Neuromuscular Touch

Measurements to Establish Structural Homeostasis

by Paul St. John

It is important that therapists measure the form (anatomy) of the people they seek to help, because proper function (physiology) is interdependent on proper form. This column includes the techniques the author has found most valuable in providing an accurate structural analysis.

Applications of structural measurements

In taking measurements we are attempting to measure the degree of distortion of four vital movement patterns.

The first movement pattern is the degree of tilt, also called side-bending, that exists in the four essential horizontal planes — the cranial base, the shoulders, the pelvis and the talus joints in the ankles (see Illustrations #1, #4, #5, #8). Without establishing the horizontal planes, we cannot normalize the tonus of the lateral flexor and extensor muscles and thus, we will always have some degree of lateral scoliosis in the spine. The spine cannot be straight if the shoulders are tilted. The four horizontal planes must be re-established, to establish the midsagittal plane. The distortion of side-bending, or tilt, in any of the horizontal planes considered here, produces the physical force of lateral compression in related structures.

The second movement pattern is the degree of rotation in the pelvis and shoulders. Abnormal rotation of the shoulders or pelvis will cause the condition of rotoscoliosis. The talus joints must also be considered when evaluating rotoscoliosis (see Illustrations #3, #6).

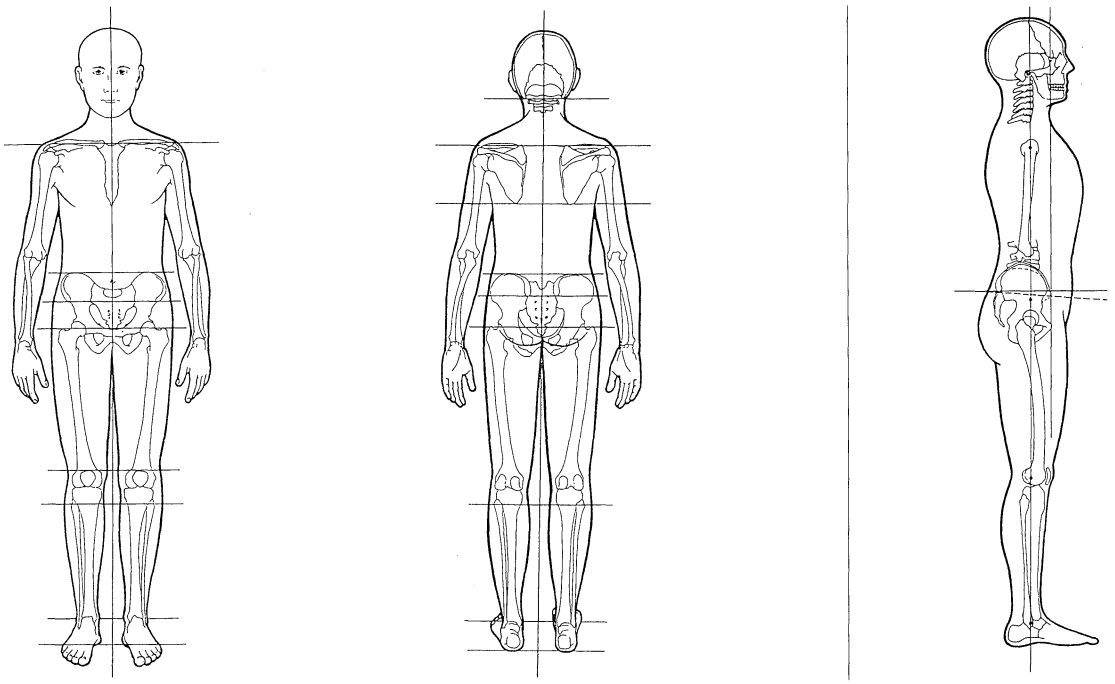
To illustrate this, pronate or collapse your right arch medially while supinating, or raising, the arch of your left foot. Notice how your pelvis spins around toward the left; your shoulder may also follow your pelvis and spine. The process of rotating the pelvis, spine and shoulder girdle produces the physical force of torque. It is this force that is most responsible for breaking down the annulus fibrosis of the intervertebral discs. Of course, tilting of the horizontal planes also contributes to disc destruction.

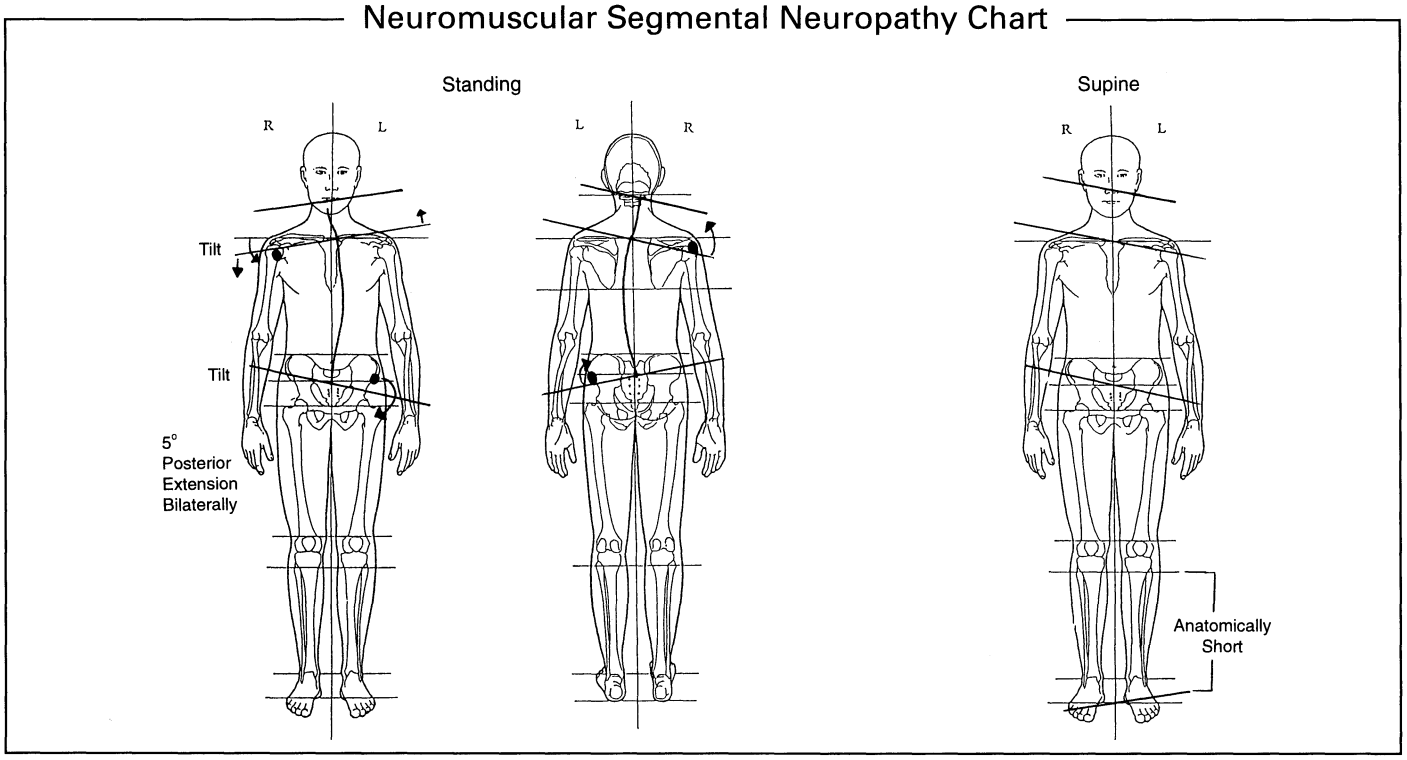
The third movement pattern is abnormal flexion or extension of the pelvis and head, which causes movement of the body off the midsagittal plane (see Illustrations #2, #7, #8, #9). Distortion in the flexion or extension movement pattern, as observed in the midsagittal plane, produces the force of anterior or posterior compression.

That movement off the midsagittal plane may also cause the fourth movement pattern: projection. Projection, which has also been called an extension pattern, occurs when the body moves off the coronal plane without a great degree of abnormal flexion or extension of the pelvis. Both projection and flexion extension movement patterns lead to anterior and posterior scoliosis, which we call kyphosis and lordosis. Scoliosis simply means "abnormal curvature of the spine," but generally, we are not taught to see kyphosis and lordosis as being front-to-back (or anterior to posterior) scoliosis. Projection also causes shearing force on the vertebrae in relation to each other, which wears away the facet joints of the spine and leads to conditions such as spondylosis and spondylolythesis.

From the side, a projected person looks as though he or she is the Leaning Tower of Pisa. You will notice the ankles are in dorsiflexion with the knees locked back, but the hip joints and knee joints are very anterior of the ankle joints when the angle of the pelvis is measured.

The most important measurements to take are the standing measurements. While evaluating the movement pattern, ask yourself, "Where do I spend most of my life?" Think about it — do you spend





Illustrations courtesy of the St. John Neuromuscular Pain Relief Institute.

Illustration #1 (above left)

This illustration shows the correct positioning of the body on the horizontal planes. The heels, ankles, knees (both at the fibula and patella), the superior border of the trochanter, the anterior superior iliac spines and the shoulder group are measured. The horizontal plane of the occipital base is also measured when the structural cranial measurements are taken.

Illustration #2 (above right)

This illustration shows the correct coronal plane (and the extended coronal plane), with the ear positioned over the shoulder, the shoulder positioned over the hip joint, the hip joint positioned over the knee joint, and the knee joint positioned over the ankle joint.

Note that the coronal plane bisects the cervical spine and the lumbar spine. The normal pelvic angles measuring the relationship between the anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS) are also noted. The straight line indicates the male pelvis in its correct position between zero and five degrees anterior tilt. The correct position of the female pelvis is between five and 10 degrees anterior tilt. These tilts allow for the proper joint position, as well as the proper spine position, to be maintained. The three landmarks used to measure the extended coronal plane are the tip of the zygomatic arch, the manubrium of the sternum and the pubic symphysis of the pelvis. These three measurements gives us landmarks to determine the general distortion off the midsagittal plane.

most of your life in a supine position? Is that where the tension and stress patterns become prevalent; or do you spend more of your life in sitting and standing positions? No doubt, the latter is true.

The only thing I want to know when taking supine measurements is whether the patient has structural abnormalities of the bone (see Illustrations #10 through #17). Does he or she have an anatomically short tibia, femur or pelvis? These abnormalities must be detected. If the person is found to have an anatomically short bone, it is important to remember that the whole foot must be elevated.

Oftentimes we find heel lifts have been used to remedy this situation; however, heel lifts are nothing more than disasters waiting to happen. If we believe that the person has an anatomically smaller bone, why would we just want to hike up the heel or the posterior part of the foot?

To illustrate the problem heel lifts create, place a book under your heel, then place your hands on the front of your pelvis. Gaze down at your pelvis and notice what the heel lift does: It creates the movement pattern of rotation, which creates the force of torque in the pelvis, and which eventually works its way up the postural chain to the cranium. In fact, wearing heel lifts for years can actually cause discs to rupture.

Elevating the transverse metatarsal arch, as well as the calcaneus, levels the pelvis, shoulders and cranial base — and is the correct solution.

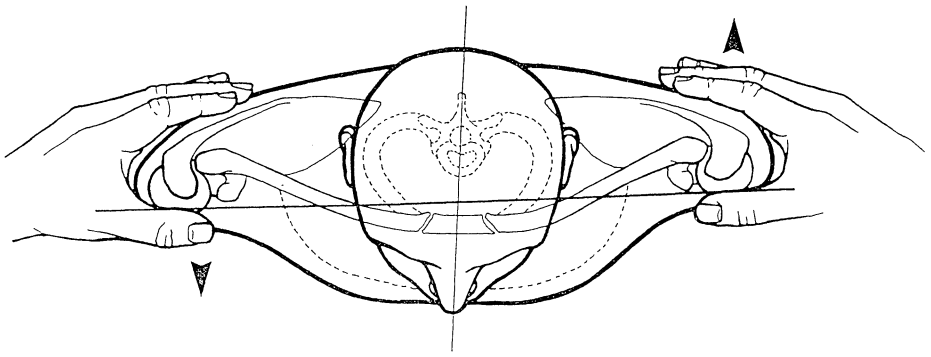


Illustration #3

A. This illustration shows the measurement of the horizontal plane of the shoulders. The index fingers are positioned on the acromioclavicular joint and pointed toward each other. This will determine whether the shoulders are positioned horizontal or are tilted.

B. Measurements of the remaining horizontal planes from the standing position are done identically. When measuring any horizontal plane, such as the ankles, knees, iliums, trochanters and shoulders, it is important that the therapist lower his or her head and look directly in front of the structure being measured. This prevents distortion of the measurements. Also, the therapist's head should not be tilted to one side, as this may create an optical distortion.

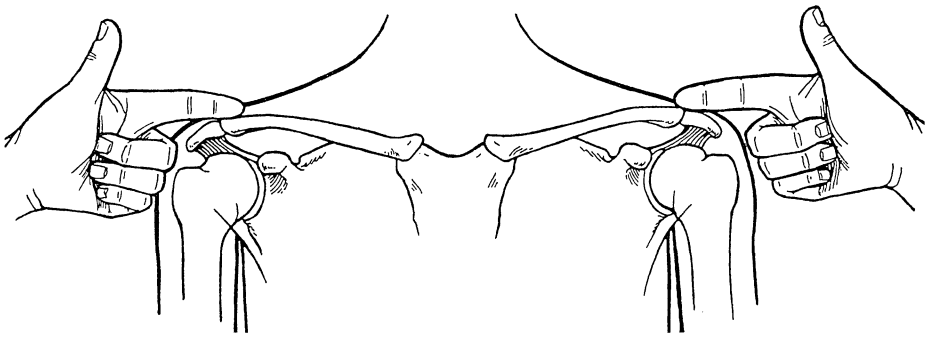


Illustration #4

This illustration shows the measurement of projection and rotation of the shoulders. Place the fingertips on the anterior surface of the head of the humerus with the index fingers positioned horizontal to the person's body. If one shoulder is projected anterior, the therapist's fingers will measure more anterior than those of the other hand. The anterior to posterior relationships are taken to determine if there is projection of the shoulders or rotations of the shoulders in relationship to each other.

Case study: Achieving structural homeostasis

Many people who suffer from chronic fatigue syndrome go about their lives struggling with abnormal tension patterns, because there has not been a precise structural evaluation in the supine and standing positions.

The neuromuscular segmental neuropathy chart (see page 55) represents a person who has suffered from chronic fatigue syndrome all his life. You can see from the measurements that he has an abnormality in the length of his tibia. When we placed a book under his left foot, it resulted in the leveling of the pelvis and near leveling of the shoulder girdle. Releasing the levator scapula and trapezius on the left side later completed the leveling of the shoulders. For 42 years no one properly evaluated this man's extremities. Despite years of chiropractic, physical therapy and orthopedic help, he still remained in a chronically fatigued state.

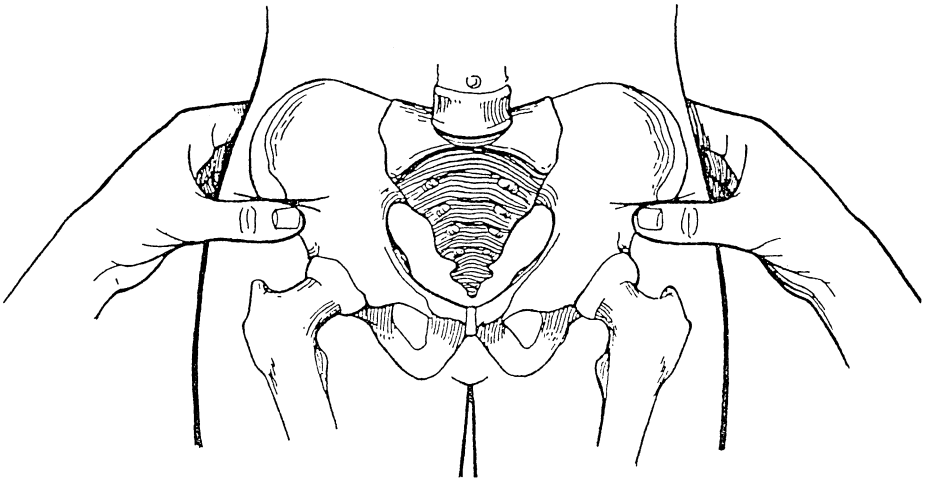


Illustration #5

This illustration shows the measurement taken to determine if the iliums are symmetrical. The therapist's eyes are positioned directly in front of the ASIS of the pelvis. The fingers are grasping behind the pelvis and pressing the thumb in front of the hip. This compression on the pelvis is done in order to find the inferior ledge of the ASIS. It is important that the therapist's eyes are positioned directly in front of the ASIS, or any structure that is being measured, and that the head is not tilted. This prevents optical distortion from occurring. It will be necessary to ask the person to bend forward, as this takes the tension out of the sartorius muscle and allows the therapist to press underneath the ASIS to find the ledge.

One ilium may be inferior to the other because the pelvis is tilted laterally; or it may also be positioned inferior because the ilium is rotated anteriorly. It should be noted that, generally, if the ilium is tilted laterally and inferiorly or rotated anteriorly and inferiorly, this will cause a lengthening of the leg in the supine position.

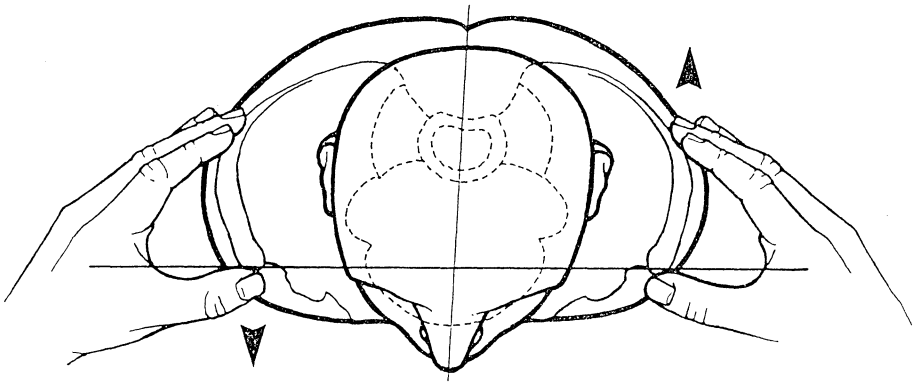


Illustration #6

This illustration shows the measurement of the anterior to posterior relationship, which is taken to determine if there is projection or rotation of the ilia in relation to each other. The anterior to posterior measurements in the standing position are obtained by the therapist standing directly in front of the patient. The therapist's thumbs should be positioned on the anterior tips of the ASISs. The person's feet should be positioned on a straight line with his or her feet perpendicular to the straight line. The therapist should then look down at his or her thumbs to see if one ASIS is positioned more anteriorly to the other.

All the concentric muscles and the corresponding eccentric muscles, lengthened because of the shortening of other concentric muscles caused by the leg length abnormality, led to the chronic tension pattern that sapped this man's strength. (The tonus system and the soft tissues of the body are the greatest users of energy.) There was also an extreme amount of rotation causing torque in the pelvis.[1] When we examined his internal and external oblique muscles, they were absolutely rigid, which contributed to the spinning around in the pelvis.

Now, after several months and four or five neuromuscular sessions to normalize the resulting leg length of the concentric tissues, his energy pattern has completely changed. He feels as though he has his life back.

Producing miracles

Without taking accurate measurements both in the standing and supine positions, we will miss many of the underlying causes that create pain and dysfunction. Instead, we will treat only the effects.

Miracles are simply laws of the universe that we don't yet understand. The purpose of this column is to help us understand how to apply the law of cause and effect to the body. When you have that skill, you will see yourself producing miracles in patients who have lived with frustration, pain and dysfunction for many years.

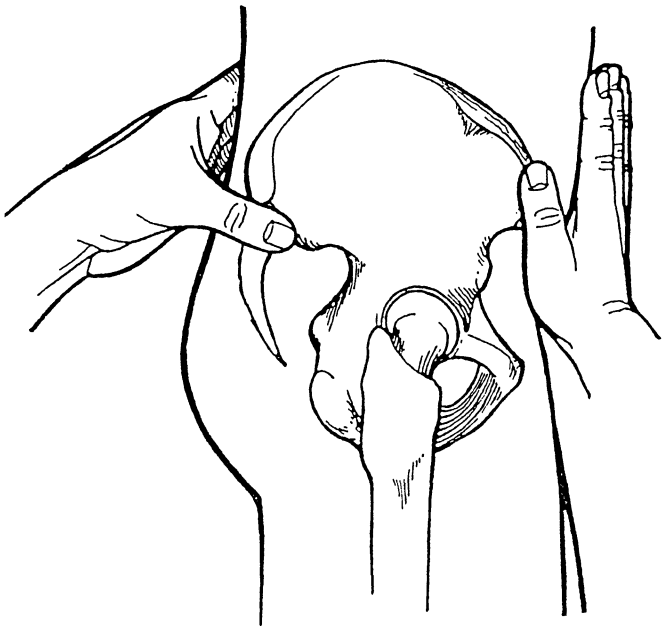


Illustration #7

This illustration shows palpation of the PSIS. The front hand is stabilizing the person while the thumbs and index fingers are used to palpate. This structure is often more difficult to palpate than the anterior superior iliac spine; therefore, it is necessary to press with a little more force in the general area where the PSIS is suspected to be. It may be necessary to ask the person to bend forward in order to find this landmark. Once the landmark is found, the therapist changes position in order to be behind the person.

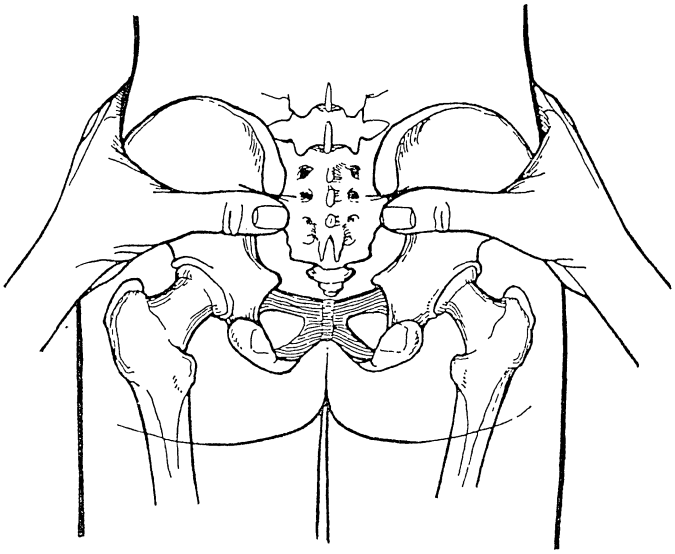


Illustration #8

A. The therapist now positions the thumbs underneath the PSIS, and the fingertips are on the front of the waist. Squeezing the hands, the therapist is able to easily feel the inferior ledge of the PSIS. If the ilium is rotated anteriorly, the therapist should experience on the posterior side that the PSIS is in a superior position and the ASIS on the front of the body is in an inferior position.

B. Next, the person should bend forward at the waist. The therapist's thumb should remain level with the ledge of the PSIS and determine if either PSIS moves superiorly. If one does, this indicates a fixation at the sacroiliac joint.

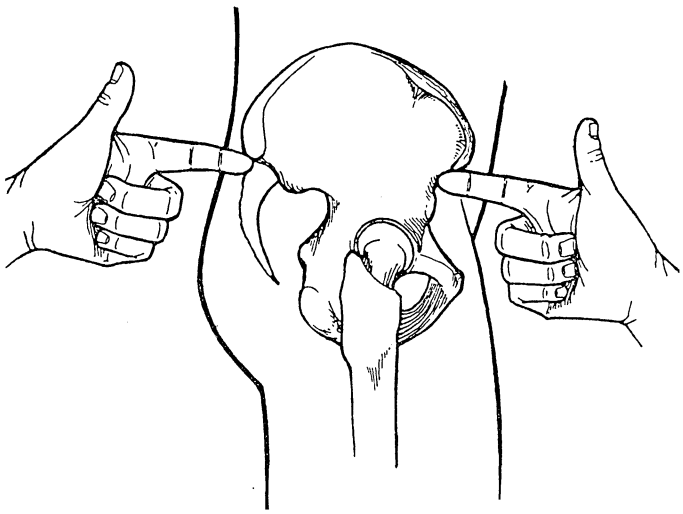


Illustration #9

This illustration shows the measurement taken to determine if the pelvis is tilted. Once the ASIS and the PSIS are located, the therapist should position the fingertips inferior to the ledge on both the ASIS and the PSIS, and point the fingertips toward each other. This gives a general angle of the pelvis. A goniometer may also be used to determine whether the pelvis is tilted anteriorly or posteriorly.

Generally, the male pelvis is normal when the anterior tilt is anywhere from zero to five degrees; the female pelvis is considered normal using these two landmarks if it is positioned anywhere between five and 10 degrees anterior. This landmark tells us whether the ilia are in an anterior or posterior position to what is normal. It is often said that one ilium is anterior and one is posterior; however, unless a general measurement of what is "normal" is understood, most ilia are both anterior. One may be positioned posterior relative to the other, but not truly in a posterior position. In a male, the posterior ilium has a posterior angle greater than zero degrees. The ASIS would be positioned higher than the PSIS. In a female, the posterior ilium is less than five degrees anterior tilt.

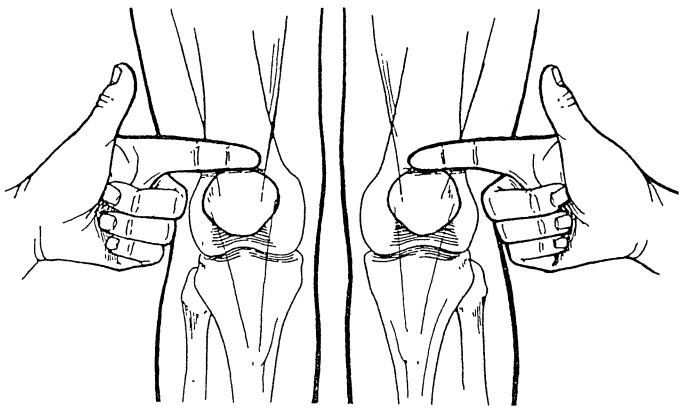


Illustration #10

This illustration shows measurement of the superior border of the patella. Position the hand so that the index fingers are lightly held on this. When measuring this, make sure that the fingers may also be positioned on the superior border of the tuberosities of the fibula. These two measurements will tell us the general leg length of the tibia and fibula in relationship to the malleoli.

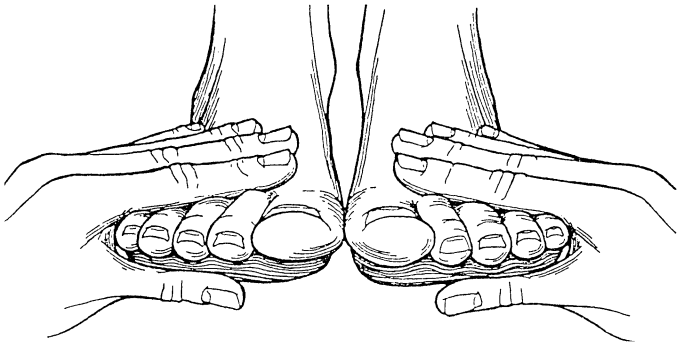


Illustration #11

This illustration shows the proper way to hold the foot while measuring. The fingers are positioned on the dorsal surface of the foot, with the thumb on the plantar surface of the foot. Hold each foot so it is neither dorsi-flexed nor plantar-flexed in relationship to each other. The feet should also not be pronated or supinated in relationship to each other. Any deviations in holding the feet properly in these planes will cause distortion in the measurements of the medial malleoli and the heels. Position the feet together and hold properly as described. Note the positions of the medial malleoli and whether one is inferior in relation to the other.

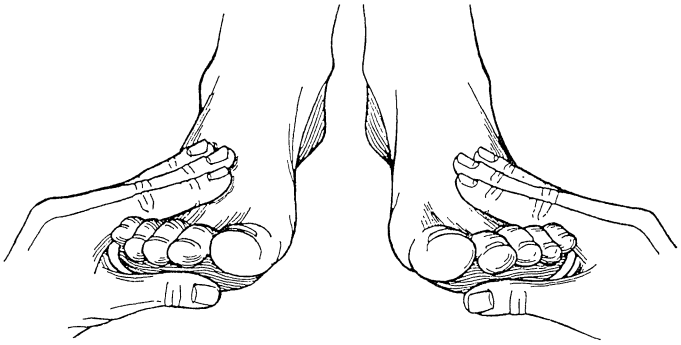


Illustration #12

Spread the feet but keep the heels close together. Observe the position of the heels to see if the heels are at different lengths.

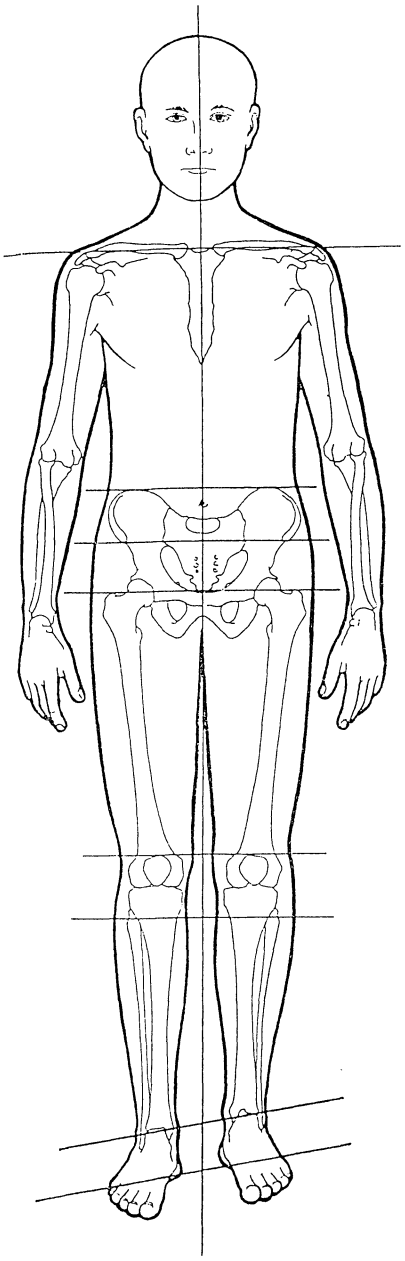


Illustration #13

This illustration shows an anatomically short tibia with the person in a supine position. When this person stands in an upright position, the pelvis can be shown to shift in a tilted position and possibly in an anterior projection, so that the left ilium will be inferior to the right ilium as a result of the anatomically short left tibia.

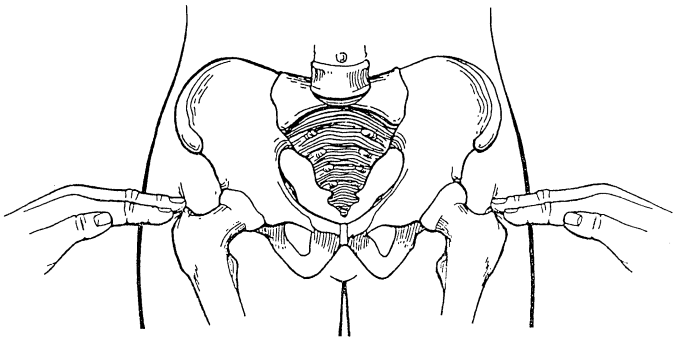


Illustration #14

This illustration shows the measurement taken to determine the lenght of the femur. Position the fingertips perpendicular to the superior border of the greater trochanter. It will be necessary for the therapist to press through adipose tissue and the thickness of the gluteus minimus and tensor fasciae latae muscles. When the bony structure has been palpated, position the fingers perpendicular to the superior border of the trochanter and horizontal to each other. This will give us a general analysis of the femur length in relationship to the knees.

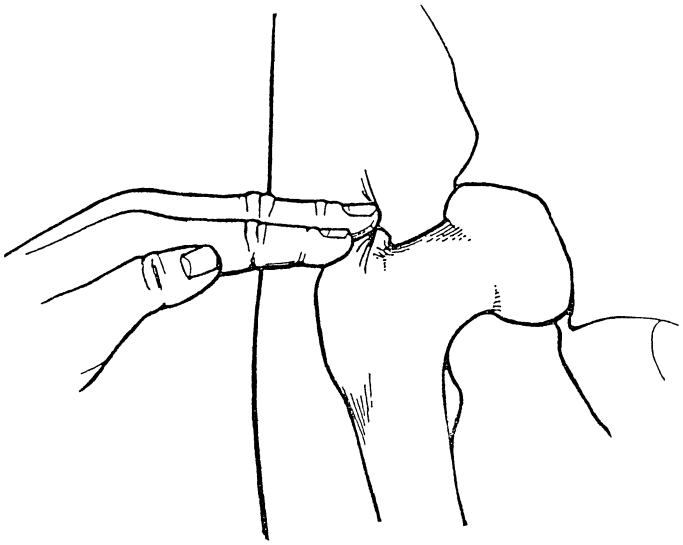


Illustration #15

This illustration shows how the therapist must press deeply into the tissue laterally and superiorly to the greater trochanter in order to properly palpate this structure. If there is difficulty in finding the bony ledge, ask the person to rotate his or her leg laterally and medially.

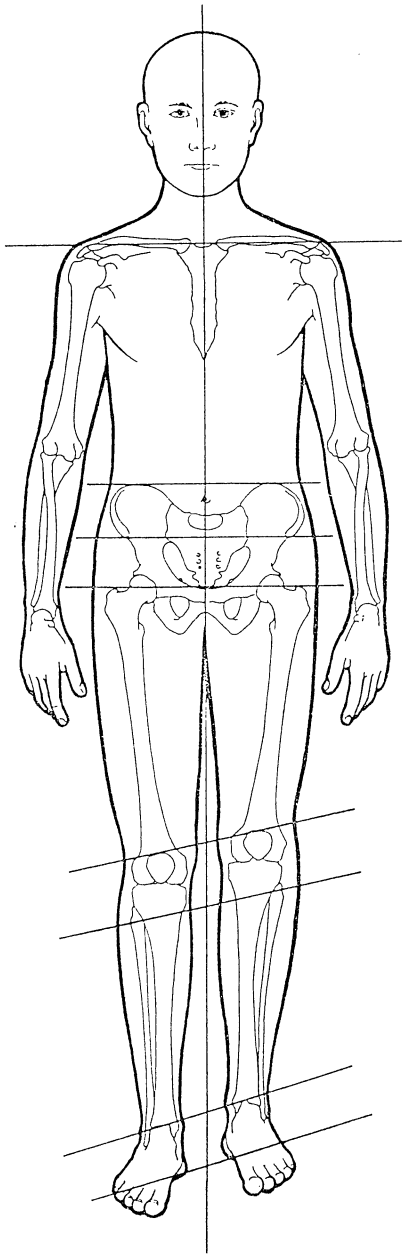


Illustration #16

This illustration shows an anatomically short left femur. In doing the structural analysis in the supine position, this anatomical anomaly will be revealed by the differences in the knee measurements and the greater trochanter measurements. A leg length discrepancy like this will also cause the pelvis to be asymmetrical in the standing position with the left ilium measuring inferior to the right.

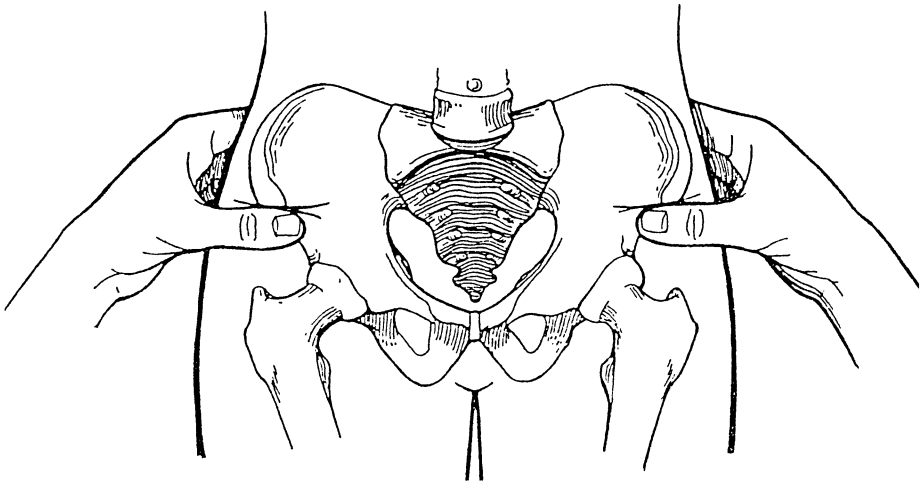


Illustration #17

A. This measurement is taken to determine if the iliums are symmetrical. The therapist's eyes are positioned directly anteriorly to the ASIS of the pelvis. The fingers are grasping around the pelvis and the thumb is pressing below the ASIS. This compression on the pelvis is done in order to find the inferior ledge of the ASIS. It is important that the therapist's eyes are positioned directly in front of the ASIS, or any structure being measured, and that the head is not tilted. This will prevent optical distortion.

One ilium may be inferiorly to the other because the pelvis is tilted laterally; or it may also be positioned inferior because the ilium is rotated anteriorly. It should be noted that, generally, if the ilium is tilted laterally and inferiorly, or rotated anteriorly and inferiorly, this will cause a lengthening of the leg in the supine position.

B. The measurement of the horizontal planes in the supine position continues with the anterior to posterior projection. This is done by the therapist placing the index fingers on the anterior tips of the ASISs while the person is in the supine position. The therapist lowers the head down to the level of the pelvis and looks superiorly. If one ASIS is projected more anterior than the other, that index finger will measure more anterior. The anterior to posterior relationships are taken to determine if there is projection of the ilia or rotations of the ilia in relationship to each other.

C. To determine if there is an internal or external flaring of the ilia, the therapist places the lower index finger on the anterior tip of the ASIS on the side they are standing. The other hand is placed flat against the side of the person. The therapist now approximates the distance between the ASIS and the side. The same measurement is taken for the other side of the body. The two measurements are then compared. If the ilium is internally rotated, there will be more space between the ASIS and the side of the soft tissues and the opposite if the ilium is externally flared. Many combinations of deviations can occur. For example, if both ilia are torsioned to the right, one measurement will be smaller than the other. Or, one ilium may be torsioned while one is normal, and the therapist will once again find one measurement smaller than the other. By releasing the restriction in the soft tissues through pelvic stabilization and other neuromuscular therapy techniques, the imbalances will correct themselves. M

Paul St. John, L.M.T., is the originator of the St. John Method of Neuromuscular Therapy, and founded the St. John Neuromuscular Pain Relief Institute in Largo, Florida, in 1977. He is an internationally-known lecturer and teacher. His credentials include lectures at Johns Hopkins University, the University of North Carolina, the Kentucky Dental Society, the Atlanta Cranio-Mandibular, the Physical Medicine Research Foundation, the American College for Advancement in Medicine, the American Academy of Head, Neck and Facial Pain, and Germany's Institute for Temporo-Mandibular Regulation. For more information about the St. John Method of Neuromuscular Therapy, call (800) 232-4668, ext. 9220.

1. For more information regarding the role that the righting reflexes play in maintaining structural homeostases, see "Neuromuscular Touch," Issue #57, Sept./Oct 1995.