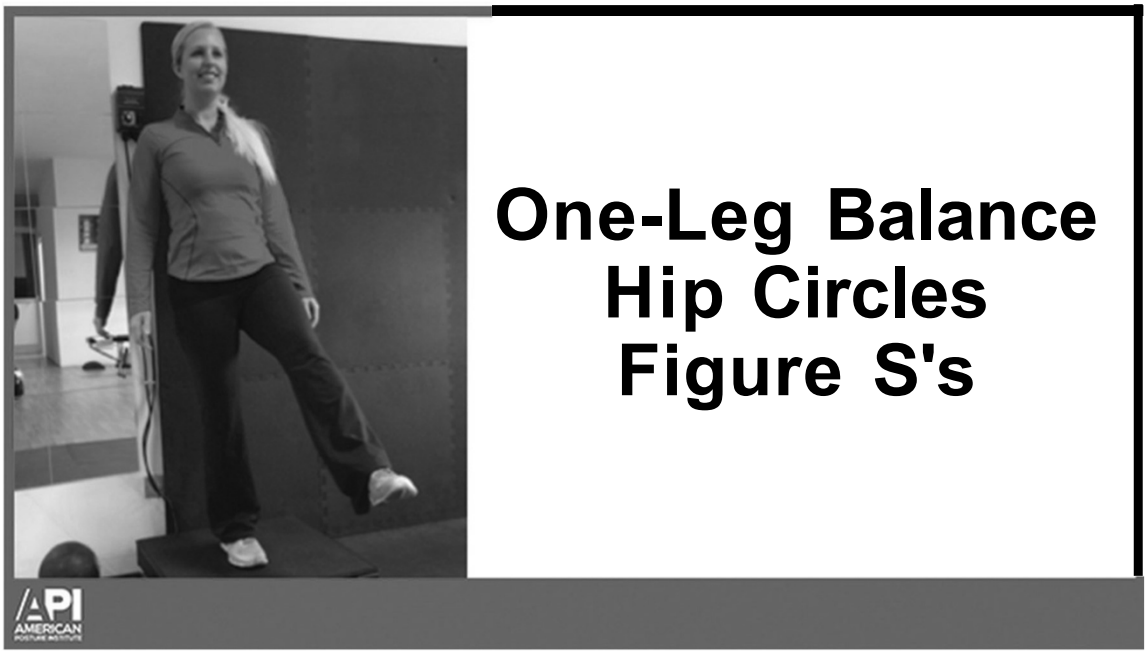
Once the patient has performed Romberg's Test, if there was a noticeable deficit you can utilize the "manipulate, mobilize, or stimulate" protocol of correction to activate the midline cerebellum.

1) WALL POSTURE:

To mobilize the spine the patient can perform the exercise Wall Posture. The patient stands against the wall with their feet out one step forward. The patient's head, shoulders, and hips are against the wall and their legs are straight. They start with an arch of their lumbar spine, then they flatten their back against the wall with a controlled movement of the pelvis down and forward. The pelvis is touching the wall throughout the movement, and the legs are straight. With controlled movements the patient slowly alternates from an arched position of the low back, to having the low back flat against the wall. They should perform this movement five times per day based upon their level of postural fitness.

2) COMPLEX MOVEMENTS:

The brain craves complex movements. Complex movements are an effective stimulus for the cerebellum. When you evaluated postural sway during Romberg's Test, which way did the patient sway to? On the ipsilateral side of postural sway have the patient perform Figure 8 movements with their hands and feet and hip circles. These complex movement patterns are an important stimulus to the cerebellum for better coordination and for better axial stabilization. The patient should perform 5-10 repetitions based upon their level of postural fitness.



Do you see how easy it is to start thinking like a Postural Neurologist? These tests and corrections can greatly impact the quality and longevity of the postural correction results with your patients. Implementation is simple, and won't cost you a large investment of time or finances.

To learn more about becoming a Certified Postural Neurologist from the American Posture Institute, visit this link www.AmericanPostureInstitut.com. The Certified Postural Neurology online certification is an in-depth certification designed to teach you how to quickly and effectively determine brain based postural dysfunctions and get immediate results through specific targeted corrections.

Getting superior clinical results that are predictable and objective is the best way to grow your practice. Postural Neurology is the answer to sustained brain-based postural correction results for your patients.

Your success is our priority.

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