A Biotensegrity Explanation for Structural Dysfunction in the Pelvis

In Biotensegrity modeling of the pelvis, the expanded octahedron tensegrity (as in the logo above) is a useful starting point. Because it is oriented along the familiar 'x, y, and z' axis it is easy to schematize the pelvis which has equivalent orientations (left/right, top/bottom, front/back). Also this tensegrity has a central 'cavity' which expands or contracts and distorts, as forces are applied - a close analogy to the pelvic structure. This basic shape has been expanded to include the femurs and suggest the lower spine which is suspended and stabilized in the tensiational network. The horizontal struts (x, and z axis') illustrate the essential balance of the ilia in relationship to the spine and femurs which are represented by the vertical (y axis) struts.

Pathomechanics of the pelvis and lower back can be illustrated by shortening or lengthening individual tension members which is equivalent to hypo- or hyper-tonicity of the tensiational network. (Refer to distortion images.) Using this model, it is possible to distort one or more tensile components (ligaments/muscles) and observe the overall effect on the structure. (distortion image) Note that a change of length (or tension) in only one tensile component (e.g., the sacroiliac ligament or pelvic floor) causes distortions to occur throughout the structure in all three axis' (distortion images). In terms of this model a change in length of a tension component is equivalent to an increase or decrease in tension in that area. It could also be described more dynamically as a change in adaptation (i.e., the range of movement changes in response to a force acting upon it). Note that a change in a single tensile element is enough to cause the entire structure to be dynamically distorted.

This model can also demonstrate gait and torsional movement, revealing the tensiional net operating in the pelvis. As you articulate the struts, which represent the femurs, to simulate walking, you will notice the corresponding torque in the struts (x, y axis') which are the ilia. By distorting a single tension element you can then observe the corresponding distortion in gait or rotation.

Biomechanical function from a tensegrity perspective is a whole system explanation. Better description means better prescription, which means more successful treatment methods to benefit patients and clients.