

Somatics?

What's Happening When We Practice Somatic Exercises

“Lisa, what are we doing?!” I heard this a lot when I first began to teach Hanna Somatic Exercises in my yoga classes. I witnessed somas become agitated, even confused. Some somas walked out or simply did not return. For those that stayed I witnessed what **is** the miracle of this work; beyond the agitation somas became profoundly content. Still. Many of those somas continue to practice Hanna Somatics today. Most of them have been so inspired by their own experiences they have introduced the work to others.

So, what **are** we doing when we are doing our somatic exercises? That is what I will attempt to answer through this paper in hopes of deepening my own understanding of this work and helping others gain a clearer understanding as well. This paper intends to lay a foundation for understanding human neurology with regard to movement and to elucidate our nervous system’s role and purpose in Hanna Somatic Education (HSE), the body of work created by Thomas Hanna. It is presented as introduction to HSE as well as an invitation for those who have never studied neurology or even contemplated it within themselves to do so. I hope this may serve as a groundwork onto which further study and understanding can manifest.

In this work, we are using our brain and nervous system (central and peripheral) to create change through an internal learning. I believe a better understanding of **how** Hanna Somatics works as well as **what** is happening when one is doing the work facilitates this learning. While a person will benefit from HSE without even a basic understanding of the neurophysiology that underlies it, some degree of understanding will make their practice more effective. Plus “To Know Thyself” is crucial, and our brains are really cool! Additionally, an understanding of our neurophysiology will help people to differentiate HSE from other modalities; Feldenkrais for example, or a deep tissue massage. Furthermore, I often have somas who are certain that they need to work when doing their somatic movement. They are deeply tied

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to the idea that without effort there can't possibly be any kind of change. With an understanding of how in HSE we use our neurophysiology to create change they come to realize that, in fact, they do not need to work so hard and may benefit more if they work less. Finally, knowledge is empowering. To better understand their neurophysiology and how that system is creating the changes they experience (less discomfort, more relaxed, improved breathing and better sleep to name a few) helps them to realize **they** are responsible for the improvements. They possess the means to self regulate and self heal.

So what are we doing with our brain and nervous system as we do our Hanna Somatic Movements? To answer this question it might be useful to outline some immutable truths with regard to this paper's topic:

- Truth Number One: A muscle's only action is to contract (shorten). Additionally, there are 2 types of muscles: Striated and Smooth. Striated is the type of muscle that contracts. Smooth muscle is involuntary like heart, stomach, intestines, bladder, uterus. In striated muscles a contraction happens via our Central Nervous System (brain, brain stem, cerebellum and spinal cord) and Peripheral Nervous System (nervous system outside brain, brain stem, cerebellum and spinal cord). The cells in our CNS are called neurons. The fibers become nerves in our PNS. To move, a motor neuron, sends an electrical impulse, (a message) down our spinal cord to the level where the muscle is innervated that will be recruited for the movement we are doing. How does this message travel? For simplicity let's say a neuron has a cell body, dendrites and an axon. Through their dendritic spines dendrites carry the electrical impulses from one neuron to the cell body of other neurons and axons carry the impulse away from the cell to the dendrite of another cell. The space between the axon of one neuron and the dendrites of another is called a synapse. Transmission of the message across the synapse happens via a chemical transmitter. This substance causes the next neuron to be electrically stimulated and keeps the signal going. At the spinal segment of the muscle we are wanting to use, the motor neuron synapses on the alpha motor neuron (or lower motor neuron) causing the muscle to contract. Our motor directive can travel down different tracts in our spinal cord depending on what part of our

brain is doing the movement (is it conscious or unconscious, reflex or learned, etc...) We have a number of different motor tracts that carry the electrical impulse from CNS to PNS to move us. The vestibulospinal tract does 'anti-gravity'. It's continuously recruiting extensor muscles in your back to draw you back, and then when stretch is sensed in the muscles in your front it contracts flexor muscles in your front to draw you forward (this is 'stretch reflex' which we'll learn about in our next Truth) and creates a bit of stretch in your extensors which causes them to contract and pull you back again. The same thing is happening side to side. This is why if you've ever tried to stand completely still you cannot do it. There's a subtle shifting going on. The rubrospinal tract allows us to flex (bend) our joints and move. Through your reticulospinal tract you are affecting muscle tone. This tract prepares you for action. All of these motor tracts come from brain stem level (unconscious level). The corticospinal tract is the only tract that comes down from the motor cortex (conscious level). It is also the only tract that can inhibit motor activity as well as activate it. Why this matters. When a muscle contracts the motor nerve impulses are coming down their tract and synapsing with the muscle causing the *motor units* for the muscle to fire (a motor unit is the alpha motor neuron and all the extrafusal muscle fibers it synapses with). In a chronically contracted muscle, the neurons take turns sending down impulses to keep the muscle contracted. If a muscle is habitually (unconsciously/ involuntarily) contracted, this volley of impulses continues 24/7 without our consent or participation. It is *only* with the corticospinal tract that we can also inhibit the firing of the motor units and de-contrast the muscle.

- Truth Number Two: Striated muscles have two types of fibers; extrafusal and intrafusal. When we are contracting a muscle to do a movement, we are contracting the extrafusal fibers. Within the intrafusal fibers are little sensors called spindles. The job of your spindles is to respond to stretch. When the spindles are stretched they send out a message to your CNS saying, "We are being stretched" and there is an immediate and unconscious re-contraction of the muscle back to it's original level of contraction and sometimes to a higher level of contraction. Your brain is not consulted in this

and you have no choice. This is a reflex. Reflexes happen at the level of the spinal cord. They are hard wired into us and are designed to help us survive. The red light reflex or startle response is such a reflex. Think of the curling-in you do (literally withdrawing) when something makes you feel anxious.

- Truth Number Three: Muscles work in pairs to move at a joint; agonist and antagonist. When the agonist muscle contracts (shortens) ideally the antagonist muscle relaxes and lengthens. For example, if I want to bend my right elbow, my right bicep contracts to bring my hand closer to my right shoulder and my tricep muscle lengthens to allow my elbow to bend. Trouble arises when a muscle remains involuntarily contracted.
- Truth Number Four: Movement can be voluntary (planned) or involuntary (reflex). Some movements are learned and other movements are built in. In HSE we are adding to our motor programs and improving movement patterns we already use. One of the ways we improve our movement is relaxing our muscles. Another way our movements improve is through corollary discharge. A movement that is planned has corollary discharge. A reflex does not. Corollary discharge is an image of the movement you plan to do. When you intend to do a movement, if you have done the movement before, a carbon copy of the movement is sent from the motor system to the sensory system to prepare those sensory systems for the changes that will occur as a result of the intended movement. Creating a corollary discharge for the movement they are doing is one of the reasons in HSE work we invite individuals to 'sort out' how to do the movement described rather than demonstrating the movement for them. It's also a way of helping them to do the movement with their motor cortex.
- Truth Number Five: Different parts of our brain do different things. The lowest level of brain function is in the brain stem at the top of our spinal cord. This is where we have reflexes and functions vital to survival. Posterior to our brain stem is our cerebellum. This is where we store learned movement patterns that we no longer have to think about doing. They are pre-programmed, happen quickly and allow us to think about other things while doing them (take walking for instance). Above our cerebellum and brain stem is our our limbic system. This is an emotional area. This area

plays a role in motivating us. Above all of this is our neocortex. This is the level of consciousness. Our motor cortex and sensory cortex are located here. This is the level of brain that does voluntary, planned movement and allows us to sense the sensory feedback of a movement. When we first learn to do something a large part of our brain is activated. As we acquire more familiarity with this activity we use less and less of our brain to do it. Only the parts of our brain involved in the doing of it are engaged. Eventually we are so familiar with it that our cortex isn't involved at all. This is both helpful and can also be unhelpful. It's helpful in that it allows us to think about other things. Can you imagine if you had to plan every part of every step that you take?! There wouldn't be much room to think about anything else. It can be unhelpful when due to injury, or repetitive movement and other reasons, we habituate a pattern of movement that is inefficient. For example, think of how you might limp for a few days if you stepped on a nail. To keep weight off your injured foot, you are hiking a hip and shortening one side of your trunk. Your brain is so adaptable that you quickly accommodate to this new mode of movement. When your foot has healed, to some degree you are still in your hip hike with a shortened side and you probably do not even realize it. The muscles that contracted in the course of injury remain contracted after you've healed. This chronic contraction makes our movements harder to do. It also decreases the amount of sensory feedback we are aware of when we do movements with these muscles. This makes it less likely that we will use these muscles for doing our movement. This is what Thomas Hanna referred to as Sensory Motor Amnesia. And this leads us to our next truth.

- Truth Number Six: Efficient, effective, comfortable movements occur through a well functioning feedback loop that involves our Central and Peripheral Nervous Systems. Motor neurons carry efferent directives down and out to our muscles and Sensory neurons carry afferent information back up about what we did. How this feedback loop flows depends in part upon how well the sensory information generated in a movement is connecting back up to the sensory cortex; meaning we are conscious of it. Part of what we are doing is helping people to develop their sensory cortex and

become more self aware. As they do a movement and intend to notice sensations coming from their skin (change in pressure or tautness), joints (is it bending or opening), muscles (am I contracting or decontracting) and other areas, their sensory neurons are producing more dendritic spines and they connect up more. The more they are able to sense themselves in movement, the more effective and nuanced their movement becomes. Their motor neurons produce more dendritic spines as well. If you are not using your neurons for a movement, say moving your right shoulder, the sensory and motor neurons lose dendritic spines and you lose your ability to do move your right shoulder well, if at all.

- Truth Number Seven - Our brain and nervous system organize us as a ***whole***. When introducing the myth of aging exercises in his book “Somatics” Thomas writes, “This program consists not of physical exercises, but of Somatic Exercises...” This is a fundamental principle in HSE. From the outside looking in we see a body. This is a third person perspective. From a first person perspective, the inside looking out, we are what Thomas called a Soma. We are whole. Any falsely constructed delineation between body and mind automatically disappears when we experience ourself from within. We are a soma. We are a whole. From a somatic perspective we grasp that if one part of us is holding contraction all of us is contracted to some degree; physically, mentally, behaviorally, etc... This also means that when we relax in one part we are, to some degree, relaxing as a whole. When we improve one system all systems are upgraded. In working with our skeletal muscles we are affecting other systems too; hormonal, chemical (think digestion), respiratory, even our mood shifts. Taking what you’ve learned so far, let us explore how a soma responds when a muscle becomes chronically contracted. Our movements are harder to do and tire us out. We are more sensitive to stretch. The more contracted we become the less we are able to sense ourself. With less sensory feedback connecting up to our sensory cortex our movements become less efficient, less accurate and we lose our joy of moving. It’s not just our body that is becoming rigid. We can find ourselves very rigid in our behaviors and in our thinking. We cannot expand to consider viewpoints that may be new to us or

contrary to our current belief structure. We lose the choice in how we physically move through our day as well as how we respond to situations that arise in our day. We end up being run by reflexes and stored patterns of movement and behavior that might not meet the present moment accurately.

Breathing is often compromised as tight muscles, especially abdominal, do not allow for the full downward movement of our diaphragm. Sleep is impaired because it's actually taking a lot of effort to maintain this new, unconscious and involuntary level of contraction. We may also feel as though we are not very strong because we do not have a muscle's full potential. (Consider, if a muscle is habituated to holding 30% contraction, when we need to recruit this muscle for movement we only have 70% of it's potential available to us.) What an unpleasant state of being! And yet many of us are living like this and are told it's simply a part of getting older.

- Truth Number Eight: Hanna Somatic Education HELPS US REGAIN CHOICE! In this work you intervene to help muscles relax and lengthen and as a result experience the benefit of improved breathing, improved sleeping, improved movement, feeling less tired and more energized. You regain the ability to sense yourself. Your outlook improves and you regain your ability to choose how you move and how you behave.

In HSE our intervention is a motor intervention. We are working with striated muscle. This intervention is happening at an internal, first person level of experience. This is what Thomas Hanna referred to as "Going through the looking glass." For a facilitator we are 'going through' and working with our client's first person; seeing them from within rather than from without. This is part of the reason an understanding of the neurology of movement is so fundamental to HSE. This 'through the looking glass' viewpoint applies to the individual doing the work as well. Rather than working with themselves as 'a body' they are encouraged to shift to an internal sense of themselves as a soma. We are facilitating something to happen in their nervous system. They are doing the movement and an internal learning is taking place so the change is more lasting.

When practicing Hanna Somatics, whether it be a group class or an individual session, participants are asked to move slowly and with full attention. This helps them to do their movement with their motor cortex (it's conscious and voluntary) and allows the opportunity to receive the sensory feedback the movement created in them. So along with a resetting of the resting level of tonus (tone measures the degree to which you can move a joint) in their muscles, they are also connecting up more with their sensory cortex and they begin to sense more which improves their movement. This is one of the principles that distinguishes HSE from Feldenkrais work, which is sensory oriented. In Feldenkrais, the body of work created by Moshe Feldenkrais, the practitioner is providing sensory information to the client. In HSE, the client provides their own sensory experience by moving. Here too we can distinguish HSE from various forms of massage. Massage is a third person intervention. Something is being done **to** the client from the outside. There is no learning happening in their first person. While there are benefits of participating in a Feldenkrais class and/or getting a massage, it's important to recognize that the intention and method of intervention is different than that of an HSE class or private session. Because we are facilitating an internal learning through movement the changes that arise out of that movement are longer lasting.

Remember that a muscle's only action is to contract. Knowing this, how can we help to de-contract muscles that have become habitually (unconsciously and involuntarily) shortened? Part of the answer lies in what motor tract is being used to do our movement. Remember our different motor tracts (see Truth Number One). Corticospinal is the only tract that connects up to the motor cortex (conscious movement) **and** it is the only tract that can inhibit and decrease the output to the muscle rather than increase it. **THIS IS OUR TRACT!** If possible, we do our work lying down. Having people lie down takes them out of gravity. Remember, when we stand we trigger "anti-gravity" reflexes that flow through our vestibulospinal tract and cause muscles to contract. By lying down in gravity we help people to relax and to do their movements with their lateral corticospinal tract.

With the understanding you now have of how our brain and nervous system move us, let's look at how HSE uses movement to facilitate a learning that allows muscles to relax and lengthen. I will outline three types of movement; Voluntary Pandiculation, Means Whereby, and Kinetic Mirroring. A pandiculation is something all animals do, including humans, as a way of preparing for movement. Consider how a cat, upon waking, rounds up their back up and slowly releases, then lengthens one leg out and slowly releases, and then the other, and then they bound off! We humans often do involuntary arching upon waking. Yawning is an involuntary pandiculation. In Hanna Somatics we are making this process conscious and voluntary as a means of resetting resting muscle tone to a lower level.

A voluntary pandiculation has two parts. The first part is moving slowly into a movement pattern, say bending your elbow. The second part is a slow, controlled release. Both parts are done consciously, slowly and with full attention so we are doing the movement with our motor cortex and we are using our corticospinal tract. In the first part we want to contract something to do our movement. This is a shortening contraction (concentric). Our motor cortex sends a message down for the muscle we want to contract. This stimulates the motor neurons, which synapse on the alpha motor neuron, which then activates more motor units and the contraction happens. In the second part of our pandiculation, which is the most important part of the movement for HSE work, we are slowly and with control releasing out of our movement. This is known as a lengthening contraction (eccentric). For this to happen our motor neurons come down and synapse on what's called an inter neuron which inhibits the motor units that were just activated to create the contraction. The result is a less activated muscle. Your muscle is now longer and more relaxed because of an internal learning. The change is now your new reality, rather than a short term change that happens when we are manipulated from the outside and no internal learning has taken place.

Another way we use movement is called means whereby. Whereas a voluntary pandiculation is always done by the client, a means whereby can be active (the person does it themselves) or passive (the practitioner is moving the person). A means whereby is helpful for several reasons. 1). It can show us the SOMATICS?

direction of ease for the movement. In our work we always go with the direction of ease first because we do not want to stretch. 2). It helps to create a corollary discharge for the movement we are doing. 3). In going with the pattern first, we are making a pattern conscious that may currently be unconscious. Conscious movement is coming down from the motor cortex and we are in our corticospinal tract. (Please refer to Truths One, Three and Four above to review if necessary.)

Kinetic mirroring is another helpful tool. In kinetic mirroring we are bringing a muscle into a shortened pattern passively from the outside. For instance, instead of recruiting my biceps to bend my right elbow, I move my right hand towards my shoulder with my left hand. This has two very beneficial outcomes. First, the spindles in the muscle are less excited and therefore less sensitive to stretch. Second, the golgi tendon organs in our tendons (fibers that connect muscle to a joint) are stimulated as we bring the two ends of the muscle closer. The increase in golgi tendon organ activity causes relaxation.

Means whereby and kinetic mirroring are both helpful in preparing for voluntary pandiculation. However the changes that occur through both means whereby and kinetic mirroring are not as long lasting as with voluntary pandiculation.

In summary I would like to borrow some of Thomas' words in describing this body of work he created. He believed that in doing this work we were changing at a level of our first person. This is the level of our Soma in his viewpoint. Because of the internal and fundamental changes that occur in doing this work, the way we *see* changes as well as the way we *feel* about ourselves and about others. Our values change. We are not changing our body, although changes are occurring, I, as a soma, as a whole being am changing. I experience my body differently. My personality changes. Thomas believed that one could not do this work without being transformed. He believed that in practicing HSE, as well as guiding it, we were liberating ourselves and others, and said, "We're going to transform human society." Having witnessed the profound change in my own soma as well as in others, I believe he is absolutely right!