

Body Mechanics--Posture, Alignment & Core

Proper Alignment

Proper body alignment allows you to safely perform different tasks throughout the day, and to do so in a way that does not require you to exert unnecessary energy. When your body is not in alignment, your muscles and joints must compensate in ways that increase strain and fatigue.

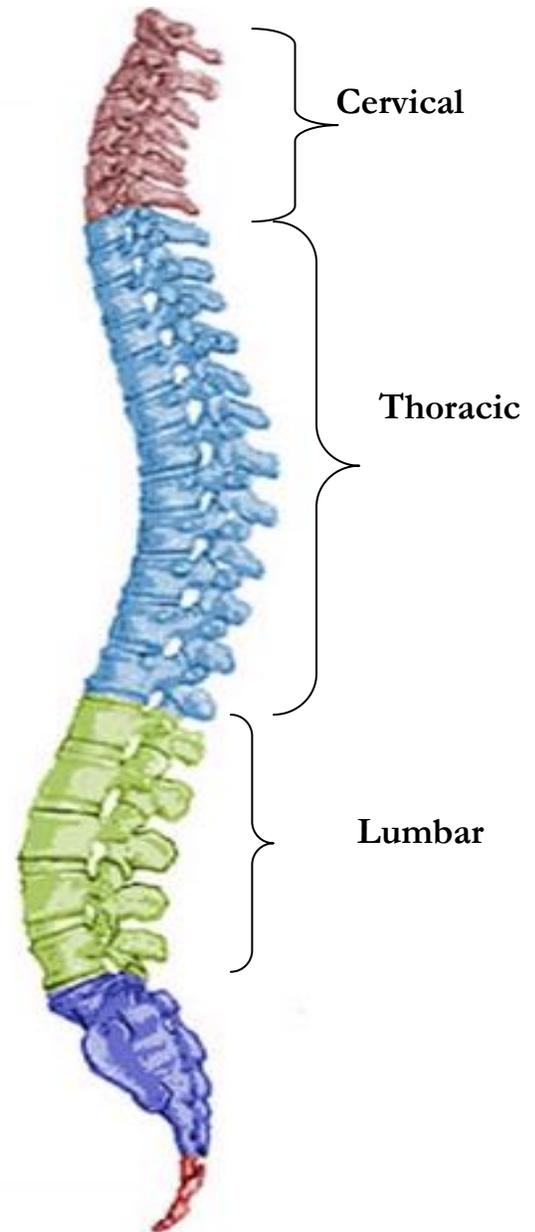
Good posture is essential for proper body alignment. Muscles, joints, and internal organs all function more efficiently when you maintain good posture and alignment. They allow you to protect your body during movements such as lifting, carrying, or changing positions.

Your Spine

Your spinal column consists of a series of vertebrae, which are divided into three main areas.

- Cervical (neck)
- Thoracic (upper back)
- Lumbar (lower back)

Each of these areas has a natural curve that acts as a shock absorber. When these curves are maintained properly, the spine is in *neutral position*, the optimal position to help support our bodies and the movements that we make throughout our day.

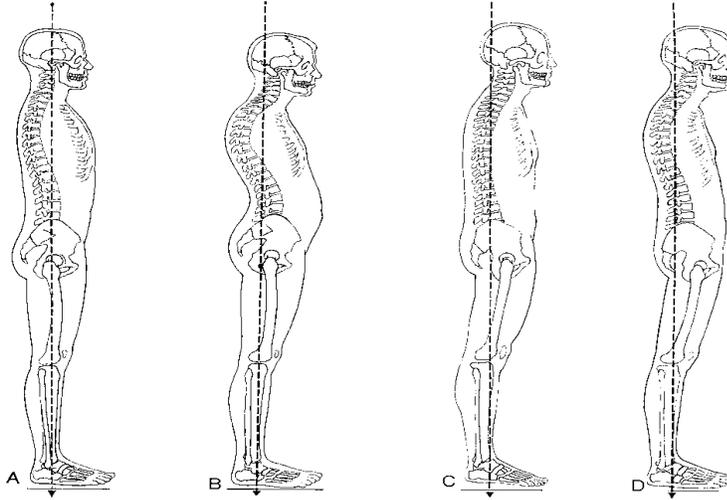


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Getting it Right!

Good posture is a harmonious balance between the muscles and the spine that maintains proper alignment. It allows you to maintain balance and control, which in turn relieve strain on the neck, low back, knees, and feet.



Proper Alignment

Kyphosis-lordosis Posture (Arching)

Flat-back Posture

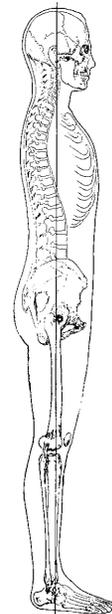
Sway-back Posture (Tucking)

Steps to Achieving Proper Posture:

- Sit or stand upright
- Align your ear to shoulders and shoulder to hips, if standing, also align your hips to knees and knees to ankles
- Bring your shoulders back and down
- Relax your pelvis, avoid arching or tucking
- Take a deep breath and engage your deep abdominal muscles (see above)

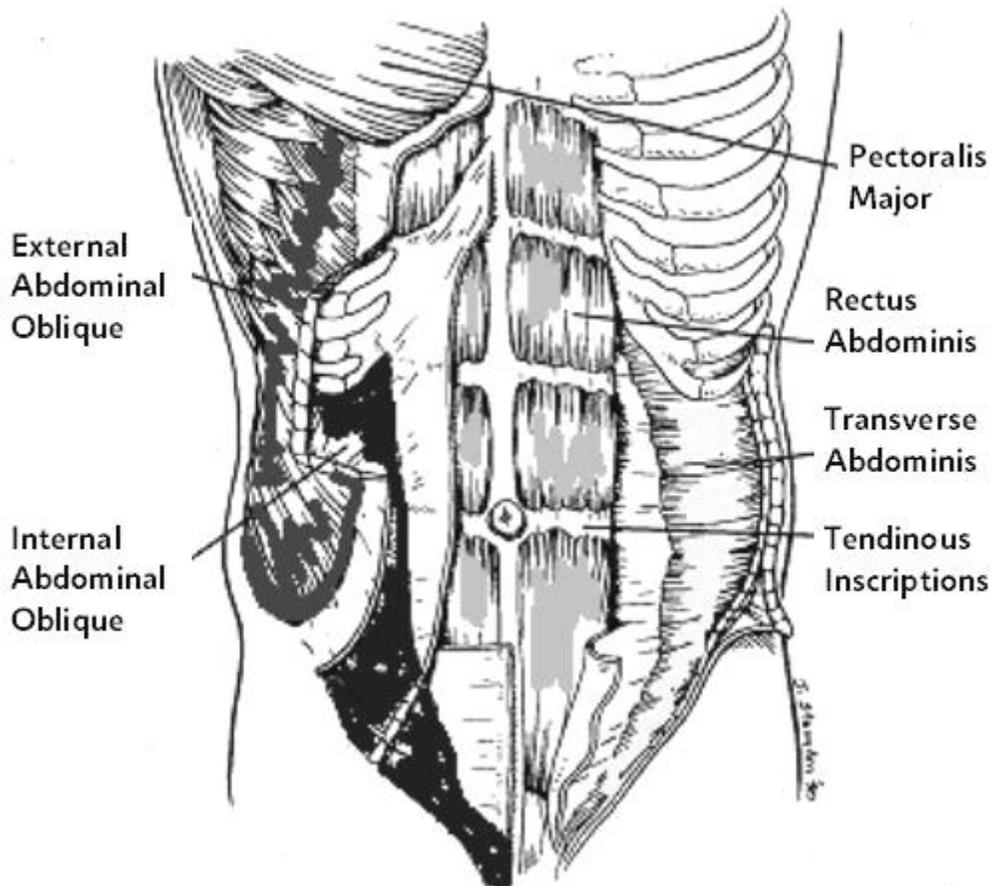
Using Good Posture

- When seated, try to maintain proper posture when you move your arms, utilizing your core muscles.
- When standing, engage your core muscles, and maintain proper form when you move or walk.



The “Core” Muscles

The key group of muscles that are referred to as your *core* include the abdominal, back, pelvic and hip muscles. These work together to support, stabilize, and align your spine, ribs, and pelvis. In active movements (for example, walking, bending, twisting, and rotating), as well as in stationary positions (such as sitting and standing), the core serves as a stabilizer so that you can safely move your body. It also supports your trunk to alleviate pressure and strain on joints, ligaments, tendons, and other muscles in the body.



Muscles of the Abdominal Wall

Why is Core Strength Important to People with MS?

Weakness and fatigue are common in people with MS, and they often cause people to be less active during the course of their daily lives. This inactivity often leads to muscle weakness, which can contribute to pain and possible injury. Maintaining core strength is a critical, yet often overlooked component needed to sustain your daily activities. Many people with MS can improve their balance and posture, better manage their energy, and experience better movement in daily activities, all as a result of strengthened the core. A strong core can improve postural control during movements such as sitting, standing, and walking.

Discovering your “Core” Muscles

In order to use your core muscles to promote proper posture and alignment, you must first find them in your own body.

To locate the deep abdominal muscles, place your hands on your lower abdominal area and cough very loudly. You will feel these muscles tighten up or contract.

What Exercises Improve the Core?

There are many different ways to focus on the core. Including an unstable surface (such as stability balls, foam boards, dyna disks, or a folded towel) during strength or flexibility training engages the core stabilizing muscles. For example, sitting on a stability ball while doing biceps curl will strengthen the core as well as the arms, as core muscles must contract in order to maintain the body's balance through the movement.

You will learn specific exercises during this course that will help strengthen your core.

Multisensory Organization

Balance is maintained through a complex interaction of the central nervous system (CNS) and involves three primary sensory systems:

- Somatosensory
- Visual
- Vestibular

Our muscles respond to input from all three sensory systems to anticipate changes that will affect action as well as respond to changes that have already occurred.

Somatosensory System

The somatosensory system relies on receptors in the skin and joints to detect events in the environment and send that sensory information to the CNS. This system, for example, is what allows you move your foot in any direction while your eyes are closed and know which way your foot is moving without having to see it. To help with balance, it sends information to the brain about the type of surface you are on. These receptors also allow you to use the firm ground as a reference point to verify that you are balanced. It is, therefore, difficult to utilize this sensory input when you are standing on ground that is uneven yet firm, such as a thick carpet, grass, or sand, or even when you are wearing soft-soled shoes.



Visual System

The visual system uses visual references to determine your body's position in space. For example, when you are sitting in your stopped car and the car next to you suddenly moves, there is a brief moment when you feel as if you are the one who moved.



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This occurs because your reference point just moved, and you quickly adjust. Maintaining a fixed gaze on an object will help to strengthen the way you use your visual system and can help you maintain your balance.

The visual system is typically the most dominant of the three systems. It provides important information that allows your body to adjust for obstacle in your path, the height of the curb, or an uneven ground surface. Impairments in vision that are common with MS may include decreased depth perception, increased sensitivity to glare, and slow accommodation to changes in light. All of these can affect your balance.

Vestibular System

Structures in your inner ear provide your brain and eyes with crucial information about the position of your head and its movement in space with respect to gravity. An intact vestibular system allows you to do many activities without losing your balance, such as walk on a cruise ship or a plane in flight, ride an elevator, or turn quickly when walking. The vestibular system also enables you to coordinate your eye and head movements, thus, for example, allowing you to read signs as you walk. The vestibular system is important in these and other activities, especially when the visual and somatosensory systems can't provide sufficient or accurate information.

Body Awareness

Body awareness and relaxation are important components of physical fitness. Together, they provide an excellent way for you to learn how to maintain your body's proper structural alignment in relation to its space during physical activity. Practicing this will lead to a heightened awareness of how you can make adjustments to alignment while sitting, lying down, and moving that will minimize stress on your body, and thus lead to lower levels of stress and fatigue. Yoga, Tai Chi, aquatics, Pilates, and Feldenkrais exercises can be great mind/body tools for relaxation and body awareness that reduce stress by helping to lower the levels of "harmful" stress that affect the immune system and your entire body.

Proprioception: How the Body Senses Itself

When you close your eyes, how do you know where your feet are? Your arms? Your hands? *Proprioception* is the internal sense that tells you where your body parts are without your having to look at them. This internal body awareness relies on receptors in your joints, muscles, ligaments, and connective tissue. They pick up information when muscles bend and stretch as well as when your body is still.

Information about body position travels through the spinal cord and into parts of the brain that are not perceived consciously. Because of this, you are seldom aware of where your body parts are unless you actively think about them. Whatever you are doing, you are probably not thinking about your body position, yet you do not fall off your chair or the couch because sensory receptors and the pathways over which they send information allow you to maintain a position without having to think about it.

MS can interrupt the functioning of this system in many ways. For example, poor proprioception in your fingers can make it difficult to manage the fine motor movements needed to write well, button clothing, or make a peanut butter and jelly sandwich without shredding the bread. Without being able to accurately gauge the weight of things, you're likely to drop pencils or use so much force to pick up things that you hit yourself in the face.



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In the same way, poor sensation in the feet contributes to the walking difficulties experienced by many people with MS, and can be a contributor to falls.

Since proprioceptors detect the stretch and pull on muscles and joints, and tell the brain just how much tension the muscles need to push, pull, or lift something, impaired proprioception robs the body of key information needed to maintain good muscle tone.

Posture & Body Mechanics Activity

Sitting Position

- Maintain good posture when sitting. Sit all the way back in your chair against the backrest. Keep your knees equal to or lower than your hips, with your feet flat on the floor or on a footrest. Avoid crossing your legs over the knees.
- When working, work at a reasonable pace and take frequent stretch breaks. Take one- or two-minute breaks every 20-30 minutes, and five minute breaks every hour. Try to get up and move around every few hour.
- Practice deep breathing in the sitting position.
- Now sit a little forward and upright in your chair, with your feet hip width apart. Place your hands on top of the thighs. Round your back and tilt the pelvis forward into a spinal roll; let your head fall forward and hold this position for five seconds. Release and lead with the pelvis moving forward extending through the abdominals, sternum, neck, and head. Hold for five seconds. Repeat five times. Now use your breath. Exhale on the spinal roll down; inhale on the forward roll up.
- Now lean forward in your chair in preparation to stand. Hinge at the hips; press through your feet into the floor and squeeze your glutes. Hold 5 seconds. Repeat 5 times. On the 5th time, exhale and press up into a standing position

Standing Position

- In order to maintain balance, your line of gravity must fall within the area of the base of support. Poor balance can make gait symptoms worse, cause you to lose coordination, produce a constant under- or overshooting of limb movements, and result in abnormal balance function in the inner ear.
- Stand with your feet about four inches apart or in a comfortable width for stability. Rotate your pelvis forward and backward by slightly slouching and arching your back until you find a balanced, pain-free, mid-range position. Extend this through the ribs, sternum, and head to elongate your spine and center. Gently press your feet into the floor with the knees slightly bent. Use the abdominal and back muscles to maintain this neutral position. Maintaining a neutral spine helps protect against injury.