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The "Sacs and Tubes Theory of Stress"

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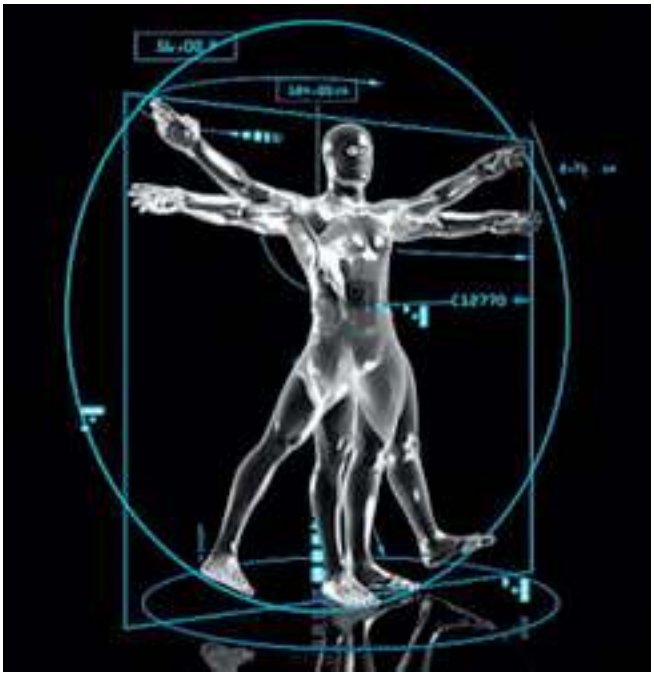
In 1996, while considering the treatment principles I had accumulated from many advanced trainings throughout my clinical career and the results they had produced for my clients, a deeply intuitive experience of anatomical understanding inspired me to conceive of the human body as composed of mostly sacs and tubes:

- The meningeal sac around the brain and spinal cord.
- The pericardial sac around the heart.
- The pleural sacs around the lungs.
- The peritoneal sac that contains many of the gastrointestinal and urogenital organs.
- The many tubes within organs and "between" the visceral organs, especially the esophagus and the respective lengths of the small and large intestines.

Integrating this personal epiphany with an understanding of Han Selye's General Adaptive Syndrome, my clinical thesis became clear: in response to "stress," the sacs around organs "cringe," while the tubes within them and between them "shorten and narrow and often twist." The intensity, duration and repetition of the stressor(s) are all relevant variables which may be reflected in the "degree" of these internal responses.[1,2]

As most body tubes are comprised of longitudinal and circular fibers, this notion of shortening and narrowing was not such a big theoretical leap.[3] The notion of the "cringing of the sacs" was initially a "felt sense" of my own body's responses to positive as well as negative anticipation. Yet, supporting anecdotal evidence emerged recently when a client who had been a biology teacher for 35 years reminded me that during dissections of live frogs, the frog's heart would swell to twice its size when the pericardial sac was retracted.[4]



What are some of the possible effects of this proposed cringing, narrowing and shortening? To my perception, this clinical insight provides a credible explanation for the downward and forward pull of the head upon the neck, so often referred to in our profession's literature as forward head position. Let's take a look inside the body to appreciate just how many structures, especially viscera, are suspended from the anterior portion of the axial skeleton and have specific, palpable soft tissue linkages back to the cervical spine.

The Anatomy

My understanding of the following anatomical references are based on seven years of study with Dr. Jean Pierre Barral DO, developer of the Visceral Manipulation approach to bodywork. I do wish to again gratefully acknowledge his dedication to articulating precise anatomical landmarks from his work with cadaver dissections and his ongoing exceptional teaching to the breadth of all professions that comprise the manual therapy field.[5] His therapeutic ideas and anatomical assertions have been core to what has assisted me to help so many.

During embryological development, the heart and diaphragm muscle descend from C2 and remnant fibers to this origin remain throughout our lives. Less appreciated is that the heart and the diaphragm muscle are like siamese twins, conjoined at the inferior pericardium and central tendon of the diaphragm, meaning that one would have to cut them apart to separate them. The heart and lungs are suspended down and forward from the

anterior surfaces of C4 - C6 by an overlapping system of suspensory visceral ligaments.

The liver is suspended down from the caudal surface of the diaphragm muscle via the coronary ligament which as noted above is related to C-2. In women, the uterus receives suspensory support from the contiguous relationship between the falciform ligament of the liver and the round ligament, which is composed of the obliterated umbilical arteries and veins.[5] From C2 and from C4, 5 and 6 and all the way to the pelvic floor in women, any one of these relationships is symptomatically and therapeutically significant and when one considers that these viscera may become increasingly immobile and congested due to trauma or disease, they can become essentially "dead weight" pulling downward and forward on the cervical spine.

And, if this wasn't significant enough, my clinical work with clients suggested there was another anatomical linkage that can literally pull the "head down upon the neck" and that is the length and tension of the esophagus which is moored from the basilar portion of the occipital bone and then descends down and forward through the mediastinum and esophageal hiatus of the diaphragm becoming the stomach.[6,7]

The esophagus is a muscular tube composed of circular and longitudinal fibers. Imagine its fibers shortening and narrowing. Given its superior mooring from the cranium might esophageal tensions relate to clients presenting with recurrent headache patterns, neck pain and upper back symptoms?

Just stop for a moment and remember the last time you were highly nervous or anxious. For many of us, this provokes tension within our stomachs. What hasn't been considered is that a contracted esophagus may communicate this tension all the way up to the base of our craniums.

More Questions

How might these combined vectors of compression affect the delicate nerve fibers exiting the brain, especially the vagus nerves and the superior origins of the sympathetic chain ganglia? How might the jaw respond to such a downward and forward pull? How might such compression rippling down the length of the human spine contribute to how easily our bodies congest fluids?

I perceive all of these anatomical actors flow from one to the other influencing our bodies' strain patterns that are reflected in our clients' presenting chronic symptomatic profiles. Now, also please consider that the right crus of the diaphragm literally wraps around the esophagus. Netter's anatomy plate #253 clearly shows this. What is not so commonly appreciated is that this aspect of the right sided diaphragmatic crus is contiguous with the ligament of Treitz which superiorly adds support to the 20 -25 feet of the small intestine by hooking around the douodenal-jejunal flexure.[8,5]

Might cringing of the peritoneal sac, the shortening and narrowing of the small intestine and the tension of the longitudinal fibers within the esophagus itself in combination be related to the incomplete closure of the cardiac sphincter more commonly known gastroesophageal reflux disease or GERD?[7]

Next, consider the mesenteric root of the small intestine which is moored down, forward and diagonally from the left anterior face of L2 all the way to the right sacroiliac joint.[9] Given the diagonal element of this anatomical relationship, might the compressive force of chronic stress be a co-conspirator in chronic low back dysfunction and pain and be related to torsional elements so often found when one assesses the osseous landmarks of the pelvis?

The connections of the mesenteric root includes the same douodenal-jejunal flexure noted earlier so we actually have a proposed anatomical routing of manipulable soft tissue from the sacrum to the cranium in both genders. Little wonder the head is pulled down and forward for so many of us in response to how our "innards" react to stress.

We need to additionally appreciate the role of the flexor-extensor reflex systems in chronic somatic dysfunction. The downward and forward pull of the above described anatomical relationships will eventually and inevitably activate their respective reflex systems constantly. These reflex systems are governed by subcortical elements of our nervous system and, as such, we do not register their activation consciously or proprioceptively until something within the kinetic chain of the axial skeleton becomes dysfunctional. Once this occurs, whatever the reason, it is the job of the soft tissues to protect the joint or joints in distress usually by contracting along a continuum until they spasm, which really gets the person's attention.[10]

Anatomical Relationships

It is my assertion that the described anatomical relationships and the constantly activated flexor-extensor reflex system when viewed as a dynamic whole are prime contributors to the progression of osteoarthritis and joint degeneration in both the axial and appendicular skeleton.

These relationships allow us a novel view of our internal architecture. They also allow us in particular to re-consider the means by which progressions of dysfunction toward pathology may proceed. Principle among these stealth physiological progressions that underlie many chronic somatic problems are cardiovascular disease, cervical stenosis and gall bladder dysfunction/ disease.

Compression, congestion and coordination or, more precisely, dis-coordination are a simple way to conceive of the downward spiral in the quality of our lives as we age and, how such progressions are related to "chronic stress."

Stress provokes cringing, shortening, narrowing and twisting functionally, "inside of our bodies." The soft tissues of the body support whatever comes to be the new normal. We can get used to damn near anything as human beings. That's the good news and is testimony to our species' adaptive capacities. The bad news is that once we do adapt, our bodies reflexively resist a return toward normal function.

As massage therapists who have a desire to assist clients to resolve their chronic somatic dysfunctions, it is our task to learn how to relieve these intrinsic forces of compression and to facilitate the movement of bodily fluids to redistribute areas of stagnant congestion. We can learn to assist the nervous system to re-coordinate its nerve and blood supply to include all the body tissues again and assist it to re-coordinate the movement of our body parts. When these skill sets expand, wondrous possibilities for healing emerge. I have seen this thousands of times. It is an amazingly satisfying experience.

References:

1. The Stress of Life, Hans Selye M.D., McGraw-Hill, 1976.
2. Emotional Anatomy, Stanley Keleman Ph.D., Center Press, 1986. Dr. Keleman added the dimensions of duration and repetition to Dr. Selye's original thesis that the intensity of stressor(s) being the primary provocation of human physiology. His writings on the body pouches preceded my distillation of the notion of the body's sacs.

3. lifesci.rutgers.edu/~babiarz/muscle.htm
4. Homer Herrick, Biology Teacher at Monroe County Schools, Fla. Keys, Fl. 1958-1990.
5. Dr. Jean Pierre Barral DO, class notes 1986-93 and all books by this author. **www.barralinstitute.com**.
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9. Gray's Anatomy, Williams, Warwick, Dyson, & Bannister, Churchill Livingstone, 1989, pgs. 1356 &57.
10. Somatics: Reawakening The Mind's Control Of Movement, Flexibility And Health, Thomas Hanna, PhD, Addison-Wesley, 1988.