the lumbar spine must respond causing spinal, myofascial and diaphragmatic compensations to be reflected through the upper cervical complex, the temporomandibular joint and into delicate cranial structures.

As the right innominate anteriorly rotates, it drags the upper right pole of the sacrum with it creating a left on left sacral torsion as illustrated in figure 4. The lumbar spine must counter by sidebending left and rotating right. The resulting tug on the pelvic diaphragm is usually not a perplexing problem as long as the thoracolumbar spine makes compensatory adjustments (sidebends left/rotates right) allowing the respiratory diaphragm to counterbalance by stretching in an opposing direction.

An in-depth look at the intriguing study of rotational patterns described by J. Gordon Zink in his Common Compensatory Pattern will be presented in the Myoskeletal Zone Therapy chapter. A very brief description here will help tie the short right leg syndrome to the vestibular lateralization theories.

**Zink’s Common Compensatory Pattern (CCP)**

When testing rotation from the cervicocranial to the lumbosacral regions, Zink discovered that approximately 80 percent of subjects who considered themselves healthy had rotational patterns of left/right/left/right, while the other 20 percent had a fascial preference for the sequence of R/L/R/L (Fig 5).

This led him to conclude that, although equal fascial bias in all zones rarely presented itself, the subjects presenting with alternating patterns reported very few health problems, were generally pain-free, and considered themselves to be healthy individuals. He labeled the group presenting with L/R/L/R patterns (80 percent) as possessing a common compensatory pattern and the opposite patterned R/L/R/L “healthy” group (20 percent) as demonstrating an “uncommon compensatory pattern.”

Zink concluded that since both of these assorted pools of subjects presented with counterbalanced rotational patterns, the pelvic muscles that portend the greatest liability for creating and perpetuating dysfunction during vestibularly-driven left pelvic sideshifting are the gluteus medius and minimus. They should fire first in hip abduction. The firing order should proceed with TFL, piriformis, QL, and ipsilateral lumbar erectors. Inferior fibers of gluteus medius/minimus also function as hip internal rotators.

![Fig. 6. Gluteus Medius/Minimus Muscles, Abductors and Internal Rotators.](image1)

The pelvic muscles that portend the greatest liability for creating and perpetuating dysfunction during vestibularly-driven left pelvic sideshifting are the gluteus medius and minimus. They should fire first in hip abduction. The firing order should proceed with TFL, piriformis, QL, and ipsilateral lumbar erectors. Inferior fibers of gluteus medius/minimus also function as hip internal rotators.

![Fig. 7. Firing of Gluteus Medius/Minimus during the Stance Phase.](image2)

In the normal walking cycle, the right gluteus medius/minimus must fire first during the stance phase to “cock” or lift the contralateral pelvis (right pelvic sidebending) so the left leg can swing through. It is imperative that the right gluteus minimus/medius be the first muscles recruited to elevate the contralateral hip so the synergistic stabilizing muscles can perform their specific duties.
they were more adaptive, healthier and better able to ward off stress and disease.

Effects of spinal decompensation in the four transitional zones and resulting altered diaphragmatic function is discussed in greater detail in the following two chapters.

**Counterintuitive Possibilities**

The central theme in *Myoskeletal Zone Therapy®* focuses on the influence cerebral lateralization – due to predictable fetal positioning during the third trimester – has on embryologic development. Eighty percent of vertex births are in a left fetal lie. In this position, the head is flexed and turned left. During the walking cycle, as the mother’s belly moves anteriorly (maternal acceleration), fetal inertia forces the left side of the baby’s head posteriorly. It is theorized that repeated left-sided stimulation affects the baby’s utricle which, in turn, perpetuates early development of not only the utricle but the entire vestibular system. The utricle is considered the most influential organ of the vestibular system. Its duty is to supply a steady stream of updated data concerning position and movement of a person’s head. Other vital inner ear sensing structures include the semicircular canals – anterior, posterior and lateral which lie anatomically in different planes with each intricately placed at right angles to the others. Thus, the combined functioning of this elaborate vestibular apparatus efficiently deals with various head movements: up and down, side to side, and tilting from one side to the other.

Interestingly, cerebral lateralization appears to be a primary influential factor in addressing the perplexing, but fascinating question of limb length discrepancies observed in our offices each day. An in-depth discussion of these theories is presented in the *Myoskeletal Zone Therapy* chapter but an introductory overview is also necessary.

Figs. 8 A & B  Pic. # A is Aphrodites Statue and beside it (#B) is Posterior view of lady.

Figure A and B depict the Common Compensatory Pattern. Although the Aphrodites was sculpted in Greece around 350 BC, it beautifully demonstrates the incredible eye of the early sculptors in describing commonly seen postural patterns. Notice how the left side-shifted, posterior/superiorly rotated pelvis creates a compensatory scoliosis causing the left shoulder to drop. Figure B shows the associated spinal biomechanical adaptations inherent in J Gordon Zink, and Janda’s postural models.
Personal Perspectives on Muscle Substitutions Patterns

In an attempt to combine many of my favorite researchers’ postural models (Zink, Janda, Previc, Geschwind, Pope, Greenman, etc.) into some sort of reasonable therapeutic protocol, I have come to recognize certain predictable substitution patterns that develop from vestibular and motor dominant neurological adaptations. In my opinion, the pelvic muscles that hold the greatest liability for creating and perpetuating dysfunction during vestibularly-driven left pelvic sideshifting are…the gluteus medius and minimus. My respect for these often neglected muscles has grown with increased observation and study. I now place them on a level with the other distinguished antigravity structures such as: (Fig. 6)

- **Transversus abdominis**: Through its intimate connection with the thoracolumbar fasciae, multifidus and sacrospinous ligaments, the transversus should not only brace the lumbar spine during forward bending, but also help lift the ribcage off the pelvic girdle with each step.

- **Hip flexors/extensors**: Allow the lower quadrant to spring forward when hip extension firing order patterns are functioning properly. Optimum hip extension firing order during the walking cycle should be: rectus femoris (extend the knee), ipsilateral hamstrings, ipsilateral gluteus maximus, contralateral lumbar erectors, and ipsilateral erectors. Anterior hip capsule adhesions often inhibit the antigravity function of these muscles resulting in disruptive firing order substitution patterns.

The proclamation concerning the importance of gluteus medius/minimus as primary antigravity structures deserves further explanation.

**Abduction Firing Order Substitution Patterns**

As discussed in an earlier chapter on firing order patterns, during hip abduction (raising the extended top leg toward the ceiling while in a sidelying position), gluteus medius and minimus should fire first followed by tensor fasciae latae, piriformis, quadratus lumborum, and ipsilateral lumbar erectors.

To test the firing order in hip abduction, simply assume a left sidelying position and raise (abduct) the fully extended right leg toward the ceiling. The gluteus medius/minimus should fire first followed by their synergistic muscles listed above.

However, during weight-bearing, the gluteus medius/minimus perform a completely different function. During the normal walking cycle, the right gluteus medius/minimus must fire during the stance phase to “cock” or lift the contralateral pelvis (right pelvic sidebending) so the left leg can swing through (Fig. 7). It is imperative that the right gluteus minimus/medius be the first muscles recruited to elevate the contralateral hip so the synergistic stabilizing muscles can perform their specific duties.

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**Tensor Fascia Latae**

Fig. 9. TFL and Iliotibial Tract.
A common substitution pattern for stretch-weakened gluteus medius/minimus is the TFL. The brain frequently recruits TFL to help in abduction efforts. However, the TFL eventually overpowers the gluteals, becomes hypertonic and short, and begins an unmerciful pull on the IT band occasionally leading to IT-band friction syndrome.
All sorts of aberrant muscle substitution patterns can be singled out during the “hip abduction sidelying test” and through keen observation of a client’s gait. These distorted patterns indicate loss of primary antigravity function throughout all lumbopelvic structures. Although some substitution patterns wreak more havoc than others, all create biomechanical breakdown in people whose bodies are unable to compensate at the four transitional zones (lumbosacral, thoracolumbar, cervicothoracic, and cervicocranial), as described by Zink.

**Here’s the Catch**

During prolonged standing, the client’s body weight routinely shifts over the vestibularly dominant left leg eventually creating stretch weakness in the left gluteus medius/minimus. This pattern can be easily tested in your own body to offer clues as to your pattern, e.g., are you ideal (equal fascial bias in all four zones), do you follow the L/R/L/R common compensatory pattern, or does your structure follow a R/L/R/L uncommon compensatory pattern?

Stand with all your weight on the left leg while the fingers of your left hand palpate the left acetabulum (lateral hip) and relax your body. (You may have to hold on to something to reproduce the feeling of prolonged relaxed stance.) Do you feel the hip pop out laterally against your fingers? Now test the right side to see if it pops out more during normal weight bearing. If the acetabulum on the right “gives” more, it is likely that your structure follows an *uncommon compensatory pattern* (UCCP).

Those that feel a stretch weakness on the right side probably fall within the 20 percent that Zink defined as *uncommon compensatory pattern*. Some will not feel stretch weakness in the gluteus medius/minimus during prolonged standing. This small percentage of the population where there is equal fascial bias at all four transitional zones would be considered “ideal”, indicating no rotational preference at the lumbosacral, thoracolumbar, cervicothoracic, or cervicocranial junctions.

1. Upslipped Innominate Left
2. Cephalad Pubes Left
3. Lumbar - FSR(L) L4 / L5 - S(L)R(R) L5
4. Sacral Torsion L on L

![Fig. 10. Most Common Pattern Resulting from Short Right Leg.](Image)

This illustration depicts the following predictable pattern: Short right leg, descended right pubis, anterior/inferior rotated right ilium, left posterior/superior ilium, substitution muscle imbalance patterns in hip extension and abduction, left-on-left forward sacral torsion, functional right convex lumbar scoliosis, various type 1 group compensatory curves and non-neutral spinal fixations finally compensating in the upper cervical complex to level the eyes.

Those with a supine anteriorly/inferiorly rotated right ilium (most common) should feel the left acetabulum pop out more to the left during left leg loading indicating weakness in these primary abductor muscles. Pay attention to people in public, such as grocery checkers, hairdressers, assembly workers, etc., as they stand in prolonged positions with weight load-bearing on one leg. Recall that the acetabulum will slightly protrude left as the gluteus medius/minimus give to the ipsilateral side during stance. An excellent example is shown in Figures 8 a & b. These perfectly represent the
biomechanics of Zink’s common compensatory pattern as seen in the famous sculpture of Aphrodites and the accompanying illustration depicting a posterior view of the identical pattern. Notice how the Aphrodites’ pelvic side-shifts over the left vestibularly dominant left leg creating compensations reflected throughout her entire body.

On A Personal Note

Those of us old enough to remember the famous Marilyn Monroe walk can visualize how her pelvis shifted side to side rather than in an ideal smooth anterior/posterior patterned gait. Weight-bearing during the stance phase caused Marilyn’s pelvis to sideshift toward the weight-supporting side. In this instance, her weight was greater on the short leg side (Leaning Tower of Pisa) during gait which is usually the case in people presenting with a true short leg. However during prolonged standing, if Marilyn followed a left vestibularly dominant pattern, one would expect the weight-bearing left hip to pop out laterally.

This dysfunctional gait is easy to recognize when viewing old Monroe films. Her right acetabulum would protrude laterally with each step. A dear friend, Peter Lawford, enjoyed telling the story of how Marilyn concocted this unique walk. Apparently, she began by first cutting one inch off her left high heel shoe and walked in the unbalanced heels for a few weeks until the left gluteus medius/minimus overstretched allowing the hip to pop out and swing laterally. After a couple of weeks she would switch shoes and remove an inch from the opposite heel. Marilyn gradually increased the amount cut off each heel and continued with the experiment, switching back and forth between shoes, until she finally created an aberrant muscle imbalance pattern that would evolve into the famous Marilyn Monroe “hip-swing.”

And the beat goes on...

During gait with body weight shifted over the short right leg, the right gluteus medius/minimus and associated hip abductors really have to be strong to develop enough contractile force to “hike” the contralateral left hip high enough to allow the long left leg to swing through. Usually the brain aids in the process by recruiting the right tensor fasciae latae (TFL), sometimes in conjunction with piriformis, to help elevate the left hip. Of course, the down side of this substitution pattern is that the TFL eventually overpowers the gluteals, becomes hypertonic and short, and begins an unmerciful pull on the iliotibial tract (Fig. 9). I have found this common, but abnormal TFL firing order substitution pattern as a major contributor to many conditions such as iliotibial band friction syndrome, especially in amateur and competitive athletes.
Conversely, on the left side a prevalent hip abduction substitution pattern develops as the brain is forced to recruit the QL muscle to fire first due to an extremely stretch-weakened gluteus medius/minimus muscle group. This pervasive and devastating pattern causes further ipsilateral posterior innominate rotation, flattening of lumbar lordosis, left sidebending of the lumbar vertebrae, tractioning of the 12th rib, and eventual back pain. These folks are easily recognized as they sidebend their torso left to allow the right leg to swing through. Therapists often mis-assess this pattern since it appears that the right side is doing all the work of pulling up the right hip and leg. If the trunk does not left sidebend during the left stance phase of gait, it is possible that they are lifting with their right side.

Try the sidelying hip abduction test to determine if you are one of many who are left vestigial dominant and follow the common compensatory pattern. Then have someone skilled in measuring anatomic landmarks check your structure while in a supine position to see if you fit the common compensatory pattern which is reflected in a short right leg and anterior/inferior ipsilaterally rotated ilium.

During the left sidelying hip abduction test, frequently the gluteus medius/minimus, TFL and piriformis will all fire together, indicating that they are combining forces due to weakness in the gluteus medius/minimus. During the right sidelying hip abduction test, look for the quadratus to fire first (indicated by dipping in the 12th rib area) followed by either TFL or the inhibited gluteus medius/minimus. This substitution pattern is a major pain generator and suggests gluteal weakness from excessive weight bearing during the stance phase.

The observations described above are only meant as an overview of a particular muscle imbalance pattern I have found interesting to work with in my practice and I remain unaware of any studies performed to verify these findings. Therefore, these conclusions may or may not prove to be accurate in all cases, e.g. clients presenting with fixed scoliotic patterns, scoliosis, hemipelvis, etc. Test your clients using hip hyperextension and hip abduction tests presented in Myoskeletal Alignment Techniques Volume I and see what correlations (if any) you find using this neuromyoskeletal theory.

**Fig. 12. Rigid, Supinated and Hyperpronated Flat Foot.**

As specialized receptors inform the brain of pelvic imbalance, signals are sent to supinate the foot on the short leg side in an attempt to lift and balance the anterior/inferior rotated ilium. Regrettably, prolonged supination strains the myofascia and metatarsals due to excessive weight-bearing on the lateral arch. The brains attempt to lift the ilium often causes the foot to function in an equinus position to prevent dorsiflexion. The opposite pattern typically occurs on the long-leg side causing hyperpronation or flattening of the medial arch to lower the high ilium. If the antigravity (springing) function of the left foot is lost, the dropped arch becomes a precursor to foot/hip/knee and back pain.
Patterns Most Commonly Encountered

Now that a brief overview of vestibular lateralization, firing order and muscle substitution patterns have been discussed, the short leg theories resulting from a posterior/superior rotated ilium can be revisited. Although all the long-held assumptions suggesting that a long leg develops as the hip drops (anterior/inferior) seems to make perfect sense, these are not patterns I commonly see in my practice. The following is a structural formula I look for and expect to see in a majority of new clients presenting for an initial structural evaluation (Fig. 10):

• Short right leg (supine);
• Descended right pubis;
• Right anterior/inferior ilium (supine);
• Left posterior/superior ilium (spring test prone);
• Substitution muscle imbalance patterns in hip extension and abduction;
• Left-on-left forward sacral torsion;
• Functional lumbar scoliosis convex right;
• Various compensatory type I group curves resolving at O-A to level the eyes;
• Scattered non-neutral dysfunctions (facet joints stuck open or closed), and
• Associated muscle/visceral/diaphragmatic imbalance patterns.

The degree of compensation may largely depend on:

• Degree of leg length discrepancy;
• Functional or true leg length problem;
• Associated traumas: acute, collective, or degenerative;
• Presence of tonic neck reflexes;
• Cranial deviations causing re-patterning from the top down; and
• Viscerosomatic dysfunction.

Short Functional Right Leg, Anteriorly Tilted Ilium and a Low Femoral Head?

The question I have asked myself for years is this: “What biomechanical mechanism is acting on the iliosacral joint in the presence of an anterior/inferior right rotated ilium and a functional short right leg?” While hanging out in clinic one day with a friend, colleague and manipulative osteopath, Ross Pope, he offered an interesting viewpoint that helped me better visualize the possible development of this common aberrant postural pattern. While viewing various postural radiographic films, I posed this simple question, “What altered pelvic mechanics do you believe are involved in your patients presenting with low femoral heads and functional short legs?”

Pope answered with these statements: “As you see in this film, the patient presents with a low femoral head and accompanying anatomic short right leg when standing. However, a functional leg length discrepancy is noted upon clinical examination when the patient is in a supine position. In this case the leg itself appears shorter as viewed by comparing the medial malleoli. The ilium on the “functionally” short side is anteriorly rotated which places the femoral head in a more cephalad position in an off-weighted position.”

Bottom line he states: “In the overwhelming majority of cases, the leg that appears to be functionally short and the leg that is actually short are the same. So, yes there is usually a low femoral head on the right (standing) with a short right leg (supine). The corollary to this is a low left femoral head with a functionally short left leg, which is also prevalent but less so.”

He paused, reflected on what he was about to say, and continued with this stipulation: “On the other hand, there are exceptions to, or disparities in these typical findings. For example, on occasion you will see a low femoral head height on the left with a functionally short right leg. This can occur in a patient with an otherwise normal pelvis and is probably due to right motor dominance combined with left vestibular dominance. In other
words when you have a right-handed person with a short left leg – the muscular component overrides the anatomic. In these cases the short left leg is probably either congenital or secondary to trauma. On other occasions you will find a normal pelvis radiographically, i.e. level sacral base and equal leg lengths, and the patient will display a functional short right leg when supine. This again shows muscular dominance and is typical for right-handed (CCP) people. The main reason for the exceptions is either fixed scoliosis or a cranial asymmetry (usually lost vertical dimension on one side of the bite).”

The key phrase for me was: “The ilium on the “functionally” short side is anteriorly rotated which places the femoral head in a more cephalad position in an off-weighted position.” Although this was precisely the picture I had in my mind concerning positioning of the femoral head and acetabulum, I was unable to verify these findings using palpatory evaluations, I simply had to see it.

**Working from an Assessment Baseline**

One assessment protocol I have found helpful when performing pain management structural work is to first develop a baseline of aberration. Working from a baseline simply means that I strive to view the body as a whole while maintaining certain expectations of what patterns I am inclined to see. For example, I ask myself:

- What predictable structural patterns are represented;
- Which alternate patterns typically accompany the aberration I am seeing;
- Is there a “key” neuromyoskeletal disorder triggering the primary dysfunction;
- Am I seeing an upper or lower crossed or common compensatory pattern; and
- What fascial, skeletal, or diaphragmatic tissue is responsible for their primary decompensation?

With all the new research surfacing on predictable patterns, it is now possible to begin combining various formulas to help develop a clearer picture of common postural asymmetries. This synergy greatly enhances visual and hands-on evaluations.

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Fig. 13. Short Right Leg Sideshifts the Pelvis, Resulting in Compensatory Scoliosis.

The most common postural compensation for leg length discrepancy is a functional scoliosis. A general rule has been suggested which summarizes the type of scoliosis present in relation to the limb length discrepancy. If the leg length discrepancy is less than 1cm, a ‘C’ curve will be present with the shoulder on the short side being the higher of the two. Conversely, an ‘S’ curve will be observed if the limb length discrepancy is more than 1cm. This increased leg length inequality causes the shoulder on the shorter side to appear lower. Typically, the pelvis will be more inferior on the short side and the thoracic spine will have a type I group curve convex left with the shoulder and arm hanging lower on the long leg side (left).
Searching for the “Tie That Binds”

Based on research from innovators such as Janda, Rolf, Zink, Greenman, Mitchell, Previc, Pope, and others, I often begin my visual and hands-on analysis with a preconceived notion of certain predictable muscle/joint strain patterns and then record non-adapting or decompensated patterns. I find this approach more interesting, less confusing and more practical than myopically investigating a single area and then attempting to relate it to the rest of the structure. Although the process demands an open mind and heart, it is still exciting to search for early embryologic and CCP clues attempting to determine where the client either follows or departs from the norm. When clients come in hurting, I always ask myself: “What key dysfunction is driving this aberrant posturally-initiated pain pattern and does the root cause of this disorder seem to be based in genetic influences, early embryologic development, trauma, habitual patterns, gravitational exposure, psychosocial, or vestibular/motor dominance?”

Unless I am dealing with acute injuries, such as tennis elbow, ankle or knee sprains, etc., I typically observe for common dysfunctional postural patterns (upper and lower crossed, common compensatory) rather than focus evaluation on each individual body segment. Sometimes it works; and other times I simply get lost in all the overlapping embedded aberrant strain patterns. At this point, I begin at square one and untangle the mess until familiar patterns begin to emerge.

Back to the Basics...

Short Right Leg

Limb length discrepancy is simply defined as a condition where one leg is shorter than the other. When a substantial difference exists, disruptive effects on gait and posture can occur.

As discussed earlier, leg length discrepancy can be divided into two etiological groups;

1. **Structural:** True shortening of the skeleton from congenital, traumatic, or diseased origins.

2. **Functional:** Develops as a result of altered mechanics of the lower extremities (foot hyperpronation) or pelvic obliquity due to upper quadrant muscle imbalances such as tonic neck reflexes, poor trunk stabilization, protective lumbar muscle guarding, deep fascial strain patterns, etc.

For efficient locomotion, a symmetrical and well aligned body is necessary. If symmetry is distorted, particular by limb length discrepancies, then gait and posture are disrupted. Consequently, a diversity of symptoms can prevail, and without adequate treatment, often manifests as chronic sources of pain and dysfunction.

The Body’s Innate Compensatory Capability

Simply stated, innate compensations occur to lengthen the short leg and shorten the long leg. Typically, the body’s innate wisdom immediately begins the pelvic-balancing correction process using information gleaned from proprioceptors embedded in fascia, muscles and joints located on the bottom of the feet. Millions of these highly sensitive receptors sense weight imbalance and body sway (Fig. 11). Over a period of weeks, it is intriguing to observe how the brain slowly raises (supinates) the medial arch on the short leg side in an attempt to balance the anterior/inferior rotated innominate. Regrettably, prolonged supination often strains and sometimes fractures the metatarsals, talus or calcaneus bones due to excessive lateral arch weight-bearing. As the brain succeeds in elevating the anterior/inferior ilium, the foot is forced to function in an equinus position to prevent dorsiflexion.

The opposite pelvic-balancing pattern typically occurs on the long-leg side as the brain hyperpronates or flattens the medial arch in an effort to lower the high ilium. Excessive medial wear on the client’s left shoe is a dead-giveaway that hyperpronation is at work. Long-term hyperpronation not only diminishes the body’s natural antigravity springing system, but is also a precursor to foot, ankle, knee, and hip pain.
As a result of these foot compensations, the shorter leg may be prone to stress fractures due to the non-shock absorbing nature of the supinated foot (Fig. 12). Likewise, hyperpronation of the long leg may cause medial knee pain as the tibia internally rotates.

In the lower limbs, compensations at each level can be summarized as follows;

- Ankle instability due to foot supination on the short side;
- Knee hyperextension on the short side and the knee flexed on the long side;
- Externally rotated leg on the short side; and
- Circumduction of the long limb.

**Trunk and head compensations**

Compensatory scoliosis is commonly reflected as a low shoulder on the high ilium side. Since the head typically will not tilt to maintain the eyes parallel to the horizon, a short “C” curve is common in the cervical vertebrae. Elbow and hand positions may appear shorter on the shorter leg side, with the opposing arm swinging more on the shorter leg side.

As mentioned earlier, some authors suggest that there is a rotation of the pelvis towards the long leg side, possibly due to hyperpronation and medial leg rotation. They describe a typical gait where the short leg steps down and the long leg compensates by “vaulting” This pattern of walking on toes on the short side and flexing the knee of the long side seems to be a fairly consistent compensatory gait. Unfortunately, as the center of gravity unevenly shifts, the smooth sinusoidal motion during the walking cycle is disrupted. Thus, cosmetic effects of gait can also contribute to compensation mechanisms and eventual tissue injury. For example walking on the toes may lead to a contracture of the Achilles and calf muscles leading to conditions such as Achilles tendinitis and plantar fasciitis.

Other muscle compensations of the CCP include left-sided QL shortening (long left-leg side) accompanied by contralateral compensatory shortening of levator scapulæ, sternocleidomastoid, upper trapezius and middle/lateral scalene muscles to counterbalance the low left shoulder and to maintain the head in a more erect position (Fig. 10). Regrettably, asymmetrical myofascial torsioning slowly sinks its insidious tentacles into associated spinal joint structures setting off neuro-reflexive muscle guarding responses.

**That Hitch in your Get-Along**

The presence of a limb length discrepancy is usually easily recognizable during gait by observing for:

- Shoulder tilting to one side;
- Unequal arm swing;
- Pelvic tilt;
- Foot supinated on the short side and pronated on the long side;
- Ankle plantarflexed on the short side; and
- Knee flexed on the long side.

**Posture and Limb Length Discrepancy**

The most common postural compensation for leg length discrepancy is a functional scoliosis. Scoliotic patterns that are noted in both standing and flexion indicate the presence of a structural or fixed scoliosis (Fig. 13).

A general rule has been suggested which summarizes the type of scoliosis present in relation to the limb length discrepancy. If the leg length discrepancy is less than 1cm, a “C” curve will be present with the shoulder on the short side being the higher of the two. Conversely, an “S” curve will be observed if the limb length discrepancy is more than 1cm. With this increased leg length
distortion, the shoulder on the shorter side should appear lower.  

Typically, the pelvis will be more inferior on the short side and the thoracic spine will have a type I group curve convex left with the shoulder and arm hanging lower on the long leg side (left).

**Conclusion**

The importance of limb length discrepancy cannot be ignored, and is often the key feature in lower limb and back pathologies. Measuring the limbs in conjunction with gait and posture analysis is vital. Thus, developing advanced visual and anatomic client evaluation skills are paramount in helping structurally-minded somatic therapists distinguish between functional and structural limb length inequalities. If in doubt about your ability to effectively and consistently distinguish leg length asymmetry, refer the client to manual medicine physicians for a radiographic screening.

Proper limb measurement is essential; unfortunately there is no single hands-on method that proves to be completely reliable in its own right. It is for this reason that following a holistic approach that includes recognizing and eliminating aberrant strain patterns, correcting aberrant firing order patterns, and searching for embryologic clues to key posturally-initiated pain issues may boost your success and empower your practice. The compensations which are part of limb length discrepancy have been discussed. Although presentations do differ from client to client, most of the patterning theories presented will prove accurate. The most important feature for the beginning therapist to recognize is that asymmetry exists... from there more specific details will emerge with experience.

Integral parts to treatment of the condition are identification, comprehension of each individual’s compensatory adaptations, and their relationship to resultant symptomatology. Today’s therapist must be aware of the fundamental importance of limb inequalities—particularly the short right leg phenomenon. Keep an open mind, look for structural relationships, and have fun when assessing and treating asymmetrical leg length patterns and resulting compensations.

**References:**


