Rolfing® SI, Trauma, Orientation, and the Autonomic Nervous System

By Lael Katharine Keen, Rolfing Instructor, Rolf Movement® Practitioner

Trauma is a part of human existence and leaves a lasting mark on the body, mind, and spirit of those who have suffered from it. In this article, we will look at the progression of how trauma reprograms the autonomic nervous system (ANS), how this affects our capacity for orientation, and how our capacity for orientation organizes both our movement patterns and our structure. Some tools for addressing trauma within the context and scope of a Rolfing Structural Integration (SI) practice will also be discussed.

Trauma and the ANS – A Simple Explanation

Let us first discuss how trauma affects the ANS. The definition and description of trauma that we will use are based on Dr. Peter Levine's work of Somatic Experiencing®. [For further information, his books *Waking the Tiger* (1997) and *In an Unspoken Voice* (2010) are recommended.]

Levine states that trauma is in the nervous system, not the event itself. How is this so? Trauma happens when we find ourselves in a situation where the level of challenge presented to our survival goes beyond our capacity to actively cope – we perceive that challenge is greater than our resources. Since each of us has different levels of resource and different breaking points, a situation that traumatizes one person may be experienced as an exhilarating challenge by another. When we are capable of rising to the occasion of a threatening event and emerge victorious, we are not traumatized; rather, we come out feeling stronger, more confident, and more capable. However, when we experience a life-threatening event that challenges us beyond our capacity for active ANS response, we may become traumatized. Again, what defines trauma has to do with how the ANS responds, not the situation itself.

Most readers will be familiar with the fact that the ANS is traditionally divided into two branches, the sympathetic and the parasympathetic. The sympathetic nervous system (SNS) activates our bodies so that we can act and react to situations that demand attention, presence, and action. When the situation in which we find ourselves is experienced as life-threatening, the SNS will come on line more intensively, and our bodies prepare for 'fight or flight'. When the fight-or-flight physiology kicks in, our bodies mobilize an enormous amount of energy to save our lives. All functions that have to do with regeneration are shut off, and adrenalin floods the body; blood flows into our muscles so that we can run or fight; blood is directed away from the surface of the skin so that if we are cut in our fight-or-flight attempts, there will be less blood loss. When sympathetic activation is high, we may be capable of feats that we would never dream possible in a more normal state. The classic example is the story of the woman whose child was caught underneath the wheels of a car: without thinking she lifted the car up and pulled her child out. This is an example of the amount of energy that is generated when our fight-or-flight responses come into play.

On the other hand, the parasympathetic nervous system (PNS) is our regenerative system. The rhyme associated with the PNS is 'rest and digest'. When the PNS is dominant, blood flows to the digestive system and also towards the surface of the skin (hence the pinkish glow, or superficial vasodilation, that Rolfers™ so often see in their clients' faces when the integrating phase of a Rolfing session is complete and the client is balanced, integrated, and settled). We need the PNS to dominate in order to go to sleep, to meditate, or to digest our food. When the PNS is functioning within a low to medium range, we can rest and digest. When the PNS activates very intensively, however, we may see another manifestation, which in trauma research is called the 'freeze' response, tonic immobility, or paralysis. For the purposes of this article we will refer to this as the freeze response.

In normal, day-to-day functioning, the two branches of the ANS have a reciprocal relationship. As one increases in function, the other decreases. Right after lunch (PNS), I don't feel like taking a jog (SNS). When I receive an e-mail that makes me angry (SNS), I may find it hard to go to sleep afterwards (PNS).

When we find ourselves in a life-threatening situation, however, many things change, and the reciprocal relationship in the ANS is affected. As the fear or anger hits, we experience a sharp rise in sympathetic activation. Our body mobilizes immense resources for the energy-consuming activity of fight or flight. If we are able to fight successfully, or are able to run and escape, then the situation is not generally experienced as traumatic – we feel victorious. We had the resources necessary to rise to the challenge that life presented to us, and this tends to make us feel more capable and confident for facing future difficulties. The energy that our body produced gets discharged through usage, and the ANS returns to its normal everyday level of functioning.

What happens, however, when our attempts to run or fight are not successful? For example, in a car accident there is nowhere to run and nothing tangible to fight. What about the child who grows up in a violent family, where the aggressors are far bigger and stronger than she is, and there is nowhere to go that is safe? In these types of situations another physiology kicks in, the physiology of the freeze response. When sympathetic activation reaches a certain peak, and fight or flight do not provide escape or a way to deal with the life-threatening event, the reciprocal relationship of the two branches of the ANS breaks down. While the sympathetic fight/flight response is at full throttle, the PNS also jumps into the fray and parasympathetic activity rises so high that it overcomes the sympathetic response. The person goes cold and pale. He may faint or have the experience of being strangely removed from the situation – dissociated. An excellent example of the dissociation that comes with the freeze response is when someone sees his whole life passing before his eyes because he believes he is going to die. The freeze response can manifest in many different ways. It is an extreme state when our body prepares for what appears to be an imminent death. Both sympathetic and parasympathetic systems are at high levels of activation. It is like being in a car with both accelerator and brake pressed all the way to the floor.

The freeze response is the last card played for survival. Going limp and lifeless helps to save the life of many a prey animal, as predators will frequently lose interest in inert prey – an instinct that saves them from eating sick animals. If the freeze response does not prevent the predator from going for the kill, at the very least its prey is spared some of the pain of its own demise as the freeze response floods its body with its own endogenous analgesics.

The freeze response is a highly successful biological response to extreme stress, which is our body's way of 'tripping the switch' when activation reaches too high of a peak. It is meant to be a time-limited response. When danger has passed, the intense parasympathetic activation responsible for the freeze response goes down, the high sympathetic charge can then be felt and discharged, and our systems are meant to return to normal. Animals allow this process to move through their systems which then reset. You witness this when a bird flies into a window: the bird hits the window and falls, as if dead, to the ground. However, if you take the time to observe, after a period of no movement, all of a sudden the bird stirs, trembles, and comes out of the freeze response, usually in a highly activated state expressed by flying frantically away.

We human beings are a little more complex. When the sympathetic charge is felt and discharged, we too may experience a number of different sensations and autonomic behaviors – such as expression of strong emotion, trembling, shaking, muscle twitching, yawning, and changes in body temperature, heart rate, and breathing, to name a few. Unlike other animals, however, we often will use our sophisticated nervous systems, and their capacity for inhibiting more instinctual behavior, to shut down this discharge of survival activation and thus short-circuit the reset process. We do this because of social conventions ("It's not okay to cry," "I need to be strong"), because shaking and trembling can make us feel out of control, or because experiencing the sympathetic activation as it discharges frightens us.

Whatever the reason, when unable to allow the discharge of the high activation of the freeze response, we get stuck. Our nervous systems do not return to normal and we continue through life with the ANS still set to red alert. This underlying dysregulation of the ANS is the basis of the complex and diverse symptoms of post-traumatic stress disorder (PTSD).

What Does the ANS **Have to Do with My Rolfing Practice?**

"So what does this have to do with my Rolfing practice?," the reader may ask. "I am not a psychologist; I am not a trauma therapist; I'm a Rolfer." There are clearly benefits to helping a client discharge traumatic activation, and there are several unique ways within a Rolfer's scope of practice.

The first way is for the Rolfer to simply become aware of the client's autonomic state, learn to recognize the signs of discharge, and give it time to happen. Human beings, like all other animals, are biologically programmed for success and self-regulation. A freeze response that gets stuck in our biological system is only a temporary glitch within our deep instinctual knowing of how to heal ourselves from trauma. Oftentimes, allowing trauma to heal is simply a question of giving the body time to 'tell its story'. The body tells its story not through words, but through sequences of sensations and autonomic behaviors.

Thus, when you, as a Rolfer, are working on a part of the body that holds a traumatic charge (let us imagine that it is a leg that was broken in a motorcycle accident), you may notice that the client's body is no longer 'listening' to your touch. Your hands may make a suggestion that would nudge the body towards the next highest level of order and integration, and the client's body resists it. The muscles in that leg lock against your touch. The client fidgets and shifts on the table, feels pain, and complains even when your pressure is very light. These are often signs that we are contacting an area of the body that has a story to tell.

What happens if instead, when the client begins to fidget, you slow down, back out with your touch, and wait, asking him what he is feeling in his body? The client may report that he feels an electrical or numbing sensation in that leg that was injured so long ago. As you encourage him to just notice that sensation, he may feel his heart rate increase, and then there may be some muscle twitches in that leg, twitches that, if given time, evolve into a wave of trembling. As you encourage the client to stay with the trembling, the wave abates, and slowly the client's whole system begins to settle. He takes a spontaneous deep breath and a wave of pleasant warmth moves through the leg. His heart rate goes down, his breathing opens up, and you will often see that all the changes you were hoping to gain by working on the leg occur spontaneously as the stored charge is able to release.

The first level of allowing trauma to release in a Rolfing session is to notice when the body is not responding to our touch in the hoped-for way, and to respond by changing our touch and waiting to see if some information that has been held in the body would like to express itself. At this level, we pay attention to the autonomic signs that accompany discharge: spontaneous 'release' breaths, sighing, yawning, emotion, twitching and trembling, and changes in skin color (vasodilation/vasoconstriction) to name a few. When the body signals us in this way, we simply remove our hands, stay connected with the client, and allow enough time for the body to tell its story.

Orientation, the Hidden **Organizer of Structure**

Any discussion of trauma and how it affects the body also needs to include how trauma affects orienting, and how orienting affects both movement and structure.

Before we move, we have a pre-movement, also known as *anticipatory postural activity*. This is the moment when our body prepares for the movement we plan to make. If I am going to raise my arm, there will be a thousand tiny compensations all over my body to assure that as my arm raises and the weight shifts, my moving center of gravity will have the support that it needs and I won't fall down. The pre-movement is orchestrated by the cerebellum and the gamma motor system, which coordinate all of our movements. The gamma motor system is informed by our orientation to space, and each of us perceives and moves into space in a very different way.

Rolfer, dancer, and movement specialist Hubert Godard speaks of two different qualities of space: *topos*, or geographical, measurable space, and *phenomenological space*, which contains our own personal histories, meanings and associations, expectations, and cultural/sociological contexts. Phenomenological space, or subjective, personal space, is the space to which we orient before we move. This perception of space, unique to each individual and each situation, is what shapes our movement, and through repeated movement, our structures (McHose 2006).

Godard's theory of Tonic Function states that in the pre-movement, the moment in which our body organizes to move, we are orienting to both space and ground. According to our unique histories and movement strategies, some of us will orient more to the support that we receive from the ground, and some of us will orient more to the support we receive from the space/context around us. An equal balance of these two orienting strategies towards ground and space will lead to a quality of two-way lengthening in the spine as part of the initiation of any movement. However, when the capacity to fully trust either ground or space is lost (an inevitable consequence of human life), it will lead to shortening in the moment that the body organizes for movement and the resulting movement will have a bias in one direction or the other.

Experiential Exercise to Feel the Effect of Orientation on the Breath

Breathing, as the most basic and most repetitive of our movements, richly illustrates the role of orientation in both movement and movement's formation of structure. This can be felt with a simple experiment.

Seated in a chair with both feet on the floor, with sit bones supported and your back comfortably straight, make sure that you are looking down at the floor. When your eyes are fixed on the floor, this effectively diminishes your capacity to orient to space and increases your orientation to ground.

Take a deep breath and notice how high in the rib cage the breath is able to move, with your eyes fixed on the floor.

Now, to feel the contrast, let your head come up and your eyes find the line of the horizon, and then let them gaze out very slightly above the line of the horizon. Take a deep breath, and now notice how high in the rib cage your breath is able to move.

If you are like most people, when you oriented towards the floor with your eyes, your upper ribs stayed still and the in-breath could not go all the way up into the upper ribs or the neck and head; when you brought your head up, the breath could also follow, flowing into the top of the rib cage and up into your upper axial pole.

Now, think about a client with a certain body type that most of us know: the person who comes to Rolfing SI because she wants to "open her chest." Her rib cage shows a strong expiration preference, her shoulder girdle slides forward, her upper arms are internally rotated, and her head is projected forward by the lack of support from the rib cage. If we look at where this client is orienting, we will notice that she rarely looks up or out. It is as if the roof of her perceptive space has been lowered. This particular body type rarely holds the change that we so painstakingly labor to bring about with our hands. After a session the client goes out feeling taller and more open, but when she returns the following week, we see that she has fallen back into her pattern of collapse.

To help her succeed in living a lasting change, we need to help her change her pattern of orienting. As long as her perceptual 'roof' is low, forcing her eyes down towards the ground, her upper ribs will not be able to respond to the movement of the breath, and her rib cage, following the breath, will not open or expand in the upper ribs. We breathe somewhere between 20,000 and 25,000 times per day. What our hands can do in one hour of fascial manipulation per week can never hope to prevail over the 20,000 repetitive movements per day.

Thus we come to an interesting cycle of cause and effect. The way we orient determines the pre-movement – the way that our body prepares for movement. The pre-movement defines the movement, and through our most habitual and repetitive movements, such as breathing, walking, reaching and sitting, to name a few, we create and re-create our bodies on a daily basis. Our patterns of orientation truly shape our bodies.

The Orienting Reflex

The *orienting reflex*, also called the *orienting response*, is our natural and deeply instinctual response to novelty in our environment. It is a multi-part reflex, involving the *arrest response* (the first phase of the orienting response), where all movement is frozen and the body flexes slightly. This is followed by the *preparatory orienting response*, where the spine lengthens, all sensory organs open, and the head turns – scanning the environment from one side to the other.

Ivan Pavlov was one of the first scientists to study the orienting response and he called it *shto takoe*, which roughly translates as "what is it?" When something new or unexpected happens in our environment, we have a biological necessity to know where it is and understand its meaning to us. The orienting response is our body's way of bringing in this information. Neurologically, it is a very complex and not yet fully understood mechanism.

When we are alerted to something new or different in our environment, after the arrest response, our sense organs open. At this moment, when all is functioning well, we are fully present in the moment and able to respond to a variety of possibilities. The source of novelty could be nourishing/interesting to my survival, such as an opportunity for food or contact with another of my species; it could be neutral, with no particular significance to me; or it could be dangerous, in which case I need to mobilize very quickly for fight or flight. In the first moment of orienting, I need to be open, without preconceived ideas. This allows me to scan, to orient, to associate, and to decide, at an organismic level, what action I need to take in relation to this new stimulus. Being biased in one direction or another may cause me to make a costly mistake. Once the location and meaning of the stimulus have been decided, I will approach, ignore, or take defensive action. My nervous system will alter accordingly to support the activity chosen:

- If the novelty is interesting to me for purposes of nourishment or pleasure and I approach, sympathetic-based defensive responses will be inhibited, and a more parasympathetic function will dominate. My quality of orienting will remain open to all forms of information.
- If the stimulus is uninteresting to me in any way, I will discharge the slight sympathetic preparation that occurs with orienting and continue on my way.
- If the stimulus is threatening, my system will prepare for fight or flight. Once my body mobilizes for defense, the quality of orienting changes drastically. Whereas before I was able to perceive all possibilities, now my senses and my attention focus entirely on what is needed for successful fight or flight. At this time, blood supply to the higher

brain centers, the digestive system, and the organs of expression shuts down. My vision becomes focused as I prepare to take the actions necessary to save my life.

- If the danger persists, and fight-or-flight responses are thwarted, I go into a freeze response, where a high-intensity parasympathetic charge dominates, and the quality of orientation here will be disorientation, dissociation, and disconnection at many levels. This is the disorientation and dissociation that we see in people suffering from PTSD. It may manifest in many ways: drawing blanks, moments of sudden confusion, being lost in time and space, bumping into things, or being disconnected from emotions or memories of traumatic events.

What this means is that, in many cases, our capacity to orient depends on our underlying autonomic state. When, through unresolved trauma, our nervous system gets stuck in freeze, that may limit our overall orienting capacities to a state of diffuse disorientation or a state of focused hyperarousal.

If orientation is the hidden shaper of movement and structure, then it follows that stuck patterns of fight or flight and freeze may have a systemic effect on those parameters that we work with in Rolfing SI. To understand this further, and to understand the parameters of healthy orienting, we need to take our consideration of the ANS to the next level of complexity, by taking a look at Stephen Porges's Polyvagal Theory.

The Polyvagal Theory – A More Complex Understanding of the ANS

In this next section, we will consider Stephen Porges' (2011) Polyvagal Theory, which looks at a previously unconsidered division of the parasympathetic nervous system: the dorsal vagal system, a subsystem found in both reptiles and mammals, and the ventral vagal system, a subsystem that is found only in mammals.

The 'reptilian' or dorsal vagal system has its neuromotor origins in the dorsal vagal motor nucleus of the brain stem. The 'mammalian' or ventral vagal system has its neuromotor origins in the nucleus ambiguous of the brain stem. Both subsystems organize around the tenth cranial nerve pair of the vagus nerve, and its close connections with other cranial nerve pairs, hence Porges' naming of his theory as the Polyvagal Theory.

The reptilian or dorsal vagal system is the system that is responsible for our rest-and-digest and freeze functions. It innervates the heart and lungs and many of the subdiaphragmatic organs. Its structures and function are ancient in evolutionary terms, with some functions going back as far as cartilaginous fish. The mammalian or ventral vagal system is evolutionarily the newest aspect of the ANS, having only appeared with mammals. It innervates the muscles that are responsible for facial expression, modulation of the voice, head turning and tilting, and the capacity of the ear to tune to the higher frequencies of expressive vocalizing. It gives us the fine-tuned responses we need to communicate with other humans and mammals. Porges calls it the *social engagement system*, and the rhyme to remember what it does is 'tend and befriend'. The ventral vagal system is myelinated, nuanced, and flexible. It also ennervates the heart and lungs – through its action we have the capacity for a subtle modulation of heart rate and breathing. It connects the expressive organs of the head with the heart and lungs, and when its function predominates we feel safe, we are relational as well as calm, and we remain flexible in our responses to environmental stimuli.

Each one of these branches of the ANS determines not only a physiological state of functioning, but a way of orienting to the world and a state of consciousness. We have already mentioned the disorienting qualities of the dorsal (reptilian) vagal system, which can manifest as a subtle turning away from outside stimuli, or drowsiness that one may feel when digesting food; this system can also produce the full-blown dissociation and disorientation that accompany PTSD. In comparison, a hyperaroused SNS can produce a defense-oriented and highly focused orienting response. By contrast, the orienting quality that seems to accompany a ventral vagal predominance is *exploratory orienting*.

Exploratory orienting is characterized by a state of "relaxed alertness to both the internal and external environment; curiosity; gathering information about the environment with a low level of activation" (Somatic Experiencing Trauma Institute 2007, 3). When the client is in a state of exploratory orienting, his eyes look clear and shiny; he perceives colors as brighter and more beautiful; and he is curious, playful, and open to contact and connection. In this state, we are most likely to perceive what is happening in this particular moment, instead of projecting a past happening onto what is occurring now. Exploratory orienting is the state where we can orient to that which nourishes us, whether that is food, connection with other, or beauty.

Exploratory orienting is the quality of perception and orientation that allows us to make decisions about our lives; it helps us to determine which situation will lead us towards pleasure and well-being. When the nervous system is stuck in fight or flight (sympathetic dominance), we find ourselves constantly responding to our environment as if we are in danger – *whether we are or not*. When our nervous system is stuck in freeze (dorsal vagal dominance), we have trouble staying present. Because the ventral vagal system is the most recent evolutionary autonomic subsystem, it is also the most flexible of our ways of being; when it predominates, it allows us to respond spontaneously and appropriately to our environment and the situations in which we find ourselves.

It is the author's theory, based on clinical experience with both Rolfing SI and Somatic Experiencing, that in a state of exploratory orienting we are using our senses in a very specific way, a way that leads to maximum balance and ease in both movement and structure. What might this quality of sense perception be? To understand this, we will take another trip into the nervous system, this time into the cortical and subcortical pathways that mediate the senses.

Cortical and Subcortical Sensory Pathways

We have two clearly distinct pathways for visual information in our brain, one pathway where information is processed cortically, and one pathway where information is processed subcortically. They mediate two very different qualities of vision. The two visual pathways are very well researched and documented, and recent research suggests that for our other senses there exists a similar division. In this article we will limit our discussion to the visual system, remembering that the same principles hold true for other senses, including hearing, touch, and smell.

The visual cortical pathway begins in the cones, the light receptors in the eye that see color. Cones gather around the fovea, the small central portion of the eye that we use when we need to focus on fine details. From here, the cortical pathway proceeds into the brain, crosses at the optic chiasma, goes into the lateral geniculate nucleus of the thalamus, and then to the visual cortices, located in the occipital lobes of the brain (Kolb and Whishaw 2002, 287-291). The cortical pathways see color, fine detail, and are responsible for our focal vision. Being processed by the neocortex, this pathway receives many associative connections. It is through this pathway that we know what we are looking at and what its meaning is to us.

The subcortical pathway begins in the rods, the light receptors in the eyes that see light and movement but not color. The rods are dispersed throughout the rest of the eye, outside of the small, central fovea. From here, the subcortical pathway proceeds to the superior colliculi in the pons, then to the pulvinar nucleii in the thalamus, and from there to the visual cortex (Kolb and Whishaw 2002, 287-291). This pathway helps us to see movement and situate ourselves in space. It mediates our peripheral vision. Having a much quicker processing time than the cortical pathway, it allows us to respond quickly.

The subcortical pathway is our movement and spatial location pathway. We'll look at the processing time of each of these two pathways, using an experience most readers will have had: that of driving and seeing something rush into your field of vision, in front of the car. The first thing that happens is that we perceive movement in front of the car and put on the brakes (subcortical pathways). Only later do we notice that it is the neighbor's cat that caused the disturbance (cortical pathways). Subcortical vision processes information more quickly, because, unlike cortical vision, it doesn't go through the rich associative processes that tell us what it is we're looking at. It simply perceives movement and we move and respond to it. This is efficient and necessary for our survival. If we only jump out of the way once we notice that the long sinuous form in front of us is a poisonous snake, the snake will already have bitten us.

Godard, in his model of tonic function, emphasizes that the two visual pathways bring us not only two very different qualities of vision, but also two different ways of being in the world. The experience of the cortical (focal) pathways is usually more of an active experience; it is as if we reach out to touch the world. When our vision is proportionally more focused, we tend towards space orientation, being oriented to the outside environment and the context in which we find ourselves. Peripheral vision connects us to weight and ground orientation. When peripheral vision is working, the experience is one of being touched by that which we see. Depending on which quality of vision predominates, we will shift our weight distribution and our posture. If the reader wishes to experience this, he can try the following experiment.

Experiential Exercise: The Effects of Peripheral and Focal Vision on Posture and Weight Distribution

This experiment should be performed in the standing position, preferably with an open space in front of you.

First, find a point directly in front of you, and stare at it fixedly, trying to see the maximum amount of detail possible. Notice what this feels like in your eyes, and in your neck. Notice what happens to the weight distribution on your feet. If you are like most people, you will feel tension in your eyes and neck, and your weight will shift towards the medial arches and the balls of the feet.

Now, standing in the same place, allow your vision to become very wide. Continue to look straight ahead, but allow your eyes to soften, and receive the images in front of you; allow yourself to take in the edges of your visual field. Notice what this feels like in your eyes, and in your neck. Notice what happens to the weight distribution on your feet. Most people will feel their eyes and neck soften, and their weight will shift towards the heels and the lateral arches of the feet.

In the best of all possible worlds, both of these qualities of vision are equally available to us and work together, with one coming to the forefront more than the other depending on our activity. Peripheral vision gives us weight orientation and helps us to come back into contact with ourselves; focal vision gives us space orientation and helps us to contact other people. We can also perceive the two qualities of vision when we look at a painting and see the figure and the ground. Figure is the equivalent of focal vision, ground the equivalent of peripheral vision. The painting would not be complete without both. For a more detailed discussion of the two qualities of vision, I refer readers to two of Kevin Frank's articles: (2007, 2010).

Considering the enormous impact that our way of orienting has on both structure and function, it is also important for us, as structural integrators, to understand more about the functions of peripheral vision.

The Importance of Peripheral Vision for Posture, Balance, Core Stability, and Movement

Peripheral vision, as stated above, is our movement vision and our spatial location vision. It is peripheral/subcortical vision that brings us stability, security, and balance. Experiments with stimulating peripheral vision and focused vision have shown that when peripheral vision is functioning, postural sway becomes more efficient (Berensci et al. 2005), which means that our balance also becomes more efficient.

Other studies have shown that where focused visual information and vestibular information cross in the vestibular cortex, focused visual information prevails and inhibits vestibular information (Brandt and Dieterich, 1999). When vestibular information is inhibited, the body feels less secure – we are no longer as connected with our sense of gravity, and this makes our body believe that it is going to fall. Consequently, the joints of the lower body brace in preparation for landing, which involves flexion and shortening at the hip and ankle joints. If the reader wants to know what this looks like, it is only necessary to think of the shuffling gait of an elderly person, head forward, steps shortened, and hip and ankles held in a position of slight flexion. The vestibular system is one of the first organs to age, and as it ages our sense of body security wanes. Thus, over-focused vision may mimic the same symptoms as aging. It is also one of the hidden culprits in hip and tibiotalar dysfunction. This is no small consideration in an age where a high percentage of the human race spends so much time staring at devices with small screens.

Peripheral vision affects our posture in other ways as well. When we are in a landscape that affords us a wide visual field, such as a beach or open plain, the tonic (extensor) muscles of the back work in eccentric contraction and our spine lengthens. On the other hand, when we are in a closed environment, the tonic muscles of the back will work in concentric contraction, shortening our spine. This is another case where two-way lengthening and lift, two of the hallmarks of a body that has experienced Rolfing SI sessions, are deeply influenced by perception and orienting.

Peripheral vision and the vestibular system go hand in hand, as mentioned above, and the conjunction of the two with the function of the spine is also deeply related to core stability. Core stability, at a kinesiological level, involves coordination, or the action and timing of a series of key muscles. However, according to Godard, the capacity of the spine to lengthen in the moment that our bodies prepare to move is one of the important bases of both core stability and efficient, balanced movement.

It is also important to note that the deep, tonic muscles that are responsible for stabilizing our body do not respond well to cortical commands. Their best response comes when they are activated by the gamma loop, the subcortical part of the brain that orchestrates gravity response, movement, and balance. As Frank (1995) points out, this part of the brain responds not to a willed command to move but to spatial awareness and orientation. And so, we return to the premise explained above: when orientation both to ground and space is present, and the two are equally represented, we have two-way lengthening in the spine as we prepare to move; one of the results of this two-way lengthening is core stability.

The peripheral senses relate to our orientation to ground, to context, and to locating ourselves in space. Where peripheral vision gets lost, core stability is also lost, as is the body's capacity for lengthening with movement. Instead of lengthening, the body prepares for movement with concentric contraction and attempts to stabilize by using the larger, multi-joint, phasic muscles, thus compressing the joints and destabilizing the body (Godard 2010).

Trauma Alters the Orienting Reflex and Peripheral Senses

Trauma changes our relationship to space – our phenomenological space, in the words of Godard, that sense of space that each of us has that is uniquely personal and related to our history and ways of perceiving and being in the world. When the trauma involves an intrusion from a certain direction, in the case of a car accident or an attack, for example, this perturbation often occurs in a vector-specific relationship to space. This altered relationship to space will generally show up in one of two different ways that correspond to either a heightened fight/flight response or a freeze response. It may be that after a car accident, if I was hit on my right side, a person or object occupying that particular angle in my right field of vision will cause me to feel threatened or become hyper-alert – a sympathetic fight/flight reaction. Or, conversely, when someone approaches me from my right side, I may not notice his presence, or I may find myself becoming disoriented and confused – a parasympathetic freeze response.

Trauma changes our capacity to orient, not only to the horizontal plane, but also to 'up' and 'down'. People who have fallen many times, for example, may no longer trust the ground or their legs to support them, and thus become overly dependent on their eyes (and no longer their vestibular systems or feet) for their support. Or, in the case of a child who has received many blows to the head from a caretaker, it may become difficult to orient upwards or outwards.

When trauma changes my relationship to space, my peripheral vision in that vector of space becomes inhibited. Inhibited, because unless neurological damage has occurred, I continue to have the capacity for peripheral vision, but I no longer access it. When I orient to the direction from which the trauma came, my field of vision narrows and my attentiveness and encoding of spatial information diminishes. In scientific literature, the narrowing of the field of vision by negative affect is sometimes called *weapon focus* (Schmitz et al. 2009), an apt term, especially when we are speaking of trauma.

Along with a trauma-induced change in my relationship to space, the integrity of my orienting reflex will also be compromised: the ancient, reflexive scanning response that occurs in the horizontal plane when I am surprised by novelty in my environment will no longer be complete. There may be portions of my scan that my eyes will skip over, or vectors in which my neck muscles will lock, no longer allowing me a smooth transit through that portion of my space. I may go directly to fight, flight, or freeze when novelty occurs, thus no longer being open to the possibilities of nourishment or social engagement.

This inhibition of orienting in a specific vector of space has consequences for core stability, movement, and structure. When working with a client, it is possible to feel where core stability has broken down by palpation, and thus to diagnose the side of the body where orienting has been obstructed. With practice, it is also possible to perceive where orienting is not working optimally, just by looking at the client's eyes. In the eye where orienting isn't working as well, there is a quality of hard focus; it often appears as if the client is wearing blinders. The loss of core stability that accompanies inhibition of orienting capacity will show up as hypertonus in the scalenes, hypotonus in the abdomen, as well as loss of flexibility in the rib cage.

The hypertonus in the scalenes, which results from the loss of two-directional orienting, shows up as concentric contraction. The scalenes are very important breathing muscles. They give a small burst of activity at the very beginning of each in-breath. Their proximal insertions are all along the transverse processes of the cervical vertebrae; their distal insertions are not only on the first and second ribs, but also on the top of the pleural dome. In the best of all possible worlds, the fixed point of the scalenes is located above, thus drawing the upper ribs and tops of the lungs upward on the in-breath and allowing them to release downwards on the out-breath. In a less-than-optimal situation, usually when space orientation is compromised, this order reverses – the fixed point becomes the upper ribs and the cervicals are pulled down into the upper ribs with each in-breath. Another less-than-optimal configuration is when the scalenes work in concentric contraction, drawing ribs and cervicals towards each other without either end being the fixed point, thus creating localized shortness with torsion in the rib cage experienced to a greater degree. This torsion that originates in the rib cage will transmit throughout the entire body, and since the scalenes participate in each in-breath, this torsion will be repeated 20,000-25,000 times per day. In this scenario, we see how a loss of orientation connected with peripheral vision results in a change to the breathing, which affects structure.

Asymmetrical Patterns of Orienting and Scoliosis

It is interesting to take this one step further and look at how orienting and perception can contribute to scoliosis. In many scolioses that we see, two very different orienting and movement strategies manifest in the two sides of the body, which may be part of what causes the asymmetry of a scoliosis. Usually on one side we will see an eye that is no longer accessing or using peripheral vision; the gaze is harder, and the eye sits further forward in the socket. On this side of the body, the arch of the foot will be higher, and often the same-side rib cage will be more anterior. On the other side of the body the gaze is softer, the arch of the foot is low or collapsing, and the rib cage will tend towards posterior.

There is a very simple test to determine how much of the scoliotic pattern we are seeing is anchored in this loss of peripheral vision on one side. To perform the test, you will need a pair of glasses fitted with plain, non-prescription lenses and some small, preferably round, stickers, no more than half an inch (one centimeter) in diameter. Place a sticker in the center of the lens on the side corresponding to the eye that you suspect has lost peripheral vision. The sticker needs to block focal vision, which is the seven central degrees of the visual field of that eye. Wearing the glasses forces the client's peripheral vision to start working again, so if a loss of peripheral vision is one of the causes of the scoliosis, you will see an immediate improvement in the client's posture and movement. Conversely, if you put the sticker in the middle of the lens on the side of the glasses corresponding to the eye that you believe has maintained peripheral vision, wearing the glasses increases peripheral vision on that side and augments the difference between the two sides; again, if the scoliosis has a component related to the loss of peripheral vision, the client's posture and movement will become more asymmetrical. In either case, the degree of the difference caused by the glasses changing the way the client's eyes work is the degree to which orienting is an influence on the scoliosis.

Some years ago, the author worked with a client who came in with a significant scoliosis and complained of a pain in her right sacroiliac joint. As her process continued, at the end of almost every session I would adjust her right sacroiliac joint. Relief was immediate, but she would return with the same pain the following week. Eventually I tired of adjusting her sacroiliac joint, and went looking for something that would be more effective in the long run. I noticed her right eye seemed to have very little peripheral vision, and when I showed her a simple trick for restoring her peripheral vision (see below), she felt immediate relief. During the week between sessions, she faithfully practiced using her peripheral vision, and when she returned, she did not have pain in her lower right back, nor was her sacroiliac joint fixated.

Because we were close to finishing her series, and she was preparing to move to another city, I made the suggestion that she buy herself a pair of glasses with clear glass and put a sticker over the center of the right side and simply wear the glasses now and again to assure that her peripheral vision on the right side stayed open. More than a year later we met again, and she told me that she had been free of her right-side sacroiliac pain during all this time. She said that from time to time her right side would start to hurt, and when it did, she would wear the glasses around the house for awhile and the pain would go away.

Below is a simple trick for restoring peripheral vision. If the loss of peripheral vision is trauma-related, other interventions may also be necessary, but this gives the client a way to work with it on her own, which is encouraging and empowering.

Self-Help for Restoring Peripheral Vision

Stand comfortably with feet hip-width apart, looking straight ahead, with both hands in front of the center of your field of vision. Point your index fingers up and position your hands right together (see Figure 1, A).

Slowly begin to separate your hands, moving them in the horizontal plane out to each side, while continuing to look straight ahead at the spot where they were in the beginning. Although you are looking straight ahead, also track your index fingers as they move farther apart in your field of peripheral vision (see Figure 1, B).

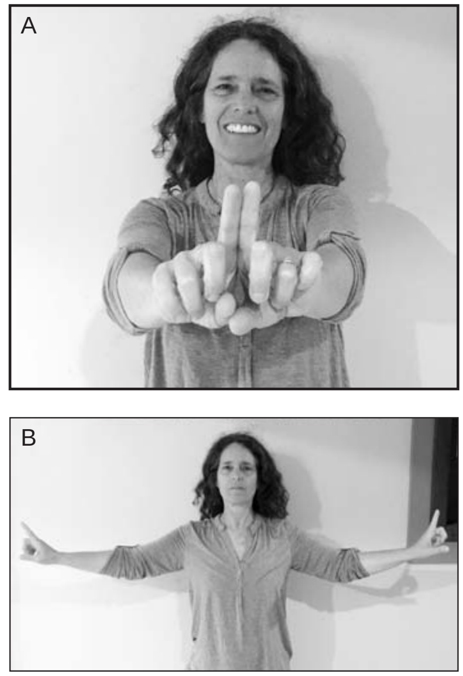

Figure 1: Self-help for restoring peripheral vision.

Continue out to the sides as far as you are able to go, without losing sight of your fingers. When you reach the edges of your peripheral vision, 'wake up' those edges by wiggling the fingers (remembering that movement is one of the things that peripheral vision perceives best).

Now drop your arms to your sides, but let your visual field stay wide, perceiving everything from the center to the farthest edges you were able to track with your fingers out to the sides.

Another way to encourage your peripheral vision to come back on line is to practice allowing images to come to you. Imagine that the object you are seeing comes to your eyes, comes into your eyes, and imprints itself in the back of your brain, near the front side of the occiput. This is the famous 'soft eyes', the eyes that see the whole tree, instead of focusing on one leaf that falls to the ground.

Conclusion

In an attempt to understand how orientation affects structure and movement, and how trauma and fixated patterns in the ANS affect orientation, we have covered a wide array of material, from Levine's physiological definition of trauma to Porges's Polyvagal Theory, and many aspects of Godard's theory of Tonic Function. Sometimes helping the client make a permanent change is as simple as sinking one's elbow into a recalcitrant structure to help restore fluidity and unstick the fascial layers. Sometimes, however, the root of the problem lies in other, not so immediately evident, layers of the being. I have attempted in this article to elucidate some of these layers and make a clear and concrete connection between structure, function, and orientation.

For readers who wish to study more on these subjects, I refer them to Levine's two books, *Waking the Tiger* and *In an Unspoken Voice: How the Body Releases Trauma and Restores Goodness*; Porges's book *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-regulation*, as well as the website www.resourcesinmovement.com, which has many articles written by Frank, Caryn McHose, and Aline Newton about Godard's Tonic Function theory. Lastly, I have written a few articles myself, which integrate the above theories in different ways, and these articles are available through the Ida P. Rolf Library of Structural Integration (http://pedroprado.com.br).

Lael Katharine Keen is faculty for Rolfing SI and Rolf Movement Integration. She is also a senior instructor for the Somatic Experiencing® Trauma Institute, at all levels from beginning through advanced, and is completing a degree in art therapy.

Bibliography

Berensci, A., M. Ishihara, and K. Imanaka 2005. "The Functional Role of Central and Peripheral Vision in the Control of Posture." *Human Movement Science* 24(5-6):689-709.

Brandt, T. and M. Dieterich 1999. "The Vestibular Cortex, Its Locations, Functions and Disorders." *Annals of the New York Academy of Sciences*. 1999 May 28, 871:293-312.

Foundation for Human Enrichment 2007. *SE Training Manual Beginning 2*. Boulder, Colorado: Foundation for Human Enrichment.

Frank, K. 2010 (Jun). "Body Security: The Movement Brain Asks, 'Where Am I?'" Structural Integration: The Journal of the Rolf Institute® 38(1):7-8. Available at www.resourcesinmovement.com.

Frank, K. 2007. "Posture & Perception in the Context of the Tonic Function Model of Structural Integration: An Introduction." IASI Yearbook 2007. Missoula, Montana: IASI. Available at www.resourcesinmovement.com.

Frank, K. 1995 Mar. "Tonic Function: A Gravity Response Model for Rolfing® Structural and Movement Integration." *Rolf Lines* 23(1):12-20.

Godard, H. 2010. Author's notes of Godard's classroom lectures.

Kolb, B. and I.Q. Whishaw 2002. *Neurociência do Comportamento*, Editora Manole Ltda, Barueri. São Paulo, Brazil. (A translation of *An Introduction to Brain and Behavior*, 2001 Worth Publishers); Chapter 8.

Levine, P. 1997. *Waking the Tiger*. Berkeley, CA: North Atlantic Books.

Levine, P. 2010. *In an Unspoken Voice: How the Body Releases Trauma and Restores Goodness*. Berkeley, CA: North Atlantic Books.

McHose, C. 2006 Summer/Fall. "Phenomenological Space: 'I'm in the Space and the Space Is in Me' – Interview with Hubert Godard. *Contact Quarterly* 31(2):32-38.

Porges, S. 2011. *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-regulation*. New York: W.W. Norton & Company.

Schmitz, T., E. De Rosa, and A. Anderson 2009. "Opposing Influences of Affective State Valence on Visual Cortical Encoding." *The Journal of Neuroscience* 29(22):7199-7207.

~~"The Map Is Not the Territory" – "The Word Is Not the Thing"[1]~~

~~*Exploring the Use of Language in the Art of Rolfing® Structural Integration*~~

~~**By Carol A Agneessens, MS, Rolfing® and Rolf Movement® Instructor**~~

~~*Author's Note: The following is based on the transcript of a lecture I gave in 2008 on the use of language in Rolfing Structural Integration (SI) sessions.*[2]~~

~~Korzybski and General Semantics~~

~~"The map is not the territory." Alfred Korzybski's famous words were quoted frequently during my early trainings at the Rolf Institute® beginning in 1981. Korzybski was a Polish-American scholar. Dr. Rolf respected his original theories and felt they were directly applicable to the study and embodiment of Rolfing SI. In an attempt to trace the threads of Rolf's early influences, I attended a ten-day seminar studying the work of Alfred Korzybski in 1997.~~

~~Korzybski developed the field called general semantics with his 1933 book *Science and Sanity*. At the height of the quantum revolution in physics, Korzybski integrated quantum understandings with the burgeoning research in human neuroscience and language. He "maintained that human beings are limited in what they know by 1) the structure of their nervous systems and 2) the structure of their languages." Further, he emphasized that "humans cannot experience the world directly, but only through their 'abstractions' (nonverbal impressions or 'gleanings' derived from the nervous system, and verbal indicators expressed and derived from language)." Sometimes our perceptions and the language we use to describe our perceptions actually end in creating false conclusions. He emphasized that our understanding of what is happening often "lacks similarity of structure with what is actually happening" (quotes from Wikipedia 2015).~~

~~I recall early Rolfing instructors giving examples of the 'lack of similarity' in our descriptions as we were learning to assess and describe the structural patterns of the individual standing before us. We were instructed to use language devoid~~