

How to Correct Imbalances in Walking Biomechanics

by [Justin Price, MA](#)

Participating in a program of regular exercise is a good idea at any stage of life. One of the most popular forms of exercise is walking, and it's an ideal [physical activity](#) for older exercisers because they generally feel confident performing the required movements—after all, they've been doing them all their lives (Williamson 2007). Though baby boomers and older people appreciate the simple, healthful benefits of walking, a combination of musculoskeletal dysfunctions and everyday aches and pains can make it difficult to walk regularly (Lee et al. 2008).

Fortunately, you can identify the common movement imbalances and compensations people develop during a lifetime of walking. Once you've noted these issues, a [corrective exercise program](#) can help you overcome them (Solberg 2008).

Walking Movement Challenges

The gait cycle requires the foot, ankle and surrounding soft-tissue structures to have enough mobility and flexibility to accept and transfer weight forward and from side to side (Chapman 2008). Weight transfer also requires the hip on the load-bearing side to have enough mobility and [flexibility](#) to let one leg travel behind the body so the other can lift off the ground and swing forward. The hip must be mobile and flexible enough to rotate inward so that weight transfers to the other side of the body before the swinging leg touches the ground (Chapman 2008; Price & Bratcher 2010).

Additionally, the structures of the upper body need enough flexibility and mobility to minimize lower-body stress during repetitive walking motions. Swinging the arms and rotating the torso help to propel and coordinate the lower body during gait (Chapman 2008; Price & Bratcher 2010). All of these movements minimize stress to the feet, ankles, knees, hips, lower back, shoulders and neck.

Common Movement Imbalances and Compensations

The most common movement imbalances and compensation patterns from walking show up in the sagittal (forward and backward movements), frontal (side-to-side movements) and transverse (rotational movements) planes. Addressing these problems can improve your mobility and flexibility, reducing their likelihood of developing pain or [injury](#) (Whittle 1991; Price & Bratcher 2010).

Sagittal-Plane Compensations

Walking involves many forward and backward movements. For instance, bending the ankle forward correctly and transferring weight onto one foot when walking are predominantly sagittal-plane motions (Knudson 2007). The motion of the leg traveling behind the body is also a chiefly sagittal-plane movement.

When [walking](#), someone who lacks the requisite flexibility and mobility to effectively perform these movements will likely compensate by transferring other parts of the body forward (Yates 2009). For example, a person may round his shoulders and upper back

(excessive thoracic kyphosis) or just his head out to tip his body weight forward to make up for a lack of forward mobility in the ankles and hips.

Another person may tilt her pelvis down at the front (excessive anterior pelvic tilt) to advance her center of gravity. This pelvic tilt is usually accompanied by overarch of the lower back (excessive lumbar lordosis).

It's easy to see these compensation patterns in your older people by watching their gait from a side-on perspective. While compensations may help them continue to [walk](#) (albeit incorrectly), these [dysfunctional movement patterns](#) can lead to neck and shoulder pain, disk degeneration, lower-back pain, sacroiliac joint dysfunction, and hip pain.

Frontal-Plane Compensations

Walking also involves side-to-side movements, such as rolling the foot and ankle toward the midline of the body to transfer weight from left to right and vice versa. In older walkers, restrictions in the feet and ankles can prevent lateral movement, causing compensation patterns that show up as deviations elsewhere (Whittle 1991).

For example, people with limited side-to-side foot and ankle mobility may tilt or bob their head from side to side while walking toward (or away from) you. You might notice a marked drop in one shoulder (or both) as they walk, indicating that the spine is swaying excessively from side to side to compensate for frontal-plane immobility in the feet and ankles.

If you don't address these issues, you may develop neck, shoulder and back pain.

Transverse-Plane Compensations

Walking requires hip rotations that transfer weight and regulate swinging of the arms. People with poor mobility and flexibility in their hips and torso often develop compensation patterns (Whittle 1991). For example, if the torso does not rotate effectively, disproportionate or unbalanced arm swinging can become a problem (on one side or possibly both sides), causing excessive stress to the neck and shoulders. Alternatively, the [lumbar spine](#) may suffer excessive rotation if the hip cannot rotate effectively. This over-rotation can increase shearing forces on the spine and lead to further disk degeneration. You can identify these movement imbalances by watching yourself in a mirror as you walk towards it.

Retraining Strategies

Integrating corrective exercise strategies into your programs will increase flexibility and mobility. It's best to adopt a step-by-step approach, rejuvenating and regenerating soft-tissue structures with [self-myofascial release techniques](#) before introducing stretches and joint mobilization techniques. [IDEA Fit Tips, Volume 16, Issue 6](#)

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