Natural Alignment

By Liz Gaggini, M.A.

The goals of Structural Integration require us to understand natural alignment. That is, the alignment that is natural to the person. The alignment they were born to have. The point of this article is that natural alignment is not the same for all bodies. There seems to be a great difference in the preferred alignment of different structures. As you will see, this can be most easily seen as a difference in the preferred positions of the two girdles. But, actually, this difference in natural alignment is a difference in every part of the body.

Alignment is serving the body's needs to orient, balance and function within gravity. A great concept for this is equipoise. Equipoise is equilibrium that is achieved by counter balancing all different parts. The counterbalancing of different parts is the way tensegrity structures are built. So, in understanding natural alignment to be unique, we are saying that we are working with uniquely tensegrous structures, unique arrangements of equipoise.

Needing to regard the unique natural alignment of every person affects all aspects of structural work. It means not trying to bring every body to the same template or the same alignment. Bodies will function best when they are aligned to their natural patterns. The assessment of natural alignment is made easier by some predictable aspects of differently aligned bodies. There are reliable factors of girdle position, spinal curvature and appendicular rotation that can be important clues to a person's natural alignment. These characteristics can be put on a continuum from one type of alignment to another. The spectrum goes from one extreme type of alignment, through neutral and to the opposite extreme.

The three different persons pictured in this article represent different positions on the spectrum of natural alignment. The labels for these positions point to the patterns of pelvic girdle tilt and shift for each structure. This article will not go into a thorough discussion here of tilt and shift. In the article in the 2004 IASI Yearbook, "The Asymmetric Pelvis", the anatomy and biomechanics of pelvic tilt and shift are discussed in detail For this discussion of natural alignment what needs to shared is an understanding that there are different positions that the pelvic girdle and shoulder girdle can have. Some may ultimately disagree with this definition of girdle tilt and shift. However, for this present discussion this is how these concepts are being defined:

Pelvic Girdle Tilt and Shift

Pelvic tilt is usually understood as relative to an arbitrary neutral. Each position can also be understood relative to its opposite, that is, this position of the pelvis is more posteriorly tilted than that position of the pelvis. Because we are going to be comparing different bodies in this article, using the arbitrary neutral to

understand tilt might be misleading. Also, using an arbitrary neutral could lead to some false idolization of neutral as favorable.

In **anterior tilt** the innominate bone is rotated around the transverse axis so that the anterior of the bone is positioned more inferior and the posterior of the bone is positioned more superior. The superior part of the innominate bone is more anterior and the inferior part is more posterior. In addition, there is an in-flare of the innominate bone which has the anterior aspect more medial and the posterior aspect move lateral. To maintain optimal alignment the femur will be rotated more medial. (In anatomical discussions it is agreed that in rotation, medial and lateral describe where the front of the bone is facing. So, medial rotation of the femur means, the front of the femur is turned to face more medial than lateral.)

In **posterior tilt** the innominate bone is rotated so that the anterior of the bone is more superior and the posterior of the bone is more inferior. The superior part of the innominate bone is more posterior and the inferior part of the innominate bone is more anterior. The innominate will out-flare, with the anterior aspect of the bone being more lateral and the posterior more medial. The femur is rotated more lateral.

There are several ways of assessing **pelvic shift** being used in Structural Integration today. The assessments in this article consider shift as a factor of position within the hip joint only. Other assessments use pelvic position relative to torso position. I have found it necessary to understand the biomechanics of shift only within the hip joint. This allows for a more clear connection to the manual and functional correction with a client. But, as important, assessing shift this way provides a wealth of material for understanding the biomechanics of asymmetries.

In **anterior shift** the center of innominate bone is aligned anterior of the shaft of the femur.

In **posterior shift** the center of the innominate bone is aligned posterior of the shaft of the femur.

Shoulder Girdle Tilt and Shift

The assessments of tilt, and this time shift, as well are, are again, going to avoid the problems of using an arbitrary neutral. The positions of shoulder girdle shift and tilt here are understood relative to the rib cage but also relative to the opposite pattern. That is, this one is more anterior and that one is more posterior.

In **anterior tilt** the scapula is more superior in relation to the rib cage. The spine (the top portion) of the is more anterior in relation to the rib cage. The humerus will be rotated more medial

In **posterior tilt** the scapula is more inferior in relation to the rib cage and the spine is more posterior. The humerus will be rotated more lateral.

In **anterior shift** the scapula is positioned with the lateral edge more anterior.

In **posterior shift** the scapula is positioned with the lateral edge more posterior.

Because of the biomechanics involved, that is the shapes of the joints, the lengths and attachments of the various myofascial components and the requirements of movement within a gravitational field, in both the pelvic and shoulder girdle there are certain combinations of tilt and shift that function more optimally when combined together. This article is not going to go into a detailed explanation of why a particular combination of tilt and shift is more or less functional. This detail exists in other publications, in particular, my book , the Biomechanics of Alignment. For now it will suffice to say that, the most optimal alignment is to combine opposing tilt and shifts within each joint. That is, the best alignment, in any one hip joint or shoulder joint is to have anterior tilt with posterior shift (AT/PS) or posterior tilt with anterior shift (PT/AS). This is the **rule of oppositional tilt and shift within joints**. Any other arrangement creates a dangerous misalignment at that joint and sets up a whole-body misalignment that greatly diminishes function.

In addition to this rule of oppositional tilt and shift within joints, there is also a **rule of girdle opposition**. That is, in order for a body to stay up-right in gravity the tilt and shift of the two girdles must counter balance one another. That is, if there is anterior tilt /posterior shift (AT/PS) in the pelvis, there has to be posterior tilt/anterior shift (PT/AS) in the shoulder girdle. This is contrary to the most simplistic interpretations of, what is known in the Rolf Institute as, “Jan Sultan’s model of internal and external”. Though internal/external assessment model has gone through much revision, in its published form and most basic explanations, it is an understanding that: some bodies are aligned more around a flexion of the central axis (internal) and some more around extensions of the central axis (external). This model has brought Structural Integration a long way into understanding the differences in natural alignment and away from an idealized template applied to all bodies.

The rendition here to this understanding of internal and external alignment is that, for balanced alignment, the shoulder girdle must tilt opposite of the pelvic girdle. If they are both tilting forward (flexing) too much of the body mass falls forward and uprightness cannot be maintained. If the are both tilting backward (extension) too much body mass falls backward. So, in natural alignment if the pelvic girdle is AT/PS then the shoulder girdle will be PT/AS and vice versa.

There are other elements in the Sultan model that are important. In the internal structure the pelvis is anteriorly tilted with medial femurs and the spine has more

anterior to posterior (A to P) curvature. In the external structure the pelvis is posteriorly tilted with lateral femurs and the spine has less A to P curvature. In the Sultan model there is also an understanding of lines of transmission for weight baring and lift that are different for each structural type. Lines of transmission will be discussed later in this article as an assessment for natural alignment.

One final thing needs to be said before a detailed assessment of the bodies in the pictures that follow. With almost impossibly rare exception, all bodies are aligned asymmetrically. Let's say that differently just to be sure this important fact is understood. With almost impossible rare exception, every body is aligned differently on its left side than it is on its right side. There is an assumption that this tendency to asymmetry **is not** genetic, but rather, is a factor of learning, injury and patterning. The assessment of natural alignment can and has to be made regardless of any asymmetries. That is, natural alignment is more primary. The assumption is that the natural alignment **is** genetic, and not a factor of learning, injury and patterning. As will be shown with the bodies in the pictures, the primary pattern of natural alignment exists even within the asymmetries.

The overlay of asymmetry onto the opposing pattern of the girdles in natural alignment can create make assessing natural alignment more difficult. There is a rule in asymmetries regarding the arrangement of tilt/shift in the girdles. This is the rule of contralateral congruence. With rare exception, In an asymmetry the tilt/shift pattern of the left shoulder will be same as the tilt/shift patter of the right hip. The same will be true for the right shoulder and the left hip. But remember these patterns will be secondary to the pattern of natural alignment which will be symmetric.

Figure 1 – Natural Anterior

Saying “natural anterior” is short hand for saying, natural AT/PS in the pelvis and PT/AS in the shoulder girdle. This expresses the rules described above of opposing tilt and shift within joints and opposing tilt/shift patterns between girdles.

Even though this woman has an asymmetry (her left side is different than her right), there is an obvious tendency to natural AT/PS in the pelvis and PT/AS in the shoulder girdle. In fact, she is fairly high on the spectrum toward extreme natural anterior.

What we see are innominate bones that are rotated more in anterior tilt and shifted posterior of the central axis of the femur. Both femurs are in medial rotation. This is true for both innominates and both femurs even though, in her asymmetry, the right innominate and right femur are less so than the left. In the shoulder girdle both scapulas are in posterior tilt and anterior shift. The humerus’ are laterally rotated. With the asymmetry, the left shoulder and arm are less so.

Other structural characteristics are evident that are classic to a natural anterior. There is a strong anterior to posterior curvature throughout the spine, the feet are more pronated. The sacrum and occiput are more curved and shortened.

Figure 2 – Natural Posterior

Natural posterior is short for natural PT/AS in the pelvis with AT/PS in the shoulder girdle.

This man's asymmetry is stronger than that of the woman above. Yet, neither innominate for the man is as AT/PS as both innominates of the woman in Figure 1. Both of his shoulders are AT/PS. Because of his asymmetry, the left innominate is less PT/AS than the right and the right shoulder is less AT/PS than the left. The primary pattern of PT/AS in the pelvis with laterally rotated femurs is primary and dominates any tendency to AT/PS in the left innominate and femur. The same is true in the shoulder girdle. The primary pattern of AT/PS is primary and dominates any tendency to PT/AS in the right shoulder.

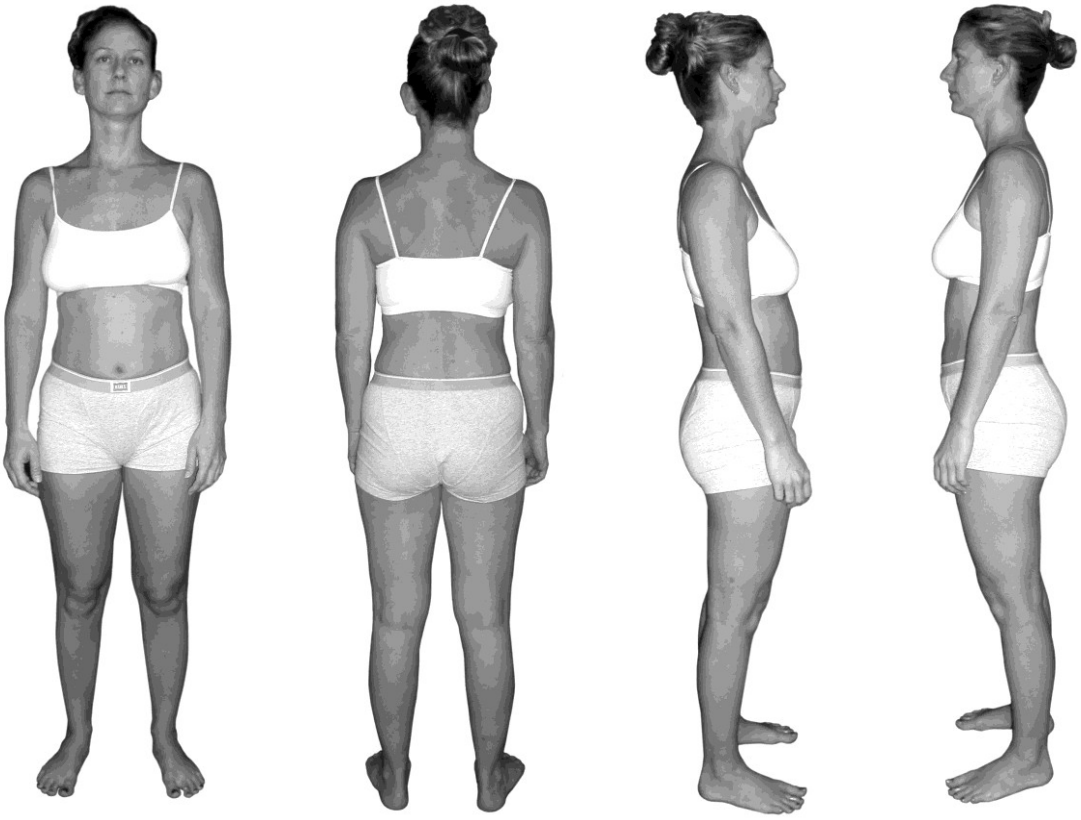
Other structural elements characteristic of natural posterior are evident. The spine has less anterior to posterior curvature, the foot is less pronated, the sacrum and the occiput are more elongated and flattened.

Figure 3 – Natural Neutral

The natural neutral is an assessment that is often difficult. Frankly it has to be based on personal experience of many more extreme natural anterior and posterior tilt structures so that the natural neutral of a structure like this woman has is clear.

Neither girdle shows a strong proclivity to either AT/PS or PT/AS. The femurs and the humerus' neither show any proclivity to medial or lateral rotation.

There is an asymmetry here (there virtually always is). The right side pelvis and left side shoulder girdle are AT/PS. The left side pelvis and right side shoulder girdle are PT/AS. Yet, once again, the natural neutral quality of this woman's structure is primary.



The other structural indicators are also neutral. The spine does not show a strong tendency toward anterior and posterior curvature as a natural anterior would. Neither is the spine as straight as a natural posterior spine would be. The feet to dot show a tendency toward pronation or supination. The sacrum and occiput are midway between the shortened and curved nature of the natural anterior structure and the elongated and flattened quality of the natural posterior structure.

Assessing Natural Alignment

There are six **primary assessments for natural alignment**. The three visual assessments that can be made from photographs are mentioned above:

1. Is there evidence of primary elements of bilateral AT/PS Pelvis – PT/AS Shoulder (natural anterior) or, PT/AS Pelvis – AT/PS Shoulder (natural posterior) in the structure regardless of the asymmetry? Or, is there little strong evidence bilaterally of either pattern in the pelvis or shoulder girdle (natural neutral) regardless of the asymmetry?

2. Are there deep or shallow or neither deep or shallow curvatures in the spine, occiput and sacrum?

3. In the appendicular structures is there evidence of a bilateral tendency toward medial or lateral femur and humerus rotation? Or is there no strong evidence of either tendency bilaterally in the femurs or humerus'? Do the feet have a tendency bilaterally toward pronation or supination or toward neither? All of this evidence would be regardless of the asymmetry.

There are two palpatory and one functional assessment that can help clear up any confusion from the visual assessment. They are all based on a tendency in the soft tissue to express a line of maximum density and functional orientation that is typical to the natural alignment.

4. There is a **line of maximum density** running vertically through the fascia of all of the muscle groups such as the hamstrings, quadriceps, adductors, biceps and triceps. In standing it is easiest to assess this in the fascia associated with the muscles groups of the arms. But, in lying the line of maximum density can be felt also in the fascia of the legs and torso. This line will run vertically through the all of the fascia associated with the entire muscle group. It will be more anterior and/or medial in natural anterior structures. It will be more lateral and or posterior in a natural posterior structure.

The palpation needs to be light as any strong pressure will compress the tissues so that a comparison throughout the fascia associated with the muscle group cannot be made. Simply divide the fascia of the muscle group in half. The mid-line will be the line of maximum density in any true natural neutral structure. Any deviation lateral or posterior will be toward the natural posterior side of the spectrum. Any deviation medial or anterior will be toward the natural anterior side of the spectrum. This can be so accurate that it is easy to make and assessments like, 15º natural posterior, 65º natural anterior, or 5º to the anterior side of neutral. The more deviation there is from the mid-line, the more extreme is the natural alignment is toward anterior or posterior. The closer to the mid-line the maximum density lies, the more the natural alignment is toward neutral.

5. The line of maximum density also manifests in the **line of primary shortness** in any muscle group contributing to anterior tilt or posterior tilt in the pelvis or shoulder girdle. (To see detailed lists of these contributors please see the authors manual, "The Biomechanics of Alignment.") For example, a primary contributor to innominate posterior tilt is the hamstrings. There will be a line of primary shortness within the fascia associated with this group. If the posterior tilt is part of an asymmetry in a natural anterior structure then the primary shortness will be in the fascia associated with the medial tendanosis or membranosis. If the posterior tilt is part of an asymmetry in a natural posterior structure then the line of primary shortness will be in the fascia associated with the lateral tendanosis or the biceps femoris.

These lines of primary shortness will be in the same line as the line of maximum density. It just might be easier to find the line of primary shortness for some practitioners or with some structures. It is generally much easier to assess the line of primary shortness in the muscled groups that are contributing to the tilt of a scapula or innominate. However, a line of primary shortness can be found co-existing with the line of maximum density in any muscle group.

6. There is a functional assessment that can indicate natural alignment. This type of assessment can be difficult to grasp in just reading about it. But, here is the information, anyway. The line of maximum density co-exists with a **circle of primary functional orientation** in movement. There is a way of understanding the motion of walking as the spiraling of a double-helix in motion. See the article, "Natural Walking," by Gael Ohlgren and David Clark, Rolf Lines, Vol. 23, #1. Another way of seeing this in walking is, when the motion of the entire body is considered, there is a circular motion around the mid-line. The circle of primary functional orientation is prescribed by this circular motion around the mid-line. The diameter that this circular motion prescribes is different depending on the natural alignment of a particular structure. The more to the extreme end of natural anterior the structure is, the smaller the diameter of this circle of primary functional orientation. The further toward the extreme of natural posterior, the larger the circle of primary functional orientation. Natural neutral would be in between these.

Axial Patterns

The curvaceous quality in the sacrum, spine and occiput of the natural anterior and the not curvaceous quality of those elements in the natural posterior seem to be basic, born with, characteristics of these structures. The understanding that there are these different types of axial shapes is based on assessment of living bodies. An extensive research of the characteristics of numerous skeletons would be good to shed further light on this.

The two sacrums in Figure 4 are real bone. The sacrum on the left is shorter and more curved as it would be in a natural anterior structure. The sacrum on the right is more flattened and straight as it would be in a natural posterior structure.

Figure 4

Look at angle of each of the S1 plateaus in relationship to the bodies of these two sacrums. The S1 plateau is the top of the sacrum. This is the platform that the L5-S1 disk and then the L5 vertebrae rest upon. Compare the two S1 plateaus. In the natural anterior sacrum, the plateau is much more angled toward the anterior. On the natural posterior sacrum, the plateau is more horizontal. The anterior angle of the plateau on the natural anterior sacrum would require the lumbar spine to have a stronger anterior curve than would the lumbar spine that stacked on top of the S1 plateau of the natural posterior sacrum.

In Conclusion – Personal Advice about Treatment

In working with the re-organization of the whole human, considering the unique natural alignment of the person is fundamental. Natural alignment is the first assessment that should be made in any structural integration process. Ease,

functional excellence and well-being in every sense is enhanced when the structure is balanced congruent to its natural alignment. Equipoise, the equilibrium achieved by the counter-balancing of various parts, requires an alignment to the unique structure. Bodies can only truly function as free structures in the field of gravity when they are at ease within this equipoise.

For the practitioner this means that when we work, if some one is naturally anterior or posterior, this is the alignment we need to encourage in their structure. **Taking every structure toward neutral can no longer be a refuge for our work.** We need to consider the appropriate position for all of the elements of the soma when we are making the transformational interventions that are the hallmark of Structural Integration. This means allowing there to be some greater shortness in the fascia associated with the adductors for a natural anterior structure and hamstring fascia shortness in a natural posterior. Of course, it is not just about adductors and hamstrings. All of fascia of the body is involved with these natural alignments.

An assessment that can be of great help with learning to gage the amount of change you need is this.

If you take a structure too far toward the posterior for its unique natural alignment, there will be a shortening along the superficial anterior mid-line.

Try this yourself, no matter what your natural alignment is, take your pelvis into extreme posterior tilt, allowing the femurs to laterally rotate and the scapulas to tilt forward with the humerus' rotating medial. Can you feel the shortening along your anterior mid-line?

If you take a structure too far toward anterior for its natural alignment, there will be a shortening of the spine, usually felt as a compression.

Try this for yourself. Anteriorly tilt your pelvis with the femurs medially rotated, the scapulas posteriorly tilted and the humerus' laterally rotated. Can you feel the compression in your spine?

If you ever see a client stand up after a session and look shorter along the anterior mid-line, you have most likely taken them too far toward a posterior alignment. If you see a client stand up looking shorter or more compressed in the spine, you have most likely taken them too far toward an anterior alignment.

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