While we use the bones as landmarks to help identify strains in the body, we must always remember that they are “landmarks” in a sea of soft tissues, and not discrete things unto themselves. Bear in mind, while we identify bony patterns, that the bones are passive to the soft tissues that wrap and invest them. In fact, bones arise from ossification centers within the soft tissues. The stressors that arrive at bony junctions are manifestations of distal musculofascial, neural, and visceral suspensory strains.

Often the motion restricted articular pattern is at the end point of strain, where the structure cannot adapt any further. While local intervention may help, restoration of normal function will ultimately rest on system wide support and adaptability.

Healing is a system wide event. Local problems are not local for long. Of course, a point trauma like a collision, falls, or direct blows, will have obvious local effects. Adaptation to any trauma begins immediately, and in remarkably short time wider distribution of adaptation begins. Soon enough the feet have to accommodate a whiplash type injury, with everything in between shifting to make a successful accommodation.

This process of adaptation will, by necessity, activate older and previously stable adaptations. Hence the appearance of seemingly unrelated aches and pains emerging in the wake of an apparently local injury. This is an expression of pressure along an “adaptive chain.” One of the essential skills in manual therapy rests on keeping the big view while attending to local events. Every symptom has a context.

There is still a fair amount of argument in the field about the ways and means of the sacrum, and the details of normal function in this area. There is also firm agreement in some circles about how the sacrum works. I acknowledge the Osteopaths for the pioneering work in understanding the function of structure, and in particular the sacrum. This presentation will outline some primary types of motion, how they interact, and how to derive meaning from your observations. This is not the whole story, but a chapter in the book of the body.

The Sacrum is a multi-functional junction. Two distinct kinds of motion interact at the sacrum. One is the cranio-sacral motion, reflective of the pressure pulsations of cerebrospinal fluid circulation on the dura and meninges. This is called the PHYSIOLOGIC motion of the sacrum. The other type of motion is BIOMECHANICAL. This involves the sacrum’s involvement in forward and back bending, side bending, and walking.

Physiologic motion is palpated with the body in neutral, while biomechanical patterns are identified in neutral, and can be verified with motion palpation.
Interference with physiologic normal motion can indicate biomechanical restrictions.

**Sacral function:**

1. The shape of the sacrum, seen laterally, is like a “C” facing ventrally. The structure of the sacroiliac joints are like a pair of letter “C’s” facing dorsally. The SI (sacroiliac) joint is synovial, with a capsule and a surrounding array of ligaments. The structure of the joint, and the ligamentous boundaries, predict and pattern a specific set of possible movements. Illustration #1

![Illustration #1](image)

2. The PHYSIOLOGIC motion of the sacrum is to nutate (from the Latin “to nod”) its base anterior and posterior in response to the membrane tensions of the dura, in relation to pressure changes associated with the circulation of cerebrospinal fluid (CSF). These pulses are rhythmic, at about 8-10 cycles per minute.
3. When the sacrum rocks its base ventrally, the apex and the coccyx move dorsally. The middle of the “C” of the SI joint is the point where the horizontal axis of PHYSIOLOGIC motion occurs. Illustration #2

4. In cranial flexion, as the CSF pressure is rising, the sacral base moves posterior between the ilia. In cranial extension, as CSF pressure is falling, the sacral base moves anterior. Illustration #2

5. This pulsation around the horizontal axis happens when the spine is in neutral. Neutral is when we are standing on both feet, sitting erect on our tuberosities, or lying down prone or supine. Neutral refers to the spinal facet joints being neither forward, side, or back bent.
6. The BIOMECHANICAL movements of the sacrum in forward bending FB have the sacral base moving posterior on its horizontal axis. In back bending BB, the sacral base moves anterior. Illustration #3

7. The FB-BB of biomechanical response shares the same horizontal axis of motion as the physiologic, pulsatory motion of flexion and extension in the craniosacral system. The semantic problem is that the flexion and extension of the craniosacral system refer to the movement of the sphenobasilar junction in the cranial base, while the flexion and extension of the biomechanical refer to whole body movement. For this reason I will use FB-BB for all biomechanical movements, and base anterior, base posterior for the craniosacral.
8. In walking the sacrum is biomechanically sidebent right and left. When the weight bearing leg in the gait is in the center, the sacrum side bends away from that leg, along with the whole pelvis. Illustration # 4

9. The biomechanical sidebend of the sacrum shifts the physiologic axis of motion into a transitory diagonal axis, TDA. This axis is named for the high side. Thus, in a right sidebend of the sacrum, a Left TDA is expressed. In walking the sacral motion axis shifts from Right TDA to Left TDA alternately. (When the body is at rest the axis reverts to horizontal.) Illustration #5
10. The PHYSIOLOGIC motion of flexion and extension of the sacrum continues during active motion, using the TDA’s as the BIOMECHANICAL forces cross them. Biomechanical motion should not interfere with Physiologic motion.

11. As the sacrum sidebends in walking, it also rotates. The normal BIOMECHANICAL sacral motion combines sidebending and rotation in the same pattern as the lumbar and thoracic vertebrae. Therefore right sidebending of the sacrum couples with left rotation. This creates the Left TDA, and left rotation. This combination will be named LEFT ON LEFT (for the left rotation on the left axis).

Sacral Disfunctions:

1. Most sacral problems have their root in motion restrictions of the transitory diagonal axes TDA’s of the sacrum. There are some noteworthy exceptions to this rule, which will be discussed.
2. When the sacrum, for whatever reason, becomes motion restricted in SIDEBENDING, and the TDA will not release and cross to the other side, it also restricts the ability of the 5th lumbar to move through it’s normal motion pattern of coupled sidebending/rotation. This is at the root of most chronic lumbar functional problems. When you palpate this pattern, you will find one sacral base deeper than the other. The inferior lateral angle ILA on the opposite side of the deep base will be prominent. This puts the sacral base on the superficial side, and the ILA on the deep side in restricted motion. Illustration # 6

3. Sacral L-FDA motion restriction will pattern the sacrum as if it is in (for example) RSB-LR or Left (rotation) on left (axis). Functionally this means that when the left leg is weight bearing, the sacrum functions (more or less) normally, and when the right leg is weight bearing, the sacrum CANNOT correspondingly go to right (rotation) on right (axis). Illustration #7
4. This binding stress on L-5 sets up a stressor that includes the disc and facets receiving unusual biomechanical loads. Over time, or quite suddenly the 5th lumbar facets can "lock up" or the disc can begin to protrude. This situation can produce sharp pain if at the facet, and deep radiating pain, and numbness, if the disc impinges on the nerve roots. Illustration #8
5. Another common sacral strain is the SACRAL DOWNSLIP. This can be thought of as a deterioration of a motion restricted TDA. In this pattern you will find one sacral base deeper than the other. The ILA on the same side as the deep base will be more prominent and somewhat inferior to the ILA on the other side. Illustration #9
6. Finally, there is another sacral strain that is not seen as often as the others, but can happen with twisting trauma that overrides the ligamentous restrictions on the ROM of the SI joint. This is what I call an ANTERIOR-POSTERIOR (AP) strain. Here you will find the sacral base and ILA anterior on the same side very deep, and there will be no apparent TDA operating. The superficial side may or may not be superficial as well. The client will often have major difficulty walking and standing and complain that they cannot “find” the leg on the deep sacrum side.
In the foregoing discussion we have covered some common sacral strain patterns. We have been looking at SACRUM on PELVIS patterns. There are a whole host of other patterns that involve ILIUM on SACRUM, and they are beyond the scope of this presentation, but not to be ignored in developing order and stability in the body. Suffice to say that preparing for, and stabilizing, a higher level of order in the structure and function of the body must involve ordering the sacrum within the context of EVERY INTERVENTION.

More of Jan Sultan’s articles (as well as audiocourses and CEU info) are at the following links:

Articles:

Illustrated Audio Courses and CEUs:
http://www.advanced-trainings.com/correspondence.html
Sample illustration from the “Structural Biomechanics” audiocourse:
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