"Asymmetry, Lateralization, and Alternating Rhythms of the Human Body"
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Part 4: How Does One Reconcile an Asymmetrical Neuromuscular System?

Perhaps as a consequence of our asymmetry there are some subsequent negative aspects? Zaidi states that "symmetry in bilateral traits are highly correlated with the amount of stress experienced during development. Adaptive development requires the organism to resist genetic and environmental stresses that disrupt the genetic plan for growth, a buffering capacity termed developmental stability. Individuals are presumably buffered against such developmental insults by employing homeostatic mechanisms to produce the ideal phenotype. Developmental instability is revealed by fluctuating asymmetry, thus fluctuating asymmetry is often used as a proxy to quantify developmental stressors and explore the effects of these developmental perturbations on an organism's health, fitness, and behavior. The effect of developmental perturbations on an organism's functional asymmetry level appears to be trait-, sex-, and stressor-specific and dependent on the developmental stage of the individual." (Zaidi, 2011) It is argued that more symmetric people tend to be more intelligent, have a better memory, and are less impaired by drugs. They also tend to have a higher basis for sexual attraction. From a biomechanical perspective, it is reasonable to assume that mechanical asymmetry can create inefficient distributions of stress and strain in a system of paired parts.

What is not typically accepted amongst the healthcare community is that the neuromuscular postural system is asymmetrical. It is normal and common for individuals to favor standing on their right extremity in addition to using their right hand. This is due to a number of influences. The first being brain lateralization where a dominant left hemisphere for motor tasks favors right body dominance. The next driver, and probably the most significant, is asymmetrical organ arrangement. Because of the right sided liver positioning underneath the right diaphragm, there is a cephalic directed pressure up against the diaphragm. This actually helps maintain a proper functional domed position of the diaphragm on the right with apposition against the basal internal rib cage called the zone of apposition. Maintaining a proper zone of apposition is crucial for efficient respiratory function. On the other hand, the left diaphragm does not have as big of a piston (stomach) underneath it driving it superiorly and thus is not able to maintain as good of a zone of apposition. Furthermore, the girth and power of the diaphragm differs side to side. The right hemidiaphragm (perhaps in evolutionary developmental response to the force of the liver) is thicker and stronger than the left. As a result of the biomechanical and power disparity between the two sides, the right hemidiaphragm attachments to the spine (~T8-L3) will rotate the spine to the right. Due to this anatomical finding amongst all human beings (except in cases of situs inversus where the organs are reversed to the other side) this will be the prevalent asymmetrical postural pattern regardless of handedness. Furthermore, due to a higher population frequency of right handedness, our society reinforces this asymmetry via environmental adaptations geared for the right handed individual who prefers to stand on their right leg. However, even in a left handed individual, the torsion imparted through the body due to the asymmetrical diaphragm will also propel them to favor standing on their right leg. This is not to completely discount situations where people may prefer to stand on their left leg or both legs. In these cases, it is maintained that these behaviors are typically a result of compensation and adaptation that has occurred in response to the right leg dominance. In other words, individuals who habitually stand on both legs or the left are attempting to find more of their left leg. The question then becomes "Are they properly accomplishing this with synchronized integration throughout the rest of their body?"

Due to the right T8-L3 spinal torque driven by the asymmetrically powered and positioned diaphragm there is a resultant pattern of compensation throughout the body in an effort for the limbs to be oriented in a forward progression state parallel with the face and eyes. The result of this force creates a domino effect of three dimensional compensation occurring superiorly all the way up to the craniomandibular and visual systems and inferiorly down to the feet. Essentially, every human being has some degree of three dimensional curvature in their spines and body. The ultimate result of this tri-planar postural torsion is that we have a pattern of primarily functioning in the right stance phase of gait. Another particularly significant consequence of this spinal torque is the effect it has on rib cage positioning and subsequent respiratory mechanics. Essentially, the left side of the rib cage is relatively externally rotated (over-inflated)

compared to the internally rotated (under-inflated) right. This respiratory pattern induces additional compensatory mechanisms in the body, particularly in the cervico-cranio-mandibular system.

This abundantly prevalent state of asymmetry amongst humans has huge implications for any healthcare professional dealing with the neuromuscular system. Essentially, because the left and right sides of the body are positioned differently, there are resultant differences is muscle length influencing force production capabilities. Muscles that are shorter and stronger on one side of the body tend to be longer and weaker on the other. Therefore, they must be treated differently. Ron Hruska, the founder of The Postural Restoration Institute (PRI) is the pioneer of this concept amongst the healthcare community. This institute's core philosophy is grounded in the tenet that the neuromuscular postural system is asymmetrical and thus treats the left and right sides of the body very differently depending on the possible predictable patterns present.

The Postural Restoration Institute also maintains that there is a neuromuscular coupling amongst chains of muscles that correspond to being either in right stance (dominant) or left stance (nondominant) of the gait cycle. Essentially, the body has two functional neuromuscular phases and within each phase there must be a 3 dimensional synchrony of movement and coordination from the foot up through the entire body including the jaw, cranium, vestibular, and visual systems. Any glitch in the chain can impact the rest of it. However, due to the inherent predictable pattern of asymmetry previously explained, there are common patterns of dysfunction that can be reliably tested and treated using the PRI approach.

There is another important consideration when interacting with a 3 dimensional asymmetrically torqued body which involves a paradigm shift from traditional manual therapy approaches. When the body is in an asymmetrical position there will be a change in orientation amongst all the involved joints. For example, because the pelvis and lumbar spine are typically oriented to the right, the femurs will compensatorily rotate (externally on the left and internally on the right) to maintain an aligned forward facing position. The resulting changed femoral acetabular relationships will also reflect ROM discrepancies. For example, in an intact left femoral acetabular joint (meaning secure joint capsule and ligamentous support) because the femur is already rotated externally it will display decreased excursion going in that direction and increased range of motion going into internal rotation. In the traditional manual therapy world, this would be interpreted as a left hip joint restriction and range of motion limitation for external rotation when in reality it is the malposition that is dictating this presentation. Therefore, to mobilize for external rotation would actually perpetuate the problem and potentially create ligament and joint capsule hypermobility.

The principles explained in the example at the hip can be applied to any other joint in the body. It can be a bit overwhelming to consider the impact this concept has on how manual therapists assess and treat. It is therefore imperative to consider the relative orientation and compensatory position of the entire body when deciding if a particular segment or region is truly restricted from a connective tissue “tightness” or due to malposition. The only true way to know if a segment is restricted is to restore a neutral rest position of the suspected segments and then test for restriction. The Postural Restoration Institute teaches how to successfully negotiate these issues.

In conclusion, the bottom line challenge of dealing with an asymmetrical postural system is that it biases the body to function on the right more than the left. This has major implications for the primary human function of walking which requires a rhythmical shifting between the right and left sides of the body. If the body becomes excessively grounded on the right side they will not properly alternate over to the left. This can set the system up for biomechanical and respiratory imbalance. Furthermore, there are additional systems in the body that also display asymmetrical tendencies with side to side rhythm that may become stuck. Part 5 of “Asymmetry, Lateralization, and Alternating Rhythms of the Human Body” will expound on this.

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