

Structure, Function, Integration.

Journal of the
Dr. Ida Rolf Institute®

June 2026

STRESSORS, FORCES, AND RESILIENCY

“As people come to Rolfers™ with their aches and their pains, we can see where their bodies are literally offering blocks to the gravitational forces.”

— Dr. Ida P. Rolf
(1896-1979)

WEAVING BETWEEN TENSEGRITY AND BIOTENSEGRITY

Let's discuss the physical material that allows humans to be upright, and then we'll talk about allowing that fluidic nature to move, feel, and be.

HOW ROLFERS™ HEAL

Every practitioner finds their own path to wellness. From breathing to psychedelics to athletics, read our authors' perspectives.

Also in this issue

Before-and-after pictures demonstrate the change during a Rolfing® session.



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Graceful Tension (2025)

June Cover

Studio Dicro.Dosis

Dicro Dosis is a Berlin-based artist duo creating three-dimensional sculptures from acrylic glass covered with dichroic film. Since 2019, they've been refining their work by blending art and design methods – carefully considering each piece's context, environment, and potential for interaction. While their play with light and color remains central, they're now expanding how audiences can actively engage with their creations, exploring innovative ways to connect people and art.

For more information:

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Next Time

● The Language of Rolfing® Structural Integration

Every profession has its own diction, wording that describes its terminology, vocabulary, and ultimately, its story. The structural integration profession started with Dr. Ida Rolf (1896-1979) and continues today with both Rolf's verbiage, and the contemporary application of Rolf's work; transforming people's structures toward ease and alignment in gravity.

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From the Editor-in-Chief

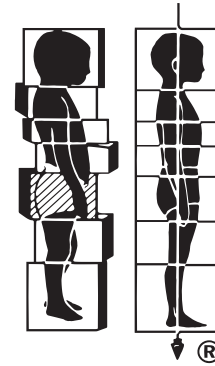
Lina Amy Hack



“Lines in a body are not mystical structures; they are where forces balance.”

– Dr. Ida P. Rolf (1896–1979)

(In *Ida Rolf Talks About Rolfing and Physical Reality*, 1978, New York, Harper & Row, page 104)



The little boy logo demonstrating Rolf's block model of seeing the lines and forces in the body.

Welcome to the June 2026 issue of *Structure, Function, Integration: The Journal of the Dr. Ida Rolf Institute*® (Volume 54, Number 1). The theme of this issue is – Stressors, Forces, and Resiliency – and we have a collection of articles that begins with the neurophysiology of fascia and the threat response, then moves to the philosophy of strain, to the dynamics of tensegrity and biotensegrity, of course, and then to the practical application of Rolfing® Structural Integration and Rolf Movement® Integration that helps people amplify their body's resiliency when faced with stress.

I have been studying Dr. Stephen W. Porges' research for over twenty years. Polyvagal Theory changed how I understand the nervous system. And now, the vagus nerve is having a real moment in popular culture; every wellness influencer seems to mention it as much as possible. I had the opportunity to sit with Dr. Porges, a true vagus nerve expert and explore his thinking about fascia and the autonomic nervous system as an integrated system, it was, for me, a genuinely moving experience. Enjoy the “Fascia Insights” column – not only is it packed with the information you need to understand the complexity of Polyvagal Theory, but in the interview portion, Porges reflects on his life as a scientist and how he is still actively expanding his own framework. I encourage you to read it.

And do not miss our philosophical column, “The Philosophical Touch: When Resilience Becomes Strain.” Rolfer™ Andrew Rosenstock guides us through historical teachings that pose a question worth sitting with: what happens when the very quality we cultivate in our clients and ourselves becomes its own source of burden?

The theme comes alive across every article in these pages. Rolf Movement® Instructor, Emeritus, Mary Bond, starts us off with her latest thoughts on biotensegrity, Rolfing Structural Integration, and how our understanding of fascia and the body is moving toward a deeper grasp of the physics of soft matter. Rolfer John Panter turns his attention to breathing in “On Breathing!” – and if that sounds simple, I promise you it is not. Breath is the foundation of life and structure, and John brings both precision and personal depth to experiencing a full-body breath.

I had the pleasure of interviewing European Rolfer and professional dancer Miquel de Jong about how he applies tensegrity concepts to movement when leading embodiment groups. He is exploring quality of touch by inviting people to become aware of the forces required to hold up bamboo sticks with a partner. He's brought tensegrity off the page and into the body as an offering for Rolfers to explore movement together.

Rolfer Will Johnson's article, “Psychedelics and The Line,” is one I anticipate will spark meaningful conversation in our community. He shares his personal experience and, with courage and thoughtfulness, brings this topic to our pages. Andrew Rosenstock's interview with Michael J. Shea, “Stressors, Forces, and Resiliency,” sits at the heart of this issue's theme. Shea's framing of a collective ‘era of grief’ – a sustained pressure on heart health, metabolism, and spiritual well-being – hit home for me. Together, Rosenstock and Shea offer a careful exploration of human capacity.

Luca Williams, a Rolfer and editor with SFI, generously offered to write a personal account of an ankle fracture sustained while mountain biking.

“Contacting Reality in my Human Body” is honest and practical, tracing how a Rolfer applies their knowledge to support their own recovery.

When considering the stress our clients endure, the forces their bodies navigate every day, and the natural resilience the human body can demonstrate, Hubert Ritter's case study is the perfect conclusion to this theme. “Body Structure, Movement Patterns, and Fascial Treatment” is the kind of grounded clinical writing that reminds us that, with precision and care, every one of us practicing Rolf's work can collect data and publish before-and-after results to communicate to the world how effective our work really is – thank you, Hubert, for showing us one way to do this.

This journal exists because of the authors who generously share their knowledge and experience, the volunteer Rolfer-editors who help bring each issue to its best form, our copy editor, Megan Overholt, who provides the quality control our public-facing articles need, and the design team at Studio-OI, who make it all beautiful and enjoyable to read. Thank you to the team at the Dr. Ida Rolf Institute® for investing in our content, Dr. Rolf's original journal, which she started in 1968. It's an honor to continue her legacy, one issue at a time. Thank you to everyone who has helped bring this issue into the world.

Thank you, the reader, for taking the time to see what's new and relevant in the Rolfing Structural Integration and structural integration community at large. If you'd like to share feedback, I'd love to hear from you at hello@sfijournal.org.

Sincerely,

Lina Amy Hack
Editor-in-Chief of

Structure, Function, Integration

Fascia Insights

Dr. Stephen W. Porges on Fascia and the Autonomic Nervous System as an Integrated System

By Lina Amy Hack, Certified Advanced Rolfer™,
and Stephen W. Porges, PhD



Stephen W. Porges



Lina Amy Hack

ABSTRACT *Fascia and the autonomic nervous system (ANS) interact through a dynamically integrated regulatory relationship shaped by neural and physiological processes and by their coevolution across vertebrate phylogeny. Despite this, the implications of this relationship remain under-integrated in both fascia research and clinical practice. This article presents a polyvagal framework for understanding fascial tone and therapeutic change, drawing on the keynote address delivered by Stephen W. Porges, PhD, at the 2025 Fascia Research Congress in New Orleans, Louisiana, and an extended interview conducted in February 2026.*

Authors' note: This article is in two parts: Part 1 is written by Lina Amy Hack, edited by Dr. Stephen W. Porges, and generously contains the 2025 Fascia Research keynote slides and notes of Dr. Porges. Part 2 is an edited conversation recorded on February 19, 2026, over Zoom. The interview has been condensed and lightly edited by both authors.

Part 1: Polyvagal Theory, the Autonomic Nervous System, and Fascia

"Polyvagal Theory highlights the crucial role of the body and nervous system in health and well-being, demonstrating how our thoughts, emotions, and behaviors are shaped by our body's ongoing assessment of our level of safety or threat. It underscores the bidirectional communication between the body and the brain and the necessity of fostering safety and connection to enhance overall health."

– In *Safe and Sound: A Polyvagal Approach for Connection, Change, and Healing* (Porges and Onderko 2025; 2).

A Foreword by Lina Amy Hack

I came to this work as a curious student, not an expert. What follows are my best class notes after more than twenty years of reading Dr. Porges' research, books, and attending his lectures. This summary is the information wish I could have had the first time someone said to me - have you heard of Polyvagal Theory? Better yet, Dr. Porges himself edited this essay, and gracefully wove correctness into the information. It's a honor to have my favorite professor edit my work to make it an A+ paper. Enjoy!

Polyvagal Theory proposes that the vagus nerve is not a unitary structure conveying a single “rest and digest” signal, but rather a complex system composed of multiple functionally distinct pathways. Although traditionally described as one nerve, the tenth cranial nerve (CN X), the vagus is a paired, bilateral nerve, with left and right branches emerging from corresponding regions of the brainstem. It is a major component of the parasympathetic branch of the autonomic nervous system (ANS), yet its function extends beyond a simple efferent role (see Figure 1), more than neural signals from the brain to the body.

Historically, the vagus nerve was conceptualized as a singular pathway transmitting a generalized inhibitory signal from the brainstem to visceral organs. The vagal signal slows down the heart rhythm, for example. This view is now recognized as overly simplistic. Approximately 80% of vagal fibers are afferent, conveying sensory information from visceral organs to brainstem structures (Porges 1995, 2007, 2023). Thus, the vagus primarily serves as a bidirectional communication pathway, with a dominant role in transmitting information about the physiological state of the body to brainstem foundational circuits.

The efferent (motor) component of the vagus, comprising roughly 20% of its fibers, is not functionally uniform. Polyvagal Theory distinguishes between two primary vagal pathways originating in different brainstem nuclei: a ventral vagal pathway, arising from the nucleus ambiguus, and a dorsal vagal pathway, originating in the dorsal motor nucleus of the vagus. These pathways differ in their phylogenetic history, neuroanatomical organization, and functional roles in regulating physiological state and behavior.

A Brief Note about the ANS

“The ANS is a brain-body network that coordinates metabolic processes to support organ function and promotes biobehavioral reactions to danger and anticipated threats” (Jokić et al. 2023, 160).

The ANS, and the role of the vagus nerve within it, are complex and often oversimplified. Neurons are the fundamental cellular unit of the ANS. Their cell bodies cluster to form nuclei – regions of grey matter located within the forebrain, brainstem, and spinal cord – as well as ganglia in the peripheral nervous system. Peripheral ganglia often appear,

in dissection, as bead-like structures connected by neural tracts, forming paired chains along the anterior aspect of the spinal column. Axons bundle into nerve pathways that transmit signals over varying distances, from short projections between adjacent brainstem structures to long pathways such as those linking visceral organs (e.g., pancreas) to brainstem regulatory centers via the vagus nerve.

Functionally, the ANS has two primary peripheral divisions: the sympathetic and parasympathetic divisions. Sympathetic neurons originate in the thoracolumbar spinal cord (T1 to L2) and project through the sympathetic chain ganglion to target organs, including the heart, lungs, vasculature, and gastrointestinal tract. These pathways support mobilization – classically described as “fight-or-flight” – enabling rapid physiological responses to challenge. Sympathetic activation is coordinated with central regulatory structures, particularly the hypothalamus, which engages neuroendocrine pathways. Under conditions of threat, hypothalamic activation can initiate the hypothalamic-pituitary-adrenal (HPA) axis, resulting in the release of glucocorticoids and catecholamines that support sustained metabolic mobilization. In other words, the adrenaline rush.

Parasympathetic neurons originate in brainstem nuclei and the sacral spinal cord. Cranial parasympathetic outflow is

conveyed through cranial nerves:

- three (CN III; oculomotor nerve),
- seven (CN VII; facial nerve),
- nine (CN IX; glossopharyngeal),
- and ten (CN X; vagus nerve),

while sacral pathways (S2 to S4) regulate pelvic organs. Traditionally, the parasympathetic system has been characterized as promoting the “rest-and-digest” functions and conceptualized as antagonistic to sympathetic activation, when one is up, the other is down, and vice versa. However, this binary framework is insufficient. Polyvagal Theory (Porges 1995, 2007, 2023, Porges and Porges 2023) reframes the parasympathetic system – particularly the vagus nerve – as comprising multiple pathways with distinct evolutionary origins and functional roles in regulating physiological state, behavior, and social engagement.

From 2005 to 2015 to 2025

My first exposure to Polyvagal Theory occurred in 2005 during a Somatic Experiencing® (SE) training in Canada. The instructor emphasized that, in response to life threat, the body does more than mobilize through fight or flight; it can also engage an *immobilization response*. At that time, the concept of a “freeze” response was not widely recognized as an adaptive biological strategy. Individuals who became immobilized during a threat

Polyvagal Theory (Porges 1995, 2007, 2023, Porges and Porges 2023) reframes the parasympathetic system – particularly the vagus nerve – as comprising multiple pathways with distinct evolutionary origins and functional roles in regulating physiological state, behavior, and social engagement.

Anatomy and Function of the Autonomic Nervous System (ANS)

Cellular Level of ANS

- Neurons are the base cellular unit of the ANS.
- The location of the cell bodies reflects function; they are called nuclei.
- The path and destination of the emerging axons determine where the signal is delivered, from the cell body to the terminus of the axonal tract.

Central Control Structures

- Hypothalamus:
 - o Small, almond-sized region of several different groups of densely packed neuronal cell bodies (many nuclei) with associated emerging axons.
 - o Centrally located at the base of the forebrain, inferior to the thalamus and superior to the pituitary gland, surrounding the third ventricle and the mammillary bodies (Lechan and Toni 2016).
 - o It functions as a high-level sensory integration and motor output area that maintains homeostasis by controlling endocrine, autonomic, and somatic behavior (Bear, Reddy, and Bolлу 2022).
- Brainstem:
 - o Evolutionarily conserved neural circuits that regulate autonomic state and support essential life-sustaining functions, including heart rate, respiration, and swallowing. These brainstem foundational circuits provide the primary regulatory platform upon which higher neural processes depend.
- Social Engagement Cranial Nerves:
 - o In mammals, the regulation of social communication is supported by an integrated system linking autonomic state with the control of striated muscles of the face and head. This system involves cranial nerves V, VII, IX, X, and XI. Notably, ocular motor control (CN III, IV, and VI) is not part of this integrated social engagement system.
- Spinal cord:
 - o The ANS has paired lateral columns of grey tissue associated with neural cell bodies from T1 to L2 for the sympathetic neurons, also called the thoracolumbar outflow, and a second cluster of sacral nuclei for parasympathetic outflow.

Peripheral Structures

- Autonomic ganglia:
 - o Clusters of connected nerve cell bodies located in the peripheral nervous system (PNS), found on both sides of the anterior spine, can look like two long strings of spaced-out beads on a vertical chain.
 - o Each ganglion, the bead-like cluster on the connected neural tissue, functions as a relay point transmitting ANS signal between the periphery, different nerves or to the spinal cord, brainstem, and hypothalamus.
- Nerve fibers:
 - o *Preganglionic neurons* are myelinated fibers extending from the central nervous system (CNS) to the ganglia.
 - o *Postganglionic neurons* are nonmyelinated fibers extending from ganglia to effector tissues.
- Enteric nervous system:
 - o A complex network of neurons within the walls of the gastrointestinal tract (Waxenbaum, Reddy, and Das 2025).

Functional Divisions

The ANS is not solely organized as a balance between sympathetic and parasympathetic influences, but can also be understood as a hierarchically organized system reflecting phylogenetic and developmental principles. This hierarchy supports distinct adaptive responses, including social engagement, mobilization, and immobilization (Porges 1995, 2007).

- Sympathetic division – originates in the thoracolumbar spinal cord, generally triggering the *'fight-or-flight'* responses via short preganglionic and long postganglionic nerves.
- Parasympathetic division – originating in the brainstem and sacral spinal cord, supports not only restorative functions (e.g., digestion and energy conservation), but also context-dependent regulation of physiological state. In mammals, this includes pathways associated with social engagement, as well as adaptive immobilization responses with and without fear (Porges 1995, 2007, 2023).

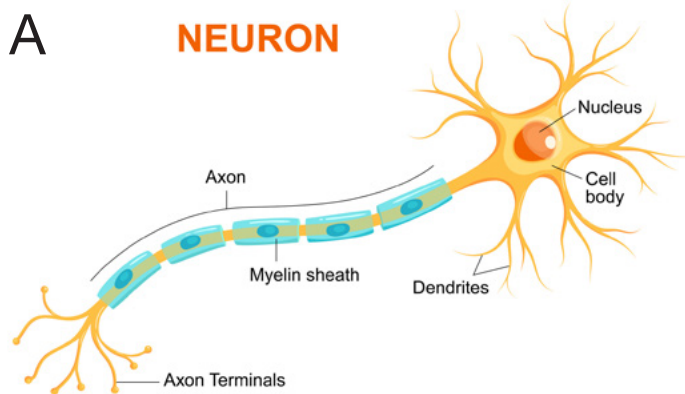
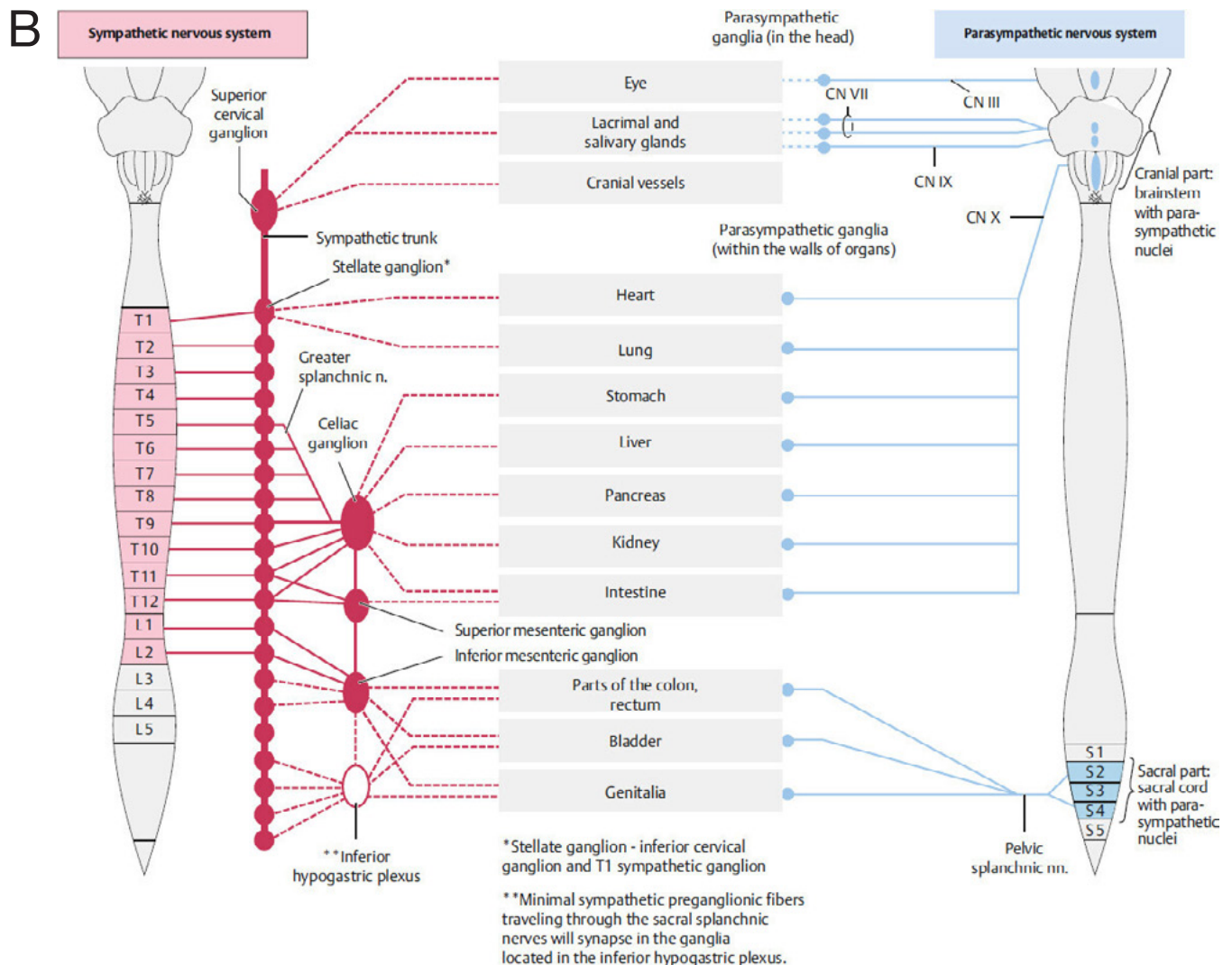


Figure 1: Anatomy and function of the autonomic nervous system happens at the cellular level, where there are central control structures in the brain and peripheral structures that have different functions.

(A) Image of a neuron, by Vitalii Dumma on iStockphotos.com.

(B) Schematic of ANS branches, the sympathetic nervous system branches neural emerge from the spinal cord at T1 to L2, while the parasympathetic nervous system neural branches are only cranial nerves III, VII, IX, and X, plus the sacral nerves S2 to S4. Image copyright 2026 by Thieme Med One, published with permission.



were often judged as passive or weak – facing questions such as, “*Why didn’t you run?*” or, “*Why didn’t you fight back?*” This reflects a limited understanding of autonomic defense responses. It was in this context that I was first introduced to the role of the dorsal vagal pathway.

Within a polyvagal framework, dorsal vagal processes are associated with states of immobilization that can emerge under conditions of extreme or inescapable threat. These states may be accompanied by reductions in heart rate and metabolic output, reflecting a shift toward energy conservation. Importantly, this response is distinct from the restorative processes typically associated with parasympathetic regulation. Rather than supporting recovery, dorsal vagal dominance in these contexts is linked to defensive shutdown, which may be experienced as immobilization with fear, dissociation, or collapse. It is essential to distinguish between adaptive physiological mechanisms and their dysregulated or prolonged expressions; dorsal vagal activity is not inherently pathological but becomes clinically relevant when it interferes with effective state regulation.

My appreciation for ventral vagal function deepened in September 2015 when I attended a workshop led by Dr. Stephen W. Porges in Ottawa, Canada. In this workshop, Porges emphasized the role of the ventral vagal complex in supporting the mammalian social engagement system. Central to the mammalian social engagement system is the close proximity of the brainstem ventral vagal nuclei to the nuclei of neural pathways involved in face-to-face interactions. This system integrates the regulation of the heart with the striated muscles of the face and head via coordinated activity among cranial nerves V, VII, IX, X, and XI. Through this integrated network, physiological state is both regulated and communicated – facial expression, vocal prosody (tone of voice), and head orientation serve as cues of safety to others.

When an individual is in a ventral vagal state, autonomic regulation supports calm engagement with the environment. This state is associated with reduced cardiac output relative to mobilization states, increased variability in heart rate, and enhanced capacity for social communication. Rather than being limited to “rest and digest,” ventral vagal function

supports flexible regulation, including states of calm behavioral engagement and forms of immobilization without fear, such as those observed in affiliative behaviors, play, and intimacy.

As manual therapists, our own physiological state becomes part of the therapeutic context. Through cues conveyed by eye contact, facial expression, vocal prosody, and regulated presence, clinicians can provide signals of safety that are detected by the client’s nervous system. Within a polyvagal framework, these cues support the activation of the client’s ventral vagal pathways by facilitating conditions under which defensive states can be inhibited.

Rather than directly “increasing vagal tone,” the therapeutic interaction provides an environment that supports shifts in autonomic state. This process is mediated through neuroception – the nervous system’s capacity to evaluate safety and risk – allowing the regulation and behavioral flexibility. Manual interventions, including those involving fascia, may contribute to this process by providing afferent input that is integrated within brainstem regulatory circuits.

In this context, therapeutic change is best understood not as the direct modulation of a specific vagal pathway, but as the facilitation of state regulation through coordinated top-down and bottom-up processes. As clients experience cues of safety within the therapeutic relationship, they may transition from defensive states toward greater autonomic stability and engagement.

Afferent signals from fascia contribute to the ongoing regulation of autonomic state by informing central neural processes involved in evaluating internal and external conditions.

In 2025, I had the opportunity to attend the Fascia Research Congress (FRC) in New Orleans, Louisiana, where Dr. Porges delivered a keynote address. His presentation offered a compelling integration of fascia research with contemporary understanding of autonomic nervous system regulation, highlighting points of convergence between these domains.

Motivated by the significance of this integration, I invited Dr. Porges to contribute to this Fascia Insights column for the structural integration community. He generously agreed to share key elements of his keynote presentation.

From the Desk of Dr. Stephen W. Porges

The title of Dr. Porges’ keynote was, “Fascia and the Autonomic Nervous System: A Polyvagal Framework for Embodied Regulation.”

Fascia: The Body’s Distributed Sensory Matrix

Fascia is richly innervated. Its role in the perception of pain is supported by the high density of sensory nerve endings distributed throughout fascial tissues. It has been proposed that, “the fasciae may be considered our largest sensory organ given its complete surface area, as well as participating actively in proprioception and nociception” (Suarez-Rodriguez et al. 2022, 2). Numerous free nerve

Fascia: The Body's Distributed Sensory Matrix

- **Mechanosensory and Nociceptive Network**
 - Detects stretch, pressure, vibration, and pain through specialized receptors.
- **Interoceptive Signaling**
 - Slow-conducting unmyelinated C-fiber afferents transmit ongoing signals from the body to brainstem and forebrain structures, where they contribute to embodied awareness and the subjective experience of internal state.
- **Autonomic Integration**
 - *Autonomic afferents—including vagal, sympathetic, and spinal pathways—convey interoceptive and mechanosensory information that modulates autonomic tone via brainstem consistent with the hierarchical model proposed by Polyvagal Theory.*
- **Emotion and Movement Coupling**
 - Fascia links posture and muscle tone with affective expression and behavioral readiness.

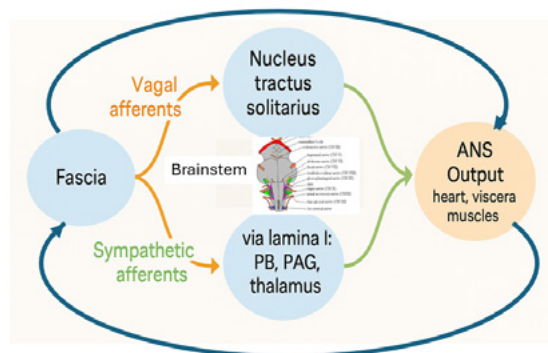
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Fascial Signaling and Polyvagal Regulation: Afferent Pathways to Autonomic Change

- **Fascia as Sensory Interface Linked to the ANS**
 - Feeds sensory input to brainstem centers
 - Reflects and shapes emotion, tone, and posture
- **State-Dependent Fascial Patterns**
 - Safety (Ventral Vagal): Soft, fluid fascia
 - Defense (Sympathetic): Tense, braced fascia
 - Shutdown (Dorsal Vagal): Flaccid, collapsed fascia
- **Bidirectional Signaling Between Fascia and the ANS**
 - Efferent: Fascia responds to autonomic signals (e.g., changes stiffness)
 - Afferent: Fascia informs the brain of body state
- **Clinical Insight**
 - Fascial tone reveals autonomic state
 - Touch, breath, or vagal input can shift patterns of facial tone

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Bi-directional Fascia-Autonomic Model



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Figure 2: Three slides from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

endings, including mechanoreceptors and nociceptors, have been identified within fascia across the body. These receptors detect mechanical forces such as pressure, stretch, and vibration, as well as signals associated with tissue irritation or injury (see Figure 2).

Interoception refers to the processing of internal bodily signals by the brainstem and higher neural structures. Sensory input originating in fascial tissues contributes to this interoceptive stream through multiple afferent pathways, including spinal and autonomic routes. While the vagus nerve is a major afferent pathway conveying visceral information to brainstem foundational circuits, most somatic sensory input comes from fascia and is transmitted via spinal afferents rather than directly through vagal pathways.

Within this framework, afferent signals from fascia contribute to the ongoing regulation of autonomic state by informing central neural processes involved in evaluating internal and external conditions. Consistent with Polyvagal Theory, this evaluative process – termed neuroception – operates outside of conscious awareness and continuously biases the ANS toward states associated with safety, mobilization, or defensive shutdown.

How the ANS Both Receives Information from Fascia and Shapes Fascial Tone

Integrating these perspectives, fascia can be understood as a distributed sensory interface that contributes to the regulation of autonomic state. Fascial afferents – including mechanoreceptors and nociceptors – detect changes in tension, stretch, and inflammatory processes, and transmit this information through spinal and autonomic pathways to brainstem and subcortical structures. This continuous stream of input contributes to interoception and influences neuroception, the nervous system's evaluation of safety and threat. In this sense, fascia functions as a source of sensory information that informs central regulatory processes.

Autonomic output, in turn, influences the physiological environment in which fascial tissues operate. Efferent pathways originating in brainstem and spinal cord circuits, and modulated by higher neural structures, regulate vascular tone, immune activity, and metabolic processes that affect tissue properties.

Fascial Tone and Autonomic State: A Bidirectional Loop

- Clinical interventions influence autonomic state by modulating fascial tone.
- Conversely, enhancing vagal regulation softens fascia—restoring pliability, hydration, and responsiveness.
- Fascia not only reflects autonomic state but sends afferent signals back to brainstem centers, influencing regulation.
- Tools such as breathwork, vocalization, therapeutic touch, and movement initiate this bidirectional feedback loop, supporting transitions from defensive to regulated states.
- *Fascia is both a marker and a mediator of physiological resilience.*

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Fascia and the Autonomic Nervous System: A Bidirectional Regulatory Circuit

Polyvagal Clinical Insight:

Manual therapies influence state by modulating afferent input, shifting from sympathetic activation toward vagal regulation—which in turn functionally softens fascia, enhancing fluid exchange, interoception (body awareness), and social expressivity.

Figure 3: Two slides from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

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Under conditions of mobilization, sympathetic activity is associated with changes in perfusion and tissue stiffness, while states supporting restoration and social engagement are accompanied by physiological conditions that promote fluid exchange and tissue flexibility.

Thus, rather than a direct bidirectional loop between fascia and the ANS, the relationship is more accurately described as an integrated system in which peripheral sensory input from fascia informs central regulation, and autonomic output shapes the internal milieu of the tissues. Within this framework, fascia is not an autonomous regulator but a dynamic participant in the ongoing coordination of physiological state (see Figure 3).

“Fascia not only reflects autonomic state but sends afferent signals back to brainstem centers, influencing regulation.”

“Tools such as breathwork, vocalization, therapeutic touch, and movement initiate this bidirectional feedback loop, supporting transitions from defensive to regulated states.”

– Porges, 2025 Keynote address at FRC.

From Vagal Paradox to Evolutionary Origins

Prior to the expansion of Polyvagal Theory through subsequent books and collaborations (Porges 2011, 2017, 2021, 2024; Porges and Porges 2023; Porges and Dana 2018; Porges and Onderko 2025), its foundational concepts were introduced in the 1995 peer-reviewed article, “Orienting in a Defensive World: Mammalian Modifications of our Evolutionary Heritage. A Polyvagal Theory.” In this seminal work, Porges addressed what later became known as the vagal paradox.

Research with human infants revealed that higher levels of cardiac vagal regulation, indexed by respiratory sinus arrhythmia (RSA), were associated with positive health outcomes in full-term newborns. However, in preterm infants, patterns interpreted as vagal-mediated responses were associated with potentially life-threatening events, including bradycardia and apnea. This apparent contradiction raised a fundamental question: how could vagal mechanisms be associated with both adaptive regulation and physiological compromise?

Polyvagal Theory resolves this paradox, as we have already discussed, the vagus is not a unitary system but consists of multiple pathways with distinct anatomical origins and functional properties. For the 1990s, Porges was making a strong challenge to the conventional agonist/antagonist model of ANS function by saying, “*the vagus is not one nerve but a family of neural pathways originating in several areas of the brainstem. . . . and at least 80% of the vagal fibers are afferent*” (Porges 1995, 304).

The areas of the brainstem of particular relevance are the nucleus ambiguus, which gives rise to the myelinated ventral vagal pathways involved in cardiac regulation and social engagement, and the dorsal motor nucleus of the vagus, which provides unmyelinated efferent pathways associated with more primitive regulatory functions (see Figure 4). Sensory (afferent) input is processed primarily through the nucleus tractus solitarius. And as we already mentioned, these brainstem structures are functionally integrated with other cranial nerve nuclei, including those supporting the social engagement system (cranial nerves V, VII, IX, X, and XI), forming a coordinated network that regulates physiological state and behavior.

Porges proposed that the ventral and dorsal vagal pathways are functionally distinct, reflecting different evolutionary origins. From this phylogenetic perspective, mammalian brainstem organization includes a ventrally located vagal complex – centered in the nucleus ambiguus – that is integrated with neural circuits supporting communication, emotion, and social bonding. This system enables the coordination of autonomic state with the striated muscles of the face and head, forming the neurophysiological foundation of the social engagement system (see Figure 5).

Brainstem Origin of the Vagus Ventral Migration

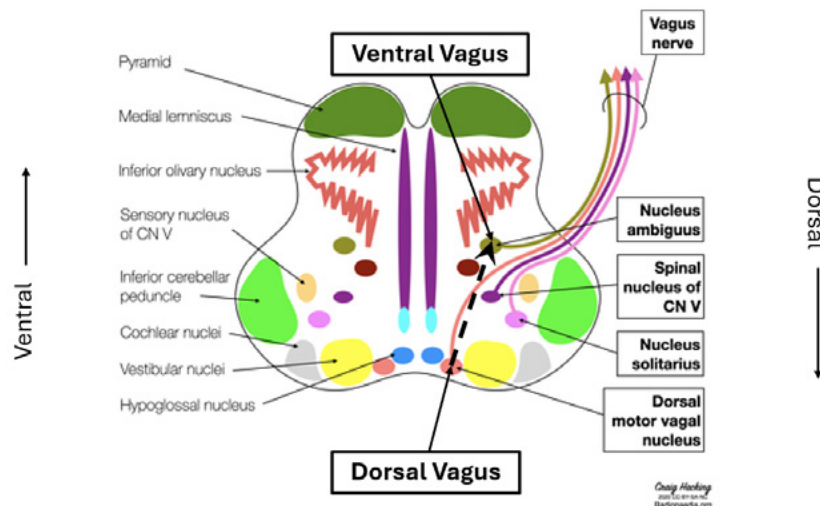


Figure 4: Horizontal section of the brainstem indicating the regional relationships of the nuclei of the vagus nerve. A slide from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

face and head. Through this integration, cues conveyed by facial expression, vocal prosody, and head orientation are linked with autonomic regulation. Signals of safety, detected through these channels, can shift autonomic state toward conditions that support calm engagement, health, and restoration.

The ventral vagal pathway is a core component of the social engagement system, which includes coordinated activity among cranial nerves V, VII, IX, X, and XI. These pathways regulate muscles involved in mastication, facial expression, middle ear function, vocalization, swallowing, and head movement, while also contributing to the regulation of the heart and bronchi. This integrated system enables mammals to both regulate their physiological state and communicate that state to others.

From a developmental perspective, these circuits support early forms of coregulation, as seen in behaviors such as sucking, swallowing, breathing, and vocalization. Through these coordinated processes, the nervous system links autonomic regulation with social interaction, providing a neurophysiological foundation for bonding, communication, and adaptive state regulation.

When the body encounters increased metabolic demands – such as cues of danger, life threat, or illness – autonomic state shifts away from patterns that

In contrast, earlier-evolving vertebrates rely predominantly on vagal pathways originating in the dorsal motor nucleus, which are associated with more primitive regulatory strategies, including immobilization. While comparisons with reptiles are often used illustratively, it is important to note that modern reptiles are not direct models of ancestral states. Nevertheless, the distinction highlights a key principle: *mammalian autonomic regulation includes specialized circuits that support social behavior and the downregulation of defensive states.*

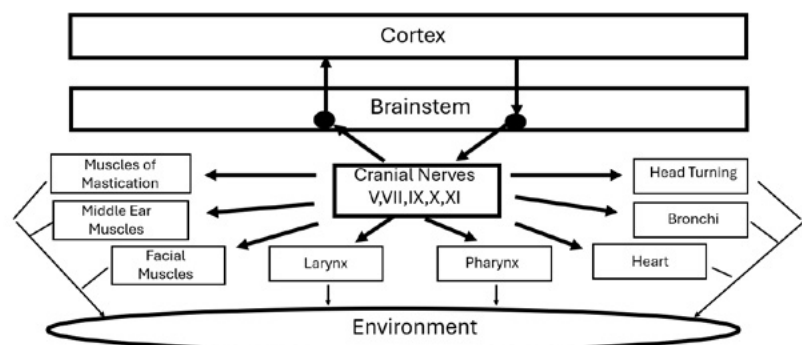
As emphasized by Porges, evolution provides an organizing framework for understanding how the ANS supports adaptive behavior. Within this framework, *sociality* is not merely behavioral but *biologically grounded*, with cues of safety functioning as powerful regulators of autonomic state. These cues – conveyed through facial expression, vocal prosody, and other features of social interaction – can facilitate physiological states that support health, growth, and restoration.

The Face-Heart Connection

Polyvagal Theory describes the neurophysiological mechanisms through

which social experiences can modulate autonomic state. The ventral vagal pathway, originating in the nucleus ambiguus, is integrated with brainstem circuits that regulate both cardiac function and the striated muscles of the

Deconstructing the Social Engagement System Special Visceral Efferent (Pharyngeal Arches) + Ventral Vagal Pathways



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Figure 5: A slide from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

Within this framework, sociality is not merely behavioral but biologically grounded, with cues of safety functioning as powerful regulators of autonomic state.

support social engagement. In these conditions, ventral vagal influences on the heart and the striated muscles of the face and head are reduced. This shift may be observed as diminished facial expressivity, reduced vocal prosody, and decreased availability for social interaction. Functionally, this reflects a withdrawal of the ventral vagal “brake” on the heart, allowing heart rate to increase and supporting mobilization in response to challenge.

From a polyvagal perspective, mammalian autonomic regulation is organized hierarchically, reflecting phylogenetic development. When conditions are perceived as safe, ventral vagal pathways support social engagement

and flexible behavioral responses. If safety is compromised, ventral vagal regulation is reduced, and sympathetic pathways are recruited to support mobilization, including flight-or-flight behaviors. Under conditions of extreme or inescapable threat, more primitive autonomic circuits associated with the dorsal vagal complex may be engaged, contributing to states of immobilization, which can include behavioral shutdown, dissociation, or fainting.

These transitions are not strictly linear or deterministic, but reflect dynamic and context-dependent shifts in autonomic state, mediated by ongoing evaluation of safety and threat through neuroception (see Figure 6).

Trauma/Threat Triggers Dissolution:
Evolution in Reverse

Structure	Function	VVC	SNS	DVC
Head	Communication	+		
Limbs	Mobilization		+	
Viscera	Immobilization			+

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Figure 6: A slide from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

The Evolutionary Trajectory of Fascia

According to Porges, fascia can be considered within an evolutionary framework that parallels the increasing complexity of autonomic regulation, although the relationship is indirect and mediated through neural integration. In early vertebrates, connective tissues primarily served structural and protective roles, supporting visceral organization and basic physiological regulation. As vertebrates evolved greater motor capacity, connective tissue systems became more differentiated, contributing to the coordination of movement and posture.

With the transition to terrestrial life and the development of pulmonary respiration, additional structural adaptations emerged in the thoracic and diaphragmatic connective tissues, supporting the mechanical demands of breathing. In mammals, further specialization of cranial and cervical connective tissues is associated with the musculature of the face and head, which is functionally integrated with cranial nerve systems involved in feeding, vocalization, and social communication (see Figure 7).

From a polyvagal perspective, these evolutionary developments can be viewed as increasing the complexity of sensory and motor integration. Rather than viewing fascia as discrete “phylogenetic domains” analogous to vagal pathways, it is more accurate to consider fascia as a distributed system that provides sensory input and mechanical support across multiple functional systems, including those involved in autonomic regulation and social behavior.

Recent fascia research has identified several classifications of fascial tissue, including superficial, deep, visceral, parietal, and meningeal fascia. Porges contrasted these structural categories with the functional organization described in Polyvagal Theory, highlighting potential points of convergence between fascial systems and autonomic regulation (see Figure 8).

Within a polyvagal framework, states associated with safety support spontaneous social engagement and physiological processes related to health, growth, and restoration. These states are mediated by autonomic regulation that influences vascular, metabolic, and immune processes, which in turn affect

Neurofascial Pathways: Evolutionary Origins

Fascial Region	Earliest Vertebrate Lineage
Cranial Fascia	Amniotes (e.g., reptiles, mammals) – especially mammals with facial musculature (CN V/VII)
Thoracic Fascia	Early land vertebrates (e.g., precursors of amphibia) – required for lung evolution
Skeletomotor Fascia	Jawed vertebrate (e.g., sharks) – linked to limb and postural control
Visceral Fascia	Jawless fish (e.g., lampreys) – supporting primitive interoception and homeostasis

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Figure 7: A slide from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

Structural (FRS) ↔ Functional (PVT): Fascia Domains

FRS Classification	PVT Functional (Phylogenetic) Domain	Neurofunctional Emphasis
Superficial fascia	Cranial / Thoracic	Sensory integration, thermoregulation, and social engagement pathways
Deep fascia (regional)	<u>Skeletomotor</u>	Force transmission, posture, mobilization support
Visceral fascia	Visceral	Organ motility, metabolic regulation, dorsal vagal shutdown
Parietal fascia	Thoracic / <u>Skeletomotor</u>	Integration of body wall movement with respiration and autonomic tone
Meningeal fascia	Cranial	Neural protection, intracranial pressure modulation, cranial nerve integration

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Figure 8: A slide from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. FRS means fascia research society, referring to the categories of fascia defined by fascia researchers, and PVT means Polyvagal Theory categories of ANS function. Published with permission. Copyright Dr. Stephen W. Porges.

the internal milieu of connective tissues, including fascia. Conversely, conditions associated with danger, illness, or life threat are accompanied by shifts in autonomic state that alter these physiological processes, potentially impacting tissue properties such as perfusion, fluid dynamics, and mechanical tension.

Thus, rather than fascia and the autonomic nervous system operating as directly coupled systems, it is more accurate to view fascia as embedded within the physiological environment shaped by autonomic regulation, while also contributing sensory input that informs central processes involved in state regulation.

Fascia and the ANS can be understood as interacting components within an integrated regulatory system that supports adaptive behavior, survival, and social engagement. Rather than forming a direct bidirectional circuit, fascia contributes sensory input through dense networks of mechanoreceptors and interoceptive afferents, while autonomic regulation shapes the physiological environment in which fascial tissues function.

Although parallels can be drawn between fascial organization and the hierarchical framework described in Polyvagal Theory, these relationships are functional rather than structurally mapped. For example, visceral fascia is closely associated with internal organ systems regulated by autonomic processes, skeletomotor fascia is engaged during movement and mobilization, and cranial and cervical connective tissues are involved in structures that support social communication. These associations reflect overlapping functional domains

Rather than viewing fascia as discrete “phylogenetic domains” analogous to vagal pathways, it is more accurate to consider fascia as a distributed system that provides sensory input and mechanical support across multiple functional systems, including those involved in autonomic regulation and social behavior.

Mapping Fascia into Polyvagal Theory ANS (Afferent) Connections

Fascia Domain	Autonomic Pathway(s)	Connection Logic
Cranial	Ventral Vagal Complex	Afferents via CN V and CN VII, supported by facial proprioception, middle ear muscle regulation, and affective touch; optimizes auditory-visual engagement.
Thoracic	Ventral Vagal Complex + Sympathetic	Afferents from phrenic, intercostal, and vagal nerves reflect respiratory state; dual regulation of diaphragm and voice affects autonomic tone
Skeletomotor	Sympathetic	Spinal afferents from muscle and connective tissue convey movement-related strain; support mobilization and bracing responses.
Visceral	Dorsal Vagal Complex	Vagal and spinal afferents transmit interoception and pain; informs shutdown reactions and homeostatic feedback under threat.

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Fascial Tone Through a Polyvagal Hierarchical Lens

Observed Fascial Pattern	Location	Likely Autonomic State	Suggested Clinical Strategy
Cranial Fascia: Supple, fluid, responsive	Head, face, neck	Ventral vagal (safety)	Reinforce engagement and co-regulation
Skeletomotor Fascia: Tense, braced, dry	Muscles	Sympathetic (mobilization)	Support downshifting via softening breath and fascia
Visceral Fascia: Flaccid, collapsed, unresponsive	Internal organs	Dorsal vagal (shutdown)	Facilitate gentle mobilization, interoceptive re-attunement

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Figure 9: Two slides from Dr. Porges' 2025 Keynote presentation at the FRC in New Orleans, Louisiana. Published with permission. Copyright Dr. Stephen W. Porges.

rather than one-to-one correspondence with specific autonomic pathways.

Through its extensive sensory innervation, fascia contributes to the afferent signaling that informs brainstem and subcortical circuits involved in autonomic state regulation (see Figure 9). In this context, fascia can be viewed as a distributed sensory interface participating in the continuous coordination of the physiological state.

Mammalian Fascia Specialized for Social Engagement, Intimacy, and Reproduction

Porges integrated these perspectives to highlight how physiological state is communicated and regulated within social

contexts. From a polyvagal perspective, coregulation emerges through face-to-face interactions in which cues conveyed by facial expression, vocal prosody, and eye gaze are detected by the nervous system as signals of safety. These cues engage the social engagement system and support shifts in autonomic state toward conditions that promote health, growth, and restoration.

Cranial and cervical connective tissues are closely associated with the musculature involved in facial expression and head orientation, which are regulated by cranial nerves, including the trigeminal (CN V) and facial (CN VII) nerves. Through this anatomical proximity, these

tissues participate in the expression and transmission of social cues, although they are not themselves components of the neural circuits that regulate autonomic state. When an individual experiences safety, the integrated activity of these neural systems supports expressive vocalization, sustained eye contact, and affiliative behavior.

Respiratory and visceral support structures, including the diaphragm and pelvic floor, play a complementary role in this integrated system. These structures are embedded within fascial networks and are essential for coordinating breathing, intra-abdominal pressure, and visceral function. Through their rhythmic activity and rich sensory innervation, they contribute to interoceptive signaling and influence the physiological conditions under which autonomic regulation occurs. In particular, the coordination of breathing with cardiac regulation – reflected in phenomena such as respiratory sinus arrhythmia – illustrates how these systems are functionally linked at the level of brainstem circuits.

Considering fascia within this framework shifts its role from a purely structural system to a distributed sensory interface contributing to interoceptive and proprioceptive signaling. Rather than directly modulating autonomic tone, fascia provides afferent input that is integrated within brainstem and subcortical circuits involved in neuroception and state regulation. Changes in fascial tension and sensory signaling may therefore reflect, and potentially influence, ongoing shifts in autonomic state.

Fascia can thus be understood as participating in the embodiment of physiological state, contributing to observable patterns in posture, breathing, affect, and behavioral expression. In this way, connective tissue systems and autonomic regulation are functionally interrelated, not as a single bidirectional control circuit, but as components of an integrated system through which physiological state is both regulated and expressed.

Dr. Stephen W. Porges: Introducing myself has always been a complex question, because there is no single disciplinary label that accurately describes what I do. My work is truly transdisciplinary, and being a scientist across multiple disciplines doesn't fit neatly into one category.

Part 2: Our Conversation

What follows is an edited transcript from a conversation recorded on February 19, 2026. Dr. Porges spoke from his home in Florida; Lina Amy Hack from Saskatoon, Saskatchewan. The interview has been condensed and lightly edited for clarity, with Dr. Porges' approval.

A Transdisciplinary Journey

Lina Amy Hack: Good day, Stephen. Thank you for sharing your Fascia Research Congress (FRC) keynote speech notes and slides with us! For readers who may not be familiar with your work, how do you introduce yourself?

Dr. Stephen W. Porges: Hello, and thank you for inviting me to talk with the Rolfers™ and the structural integration community. I'm happy to share my FRC talk and help you edit your summary.

Introducing myself has always been a complex question, because there is no single disciplinary label that accurately describes what I do. My work is truly transdisciplinary, and being a scientist across multiple disciplines doesn't fit neatly into one category. It requires learning the language and definitions of each field in order to communicate effectively – and that has been part of my journey.

My science is closely tied to that personal journey, which has been an effort to understand what it means to be human – and how that understanding might help us optimize our functioning. In many ways, this parallels the philosophy of Rolfing® Structural Integration: both are concerned with the relationship between structure and function, and between human physiology and behavior. Structure

creates constraints, but the challenge is to understand how to function optimally within those constraints.

So, I tend to describe myself as an integrated bio-behavioral neuroscientist – or more simply – as a curious person.

Lina: The last time we spoke (Hack and Porges 2021), we learned that in the 1980s and 1990s, you helped the then-Rolf Institute® [now the Dr. Ida Rolf Institute®] with research on Rolfing Structural Integration and on how to communicate its clinical relevance to the medical community. Can you orient us to that part of your history for us?

Stephen: That part of my journey with Rolfing [Structural Integration] actually began earlier than the 1980s. It started in the late 1970s when I met with Peter A. Levine, [PhD.] who emerged from the Rolfing community and later developed Somatic Experiencing®. Peter was building a bridge between the impact of trauma on bodily structure and its effects on mental and physical health – helping to integrate

those domains as expressions of a common underlying system.

In many ways, Peter was also an early neuroscientist. He was deeply interested in what he referred to as biophysics, particularly the ANS and its responses to stressors and disruptors. That interest led him to seek me out. His perspectives differed significantly from mainstream academic thinking at the time, and he would ask me to help explain the phenomena he was observing clinically. That collaboration marked the beginning of our shared effort to understand processes that we can now describe more formally.

My strength is not as a therapist – I'm not a clinician. But I do have a capacity to deconstruct complex phenomena and identify underlying mechanisms that may be observable. A paper that reflects this perspective is, "Polyvagal Theory: A Journey from Observation to Innovation and Application" (Porges 2025). I see myself as someone on a journey – respectful of observation, curious about underlying mechanisms, and deeply

Stephen: I tend to describe myself as an integrated bio-behavioral neuroscientist – or more simply – as a curious person.

committed to translating that knowledge into application that can improve human life.

From Observer to Integrator: The Fascia Research Congress Talk

Lina: Your keynote — “Fascia and the Autonomic Nervous System: A Polyvagal Framework for Embodied Regulation” — was an extraordinary synthesis. Was it a talk you had been building toward for some time, or did it come together specifically for that audience?

Stephen: I would say it reflects the arc of my scientific journey. The relationship between fascia and the ANS had been percolating in my mind for a long time — I’ve questioned these issues throughout my career. I had been an observer, respectful of what practitioners were doing, and learning from them, but I hadn’t yet fully engaged the underlying mechanistic questions.

When Robert Schleip, [PhD,] invited me to speak at the FRC, I made a decision: it was time to move beyond observation and ask more directly about fascial innervation. To ask, “What is the neural architecture here? And how might that help practitioners understand their clients’ responses?”

I returned to the original literature and approached from a different perspective — not the primarily correlational autonomic lens I had used previously, but one focused on neuroanatomy: What is the innervation of fascia? And, how does it relate to autonomic regulation? What struck me was how much coherence emerged when these findings were interpreted within the ANS framework. It became easier to understand why changes in fascial

state are often accompanied by shifts in subjective and physiological experience, and how patterns of bracing or tension may reflect underlying autonomic organization.

My reaction was not only, “This is interesting,” but also, “How did I not fully see this earlier?” I had been engaged with this community for decades. Over time — particularly through listening to individuals describing their experiences of trauma — I had accumulated a broad matrix of observations. The FRC lecture was an opportunity to begin organizing those observations into a more integrated model, linking autonomic regulation with embodied experience, including the role of connective tissue systems.

Lina: You opened your talk by presenting the 1988 research you conducted with Rolfer™ John Cottingham. That was especially meaningful to our community — to see a Rolfer feature at the outset.

Stephen: John Cottingham’s work provided my first close-up view of what Rolfing [Structural Integration] was doing from an autonomic lens. He was deeply interested in understanding the underlying mechanisms. Even at that time, I could see clear autonomic effects emerging from his research (Cottingham, Porges, and Lyon 1988; Cottingham, Porges, and Richmond 1988). Interventions such as the pelvic lift and abdominal massage were associated with measurable shifts in autonomic regulation.

It felt appropriate to begin the talk there. Those early observations provided an important foundation for my later work, and it was also a way of acknowledging and honoring a community that had been exploring these phenomena long before I entered the conversation.

Fascia is Sensory, and its Motor System is Autonomic

Lina: In the fascia research community, we’ve known for over a decade that fascia is sensory — that it contains mechanoreceptors and nociceptors, and is continuously “listening” to the state of the body. What your talk added for many of us was the other side of the equation. Is fascia also influenced by signals from the brainstem and efferent [motor] pathways of the ANS?

Stephen: Yes. And that’s where the synergy between the sensory properties of fascia and autonomic regulation becomes more apparent. It helps explain why states of safety and calm are often associated with physiological conditions in which tissue may feel more compliant, while states of threat are often accompanied by increased tension.

Fascial sensory information is conveyed through afferent pathways — primarily spinal, with integration in the brainstem and related structures, including regions such as the nucleus tractus solitarius that process visceral input. That’s the afferent [sensory] side of the system. But those signals are part of a larger regulatory process, and what emerges from that integration influences the physiological state of the tissues.

The return pathway is not a dedicated “motor system of fascia” per se. Rather, autonomic efferent pathways regulate vascular tone, immune system activity, and metabolic processes that shape the internal environment of connective tissue. This was a piece that had not been fully integrated into the fascia conversation. There was, at times, an implicit assumption of a self-contained

Lina: We are talking about fascia as if it were a singular tissue, but in reality, there are multiple types of fasciae.

Stephen: This is where the discussion becomes even more interesting.

communication system within fascia itself. My approach has been guided by parsimony: if a simpler explanation accounts for the observations, we should consider it carefully.

From that perspective, fascia participates in an integrated regulatory process. Sensory input from fascia contributes to central processing, and autonomic output, in turn, influences the conditions under which fascial tissues function. When autonomic state shifts toward mobilization, changes in vascular and neuromuscular activity are often associated with increased tissue stiffness and bracing. When the state supports safety and regulation, those conditions shift toward greater fluidity and flexibility.

Lina: We are talking about fascia as if it were a singular tissue, but in reality, there are multiple types of fasciae.

Stephen: This is where the discussion becomes even more interesting. Consider deep abdominal work directed toward the organs, which engages visceral fascia. Clinically, we observe that visceral tissues can become restricted under conditions of chronic stress or defensive states, much like skeletomuscular systems. In the early work with Cottingham, when deep abdominal techniques were applied, we observed measurable changes in autonomic regulation. These findings suggested that changes in visceral tissue properties are associated with shifts in physiological state.

The fascia research community has already emphasized that muscles cannot be understood independently of fascia. Wherever there is muscle, there is connective tissue that supports and integrates its function, even if anatomical representations often separate them for clarity. Muscle and fascia operate as a functional unit. Extending this perspective, visceral organs are similarly embedded within fascial networks that are responsive to physiological conditions, including those shaped by autonomic regulation.

From a polyvagal perspective, it is useful to consider broad functional domains of motor output, including regulation of visceral organs, skeletomotor activity, and cranial motor systems involved in communication and ingestion. While fascial categories do not map directly onto these domains, there are meaningful functional associations. Visceral fascia is closely related to organ systems regulated

by autonomic processes, skeletomotor fascia participates in movement and postural control, and cranial connective tissues are associated with structures involved in fascial expression, vocalization, and head orientation.

Structures such as the diaphragm and pelvic floor are particularly important because they integrate multiple functional demands. They coordinate breathing, support visceral organs, and contribute to postural regulation. These regions include both smooth and striated muscular components and are embedded within complex fascial networks. Because of this, they are especially sensitive to changes in physiological state and are often clinically informative when assessing patterns of tension, breathing, and regulation.

The key point is that fascia participates in an integrated system in which sensory input from connective tissue contributes to central processing, and autonomic regulation shapes the physiological conditions under which these tissues function. Rather than having an independent motor system, fascia reflects and participates in the broader regulatory processes that organize physiological state and behavior.

The Power of Safety: The Body Perception Questionnaire and Coregulation

Lina: And this circles back to the power of a person feeling safe. Are you suggesting that when a person feels safe

in the presence of another, it can influence fascial state?

Stephen: Yes. When we consider the relationship between fascia and autonomic regulation through a polyvagal lens, we begin to appreciate how profoundly a sense of safety in the presence of another can influence physiological state. Rolfing [Structural Integration], in many ways, is a pragmatic structural treatment model, and its practitioners are often highly attuned – both to their own internal states and to those of their clients.

Let me take you back to my early work with the Rolfing community. I was asked to develop research methods to evaluate how individuals experienced changes following Rolfing sessions. That led me to begin constructing a set of sensation-based questions that could capture aspects of bodily experience. Over time, this work evolved into what is now known as the Body Perception Questionnaire (BPQ, see Figure 10).

The questionnaire has since been standardized as a measurement tool, translated into multiple languages, and used with thousands of individuals. It provides a structured way to quantify subjective bodily experience and relate it to underlying physiological processes.

The goal of making the BPQ available to practitioners, including those in structural integration, is to provide a subjective measure of clients' autonomic reactivity without requiring physiological

Stephen: The key point is that fascia participates in an integrated system in which sensory input from connective tissue contributes to central processing, and autonomic regulation shapes the physiological conditions under which these tissues function.

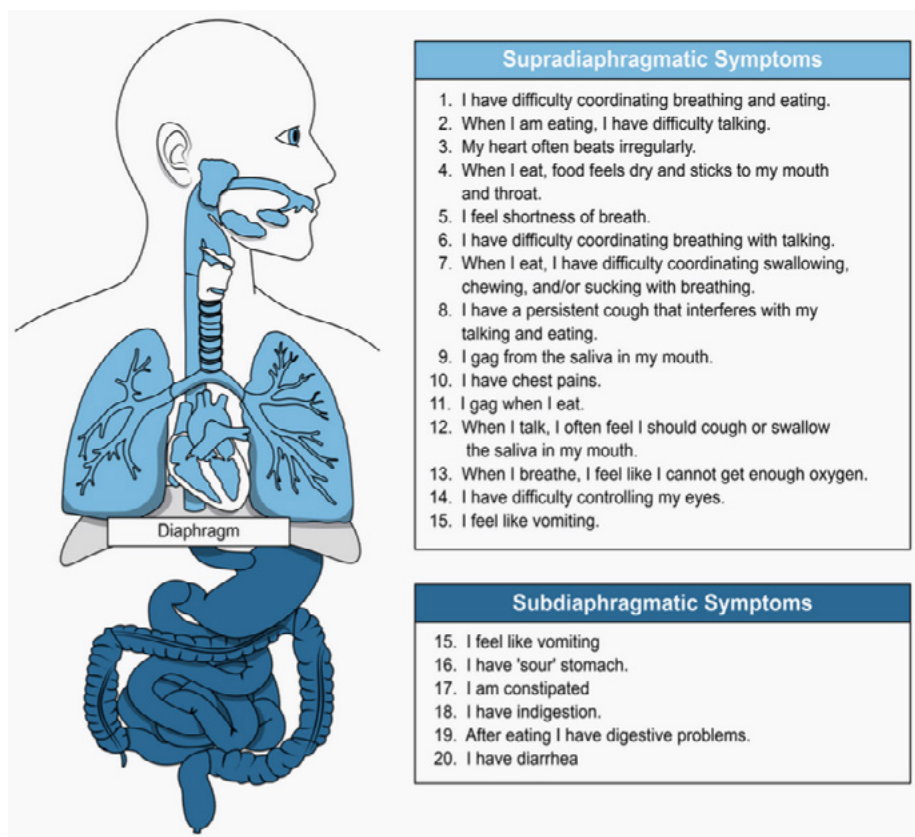


Figure 10: Available online, the Body Perception Questionnaire (BPQ) is a standardized self-report questionnaire that assesses the frequency of specific body stress reactions in organs that are innervated by the autonomic nervous system (ANS). The system needed to score people's responses is available.¹ Courtesy of Dr. Stephen W. Porges, printed with permission.

instrumentation. It is a scalable and accessible tool that can offer meaningful insights into patterns of bodily experience. The Rolfing community is invited to use this resource.¹

Lina: That's great. I'm thinking about how I might incorporate a questionnaire like this with my clients.

Stephen: The BPQ provides a way to begin assessing aspects of autonomic regulation, even for practitioners who are not formally trained in physiological measurement. It originated from a simple question: "What is happening inside the body during a Rolfing session?" The most direct way to answer that was to ask individuals about their experiences. From

those responses, we developed a tool that can be used to better understand patterns of autonomic reactivity.

Using the BPQ, we have also examined how working as a somatic therapist relates to autonomic regulation (Jokić et al. 2023). The measure is sensitive to patterns often associated with trauma history, including indicators of altered autonomic responsiveness. It does not diagnose trauma, but it can reflect how past experiences may be expressed in current physiological regulation.

What we found was that, as a group, body-oriented psychotherapists often report higher levels of adversity experienced early in their lives compared to population averages. Yet, despite this, they frequently demonstrate more effective regulation of their autonomic responses in adulthood. In other words, they are not necessarily more dysregulated; rather, many appear to have developed a greater capacity to modulate their physiological state.

This suggests that individuals drawn to working with trauma may bring both a history of sensitivity and a motivation to support others. Importantly, engaging in this work may also have regulatory benefits. From a polyvagal perspective, therapeutic interactions can function as coregulatory processes – supporting both the client and the practitioner. I find that particularly meaningful, as it highlights how professional engagement can align with both personal history and physiological resilience.

The goal of providing the BPQ to everyone, including practitioners like yourselves, is to give you a subjective measure of your clients' autonomic reactivity without having to put electrodes on them. It's a very powerful and scalable, meaning "inexpensive," tool that is often

Dr. Stephen W. Porges: The goal of providing the BPQ to everyone, including practitioners like yourselves, is to give you a subjective measure of your clients' autonomic reactivity without having to put electrodes on them.

useful. The Rolfing community is invited to use the links available on my website www.stephenporges.com/assessments.

Lina: Your study of somatic therapists reflects my experience offering Rolfing sessions for twenty-two years. I have personal practices that help me regulate my nervous system before work, and I carry that into my state while working. I also teach my clients how to do this for themselves. While I'm tired at the end of the day, I also feel genuinely nourished.

Stephen: When you enter the world of somatic therapy, you're entering a context in which touch is central – but often with individuals who may be highly defensive about being touched. What skilled practitioners bring is not simply technique, but an ability to convey signals of safety through their voice, their proximity, and their regulated presence. These cues enable the client's nervous system to become more receptive to contact.

From a polyvagal perspective, these signals of safety support shifts in autonomic state that can reduce defensive patterns and allow greater flexibility in physiological regulation. In that context, manual interventions may be experienced as less intrusive and more effective, as the tissues are no longer organized around protective bracing.

What practitioners often describe as a change in tissue quality – greater ease, compliance, or fluidity – can be understood as reflecting changes in the underlying physiological conditions, including vascular dynamics, muscle tone, and autonomic regulation. These are not properties of fascia in isolation, but expressions of an integrated system.

Clinicians frequently report sensing rhythmic changes in tissue during intervention. From a physiological perspective, this may reflect underlying regulatory processes, including cardiovascular and respiratory rhythms, as well as the timing of autonomic responses. These patterns provide indirect information about how the system is adapting and responding over time.

What Ida Rolf, PhD (1896-1979) Was Seeing

Lina: Studying your FRC slides for this article has given me a new appreciation for what Dr. Rolf herself may have been perceiving when she observed her clients

standing and walking. When she said, "Look at the form, look at the structure," part of what she may have been sensing was the organization of autonomic regulation, even without the language to describe it.

Stephen: I never met Ida, but what I can share is based on conversations with those who knew her and spoke about the way she approached her work. She was an expansive thinker who perceived connections and patterns, including rhythmic processes within the body. The idea of structure as something static – something you simply move through the world with – was likely not the essence of her message.

I think her perspective aligns more closely with what you described in your own experience: becoming present within your body, and through that presence, influencing the experience of others. When practitioners are grounded in this way, they convey cues that can be detected by the nervous system as signals of safety.

In this context, what manual therapists are doing is not simply mechanical. Through movement and changes in tissue organization, they are creating conditions in which clients can experience their bodies outside of defensive states. In a sense, this provides an opportunity for the nervous system to engage in new patterns of regulation – an experiential shift toward a body organized around safety rather than threat.

Lina: When I think about these ideas in relation to Rolfing Structural Integration as a type of training, particularly the Ten Series, it gives me a deeper appreciation for how much Dr. Rolf was perceiving. She seemed to be communicating how to facilitate these changes without the technical language we have now. Was she, in some way, working with autonomic regulation?

Stephen: Yes, and consider how much emphasis she placed on the sacrum, pelvic organization, and breathing. Rolfers are trained to attend closely to the movements of breathing in the chest and throughout the body. For example, when you invite the sternum to move more freely within the thorax, you are indirectly engaging the connective tissues associated with respiration.

The thoracic region is particularly complex because it integrates multiple

functional systems, including breathing, posture, and autonomic regulation. When changes occur in this region, practitioners often observe shifts not only in movement but also in facial expression and overall presence. These visible changes may reflect alterations in underlying physiological state, including vascular dynamics and patterns of autonomic regulation.

Clinicians sometimes describe a "brightness" or "glow" in a client's face following intervention. While the mechanisms are multifactorial, such observations are consistent with shifts toward states that support improved circulation, engagement, and social communication – even when the intervention itself may have involved moments of discomfort. I would expect that practitioners develop their own descriptive language to capture these changes in appearance and expression following treatment.

Lina: Sometimes my clients look like a younger version of themselves – as though years of tension have been lifted and they simply look more like themselves.

Stephen: What you're observing is that the person's body appears more open, more accessible – I might even say, more available for connection – when it is no longer organized around threat. They don't need to be smiling; what matters is that they are accessible.

If we distill compassion to its essence, it is the capacity to be accessible to another. What you are seeing in your clients after a session is a shift in that accessibility – a movement from a state shaped by vulnerability and defense toward one supported by safety. And within that shift, their underlying capacity for connection becomes more visible.

Beyond Vagal Tone: Vagal Efficiency

Lina: The vagus nerve has become something of a wellness buzzword. Embedded in both Rolfing and polyvagal language is the assumption that more vagal tone is better. Can you help clarify that?

Stephen: Measures of vagal tone can be informative, but they don't fully capture how the system is functioning. Vagal activity is dynamic – it increases and decreases as the body responds to changing metabolic demands and supports recovery following those demands.

Dr. Stephen W. Porges: I do have concerns about how the vagus nerve is often discussed in popular media and even in some professional contexts. The vagus is not a single, uniform pathway but a complex system composed of multiple fiber types with distinct functions.

To address this, I introduced a metric called *vagal efficiency*. Conceptually, it reflects how effectively vagal pathways regulate the heart in response to challenge. One way to assess this is by observing changes in heart rate across postural shifts – such as moving from supine to seated to standing. These transitions require rapid cardiovascular adjustments, and we can evaluate whether those changes are being mediated efficiently by vagal regulation or whether the system relies more heavily on sympathetic activation.

Across a wide range of clinical conditions, we find that individuals may show reduced vagal efficiency even when traditional measures of vagal tone appear within normal limits or relatively high. In other words, the presence of vagal activity does not necessarily indicate that it is functioning optimally.

This distinction becomes particularly important when considering individuals with trauma histories. Even in cases where experiences do not meet formal diagnostic thresholds, patterns of autonomic regulation may differ. What we observe is that alterations in neural regulation can precede detectable changes in organ function or tissue pathology.

Gastroenterology provides a useful example. Many individuals present with symptoms that are distressing yet do not meet the criteria for structural pathology. In these cases, standard diagnostic approaches may fail to identify a clear cause, leading to a disconnect between the patient's experience and clinical findings. However, when viewed through the lens of autonomic regulation, these symptoms may reflect disruptions in

neural control of organ function rather than damage to the organ itself.

This suggests that dysregulation of the ANS can emerge before structural changes are detectable. Over time, chronic challenges may lead to shifts in regulatory capacity, which can eventually manifest as more persistent physiological or clinical conditions.

Lina: Wonderful insight.

Stephen: You can think of this as a model of numbness – where the body is no longer responding to challenge through the typical pattern of vagal withdrawal followed by mobilization. Instead, the system may no longer be regulating efficiently, and the expected physiological responses are blunted or disorganized.

Within medicine, and more broadly in our culture, there is often an assumption that when something differs from a normative pattern, it must be deficient. A measure increases, decreases, and then increases again – but what does that variation actually represent? That's really at the core of your question about vagal tone.

As you know, vagal tone is reflected in the patterning of heart rate variability (HRV) – the beat-to-beat changes in heart rate. What matters is not simply the level of vagal activity, but how flexibly and effectively it is regulating physiological state.

Lina: Yes, I explain this to my clients all the time – especially those who have purchased devices that measure “heart rate coherence” but aren't sure what it means. Let me know if I have this right. This is what I say to them:

“The healthy heart beats irregularly, while it may sound like a regular drum to us, if

you really listen to the beat, some beats are far apart and others closer together. It's subtly speeding up and slowing down all the time – and we want that. That difference between the beats is called ‘variability’, as in, the beat varies. The sicker we are, the less variability our heartbeat rhythm will have; the healthier we are, the more variability. And, even when we breathe, our heart rate changes. When we breathe in, the rate increases a little bit, and when we exhale, the heart rate decreases a little bit. This change of rate has been measured for a long time; researchers call it ‘respiratory sinus arrhythmia’, or RSA, also termed ‘heart rate variability’, and clinicians call it ‘heart rate coherence’. And those machines that people buy; they often call it ‘heart coherence’.”

Stephen: That's a very good summary. And as you mentioned in your introduction, my work in the late 1960s focused on understanding heart rate variability and its neural mechanisms, which led to what later became known as the vagal paradox in newborns. In that research, RSA emerged as a measurable index of vagal influences on the heart, particularly those associated with pathways originating in the nucleus ambiguus.

It's important to be precise here. RSA is a specific component of heart rate variability that reflects the influence of myelinated vagal pathways on cardiac function. Heart rate variability more broadly, includes multiple sources of variability, not all of which are vagally mediated.

I do have concerns about how the vagus nerve is often discussed in popular media and even in some professional contexts. The vagus is not a single, uniform pathway

but a complex system composed of multiple fiber types with distinct functions. It serves as a bidirectional superhighway of neural communication linking the body with brainstem foundational circuits, carrying predominantly afferent signals while also providing efferent pathways that regulate physiological state.

Ventral Vagus, Cranial Fascia, and the Social Engagement System

Lina: Let's get into the ventral vagal and cranial fascia connection. Rolfers are familiar with ventral vagal function as influencing the heart and lungs, and as central to the social engagement system. In your talk, you also linked the ventral vagus to cranial structures.

Stephen: Let me refine part of the framing. The regulation of visceral organs often referred to as "rest and digest" is not exclusively ventral vagal. Much of the ongoing homeostatic regulation of subdiaphragmatic organs is mediated through pathways originating in the dorsal motor nucleus of the vagus. Under typical conditions, these pathways support metabolic and digestive functions. However, under conditions of extreme threat, those same circuits can contribute to energy conservation responses, including reductions in heart rate and, in some cases, syncope.

The ventral vagal pathways, which are unique to mammals, serve a different function. During development, cardioinhibitory neurons originating in more dorsal regions of the brainstem migrate ventrally and become integrated with nuclei that regulate the striated muscles of the face and head. This creates a functional linkage between autonomic regulation and the muscles involved in facial expression, vocalization, and head movement.

As a result, the ventral vagal system coordinates physiological state with social communication. When individuals display prosodic vocal patterns, facial expressivity, and adaptive head orientation, these are observable features of ventral vagal regulation. Conversely, reduced prosody, strained vocalization, or diminished facial expression may reflect a reduction in ventral vagal influence.

The ventral vagal pathways contribute to the regulation of structures such as the larynx and pharynx, while also influencing cardiac function. Through this integrated system, physiological state is both

regulated and expressed in ways that support social interaction.

Lina: Okay, to knit this together, the fascia of the face and throat is affiliated with ventral vagal function. We have evolved to reveal our inner comfort or discomfort with our faces?

Dr. Porges: If we put this into evolutionary history, what we realize is that everything about social mammals is built on the social engagement system, which has a specific biological function: it broadcasts the autonomic state of one individual to another. This enables the nervous system of one to assess whether the other was safe to approach, without conscious deliberation. This is the process of neuroception, or detection of threat without awareness.

We experience this in everyday life. You can completely agree with what someone is saying and yet not like them, you feel resistance to them. If you go inside and ask yourself why, what you find is that the person's intonation, facial expressivity, and gestures weren't conveying safety or trust. Your nervous system detected that before your cognition did. That is neuroception.

For the Rolfing community, this works in both directions. What your clients' bodies are broadcasting to you: the rigidity, the lack of prosodic features in their voice, and a high-pitched voice – those are neuroceptive signals of a defensive autonomic state. And what your body is broadcasting to your clients through your presence, your voice, and your quality of attention. When you finish a session, their voice may be very different. And you'll initially attribute it to slower breathing, but then you have to listen a little more carefully and realize that the actual intonation is changing because the ventral vagus also controls the larynx and pharynx. So what you're getting in the richness of the voice is a higher vagal tone than before.

Working with the Sympathetic System: Ventral Vagal Containment

Lina: Rolfers are working within the skeletomotor system all day long – engaging the fascia of the limbs, trunk, neck, head, hands, and feet. We observe movement patterns, and when clients are in chronic pain, their range of motion is often restricted. What you've described aligns with what we

see clinically: posture will reflect states of sympathetic dominance – tension, bracing, and reduced tissue compliance. Our interventions aim to reduce these intensities through touch and breath. Are we interacting directly with the sympathetic nervous system?

Stephen: What you are engaging is not the sympathetic system in isolation, but the broader regulatory processes that include ventral vagal influences. The ventral vagal system plays a key role in modulating autonomic state, creating conditions under which defensive activation can be reduced. In many individuals, especially those exposed to chronic stress, ventral vagal regulation may be diminished, resulting in patterns of hypervigilance and persistent mobilization.

From this perspective, your work provides cues that support a shift in state – allowing the nervous system to move away from defensive organization toward greater flexibility and regulation.

Consider the difference between running in fear and running in play. The underlying physiological systems may overlap, but the state is clearly distinguishable through facial expression, vocalization, and posture. These differences are reflected in the coordinated activity of the muscles of the face and head, which provide observable markers of autonomic state.

For practitioners, this becomes part of developing a polyvagal-informed lens: attending to these visible and audible cues as indicators of how the system is organized. While connective tissues are not themselves regulatory structures, they participate in the expression of these states. Patterns of tension, posture, and movement can reflect the underlying organization of the ANS.

When interventions are effective, practitioners often observe increased ease, rhythmicity, and variability in the system. These changes are likely associated with shifts in underlying physiological processes, including autonomic regulation, circulation, and breathing patterns. From a physiological perspective, rhythmicity reflects ongoing regulatory processes – oscillations that indicate the system's capacity to adapt and return toward homeostasis following challenge.

In this way, manual therapy may facilitate conditions that support the nervous

Dr. Stephen W. Porges: . . . there is a distinction between immobilization with fear and immobilization without fear. Both may involve stillness, but they reflect very different underlying physiological states.

system's inherent capacity for regulation, rather than directly imposing change on the system itself.

Thoracic Fascia and Breath as a Portal

Lina: What about thoracic fascia?

Stephen: The thoracic region is more complex than purely skeletomotor systems because it integrates multiple functional domains, including respiration, posture, and autonomic regulation. While it can be useful to think in terms of visceral, skeletomotor, and cranial connective tissue systems, these distinctions become less discrete in regions such as the thorax.

As we discussed with structures like the diaphragm and pelvic floor, these areas function as integrative zones – coordinating breathing, visceral support, and movement. Rather than fitting neatly into a single category, they reflect the interaction of multiple systems operating together.

This becomes especially relevant when we consider differences in autonomic state. For example, there is a distinction between immobilization with fear and immobilization without fear. Both may involve stillness, but they reflect very different underlying physiological states. Lying safely in the arms of someone you trust is an example of immobilization that is supported by ventral vagal regulation, whereas fainting or collapse reflects a

defensive state associated with dorsal vagal mechanisms.

If movement alone is used as the primary indicator, this distinction can be missed. The observable behavior may appear similar, but the underlying autonomic organization – and therefore the clinical meaning – is fundamentally different.

Lina: And breathing itself – the thoracic fascia is the tissue architecture of breath.

Stephen: Breathing is a portal. This goes back to what you said earlier, that you engage your clients to take a deep breath and exhale slowly. That's an observation that many people have experienced as useful, and as we have already said, during inhalation, there's a transitory inhibition of the ventral vagus, and during exhalation, you're giving permission for the ventral vagus to now resume its inhibitory calming effect. And that's why the ratio of inspiration to expiration, when it's a greater expiration, it's a more calming experience. When inspiration is greater in that ratio, it's arousing; it changes your state. Both are functional.

Autonomic Resources, Appeasement, and Survival

Lina: What about performers – singers, athletes – who are terrified of their audiences but present a convincing ventral vagal face? Are they overriding their nervous system?

Stephen: Those are what I would call superhuman nervous systems – they have developed so much resource that they can sustain the performance, to a point. I've worked with a famous opera singer from Europe who lost her voice. Basically, her nervous system gave up, it was no longer going to allow her to sing. Her career changed. She went to graduate school and studied Polyvagal Theory. And in an interesting moment at a conference, I helped her understand what had happened, and she got her voice back.

I also did a podcast with a well-known pop singer who is genuinely petrified by audiences. I asked her how she deals with that. She said, "I turn and look at my band members." That is co-regulation in action: Finding a pocket of safety in an overwhelming activating environment.

I have worked with people who survived abduction. One woman was held for nineteen years. She survived not only physically but psychologically intact – a remarkable person with tremendous insight into her own behavior. What allowed her to survive was that she remained an interesting, engaged presence for her captor. Passivity, fawning, and total shutdown – those are not reliable survival strategies. They can provoke escalation rather than diffuse it. Some people are gifted with a range of nervous system resources that allows them to navigate extreme situations. And that word gifted matters: it is not a choice, not an intention. If the resource isn't there, the body shuts down. An appeaser has much greater range until the body says, "I've had enough, I'm out of here."

Trauma Imprints, the Ten Series, and Re-embodiment

Lina: Rolfers often receive clients who have seen every other practitioner, and they come into our offices saying, "What else could you possibly do?" And the Rolfing Ten Series® does help.

Stephen: They're in the door – that's the important thing. They've arrived, and that reflects a continued search for change.

Let me offer a way to frame this. Many of these individuals have experienced persistent patterns of physiological regulation shaped by stress or trauma. These patterns can be expressed in the body through tension, restricted movement, and altered autonomic state.

Connective tissues participate in these patterns, reflecting how the system has adapted over time.

Signals of safety – conveyed through your presence, attunement, and interaction – can support shifts in autonomic state. For some individuals, that may be sufficient to begin changing how their body is organized. For others, additional forms of intervention may be helpful.

This is where manual therapy plays an important role. Through skilled touch and guided interaction, practitioners can create conditions in which clients experience changes in tension, movement, and internal state. Even if these changes are initially transient, they provide an important reference point – an experience of the body organized differently.

Once a client has experienced that shift, it becomes meaningful. It is often recognized as familiar at some level, even if it has not been previously accessible. With repeated experiences, individuals may develop great capacity to access and sustain these states.

Over time, this process can support meaningful changes in how a person experiences their body – greater ease, increased accessibility, and a reduced tendency to organize around defensive states.

Lina: Manual therapists are giving the fascia a new message from the ANS through social interaction as somatic therapists and through contact with our hands.

Stephen: Remember the important message I have for the fascia community: *fascia is a tissue system whose properties are shaped by autonomic regulation*. Practices that support a sense of safety may influence autonomic state, which in turn can affect the physiological conditions under which fascial tissues function. So, in a way, you could have hands-off Rolfing [Structural Integration] and hands-on Rolfing [Structural Integration], in both, you're shifting the fascia through a relationship with your client.

Even though there's great relief after one session, because of the way that individual interacts with the world, the pain pattern is reinforced in one way or another. Then their challenge likely can't be 'fixed' with only the singular visit, and the person comes back. The toxicity of their life has not been adjusted. So there's learning that takes place. Yes we can help you experience this new, easier state, but there's a part of feeling better that you have to do with your own nervous system. I use the word navigate, we each have to learn to navigate and respect our world, our environment.

We have this very gifted nervous system that can deal with threats miraculously, as long as the threat is not twenty-four hours a day, seven days a week. Our nervous system cannot deal with threats all the time. For some people, they just need a good night's sleep, or time with a loved one, or a pet that enables their body to recover. Other people need more. When

we respect and honor our body's needs, this is what we realize. It's not wrong to be under stress, and you can do very well with it. But you can't do it all the time. You need to have periods of time of what I like to call – *social nourishment*.

Embodied Regulation: A Working Definition

Lina: Your FRC talk subtitle was "A Polyvagal Framework for Embodied Regulation." What does embodied regulation mean to you?

Stephen: Over the course of my work trying to understand how the body responds to trauma, I've come to see that recovery is, in many ways, a process of re-embodiment. It is a return to being able to experience the body as a place that feels accessible, organized, and safe.

When individuals have been living in states of chronic threat, their experience of their body can become altered – constrained, defensive, or even disconnected. From a polyvagal perspective, embodiment reflects the capacity to remain present within one's body while the ANS supports regulation rather than defence.

Practitioners who work with fascia are often engaging with tissues that reflect these patterns of adaptation – tension, restriction, and altered movement. Through their work, they can help create conditions in which clients begin to experience their bodies differently. That shift can be understood as an initial step toward re-embodiment.

Stephen: Remember the important message I have for the fascia community: *fascia is a tissue system whose properties are shaped by autonomic regulation*. Practices that support a sense of safety may influence autonomic state, which in turn can affect the physiological conditions under which fascial tissues function.

But that is only the beginning. The next question becomes: what supports the individual in sustaining that state? What forms of nourishment – physiological, relational, and environmental – allow the nervous system to remain in a state of accessibility for longer periods of time?

Lina: That makes so much sense; their environment is setting the tone. Yet we can plant a seed, so to speak. One of your slides read, “Fascia enables the nervous system to translate internal physiological signals into embodied behavior, shaping posture, breath, affect, and presence.” When we invest in wellness that allows for a peaceful and curious nervous system, how we move, feel, and communicate will have this tone. And that’s how we help ourselves, and the people around us. Your research has this positive message from years and years of work – thank you!

Stephen: This perspective didn’t emerge in isolation. It developed through a long and collaborative journey – beginning with Peter Levine, continuing through my work with John Cottingham, and more recently through conversations with Robert Schleip, as well as contributions from Jim Oschman [author James L. Oschman, PhD], Stanley Rosenberg [practitioner and author], and Pat Ogden [PhD]. All of them shared a commitment to understanding the phenomena observed in the Rolfing paradigm and other somatic therapies.

Peter was asking these questions as early as the 1970s. He wanted to understand why individuals exhibited particular physiological and behavioral responses following trauma. That was a reasonable

and important question, and it initiated a line of inquiry that has continued to evolve.

What has changed over time is that the language and the science have begun to converge. Concepts such as “embodied regulation,” which may once have been difficult to articulate within scientific contexts, are now more widely accepted. We are increasingly able to describe these observations in terms that are meaningful both to clinicians and to researchers.

With respect to fascia, it is not that the tissue itself carries complex “messages” in isolation. Rather, it participates in a broader system in which neural pathways, vascular dynamics, and mechanical properties interact. As our understanding of these interactions has grown, the discussion has become more precise and more integrative.

Lina: It paints a deeper picture about what “opening” tissue is doing – that it’s not just relaxation, but a shift in physiology.

Stephen: Yes. If we think of fascia as a richly innervated tissue contributing to sensory input, then manual therapy can be understood as influencing the signals being conveyed to the nervous system. Rather than viewing fascia as simply “releasing,” we can consider how changes in tissue tension and movement alter the afferent information reaching brainstem regulatory circuits.

From that perspective, shifts in tissue organization are accompanied by changes in how the body is being monitored and regulated. These changes can, in turn, influence autonomic output, including processes such as circulation and visceral regulation.

I experienced this personally when I went through the Rolfing Ten Series®. I remember noticing changes in my own face following sessions – a kind of brightness or “glow.” At the time, I began to think about what might underlie that observation. It likely reflects changes in physiological state, including vascular dynamics and autonomic regulation, rather than a purely local tissue effect.

When practitioners observe their clients, they are often sensing patterns within a highly interconnected system. Fascia can be thought of as part of a broader sensory interface contributing to interoception, providing continuous input that informs autonomic regulation. Through this lens, it participates in the processes that support health, adaptation, and social engagement.

One of the contributions of Polyvagal Theory is to emphasize that sociality itself is a biological function. When physiological state supports safety, individuals spontaneously engage with others, and coregulation emerges. These processes are not primarily driven by cognition, but by underlying neural regulation – they are experienced, rather than consciously constructed.

A Theory of Human Experience

Lina: Your work and your talk at the FRC feel like the closest thing to a “theory of everything” to explain Rolfing Structural Integration I’ve encountered.

Stephen: Thank you. What you’re observing is really a reflection of my journey. I’m a curious person, and understanding the human experience

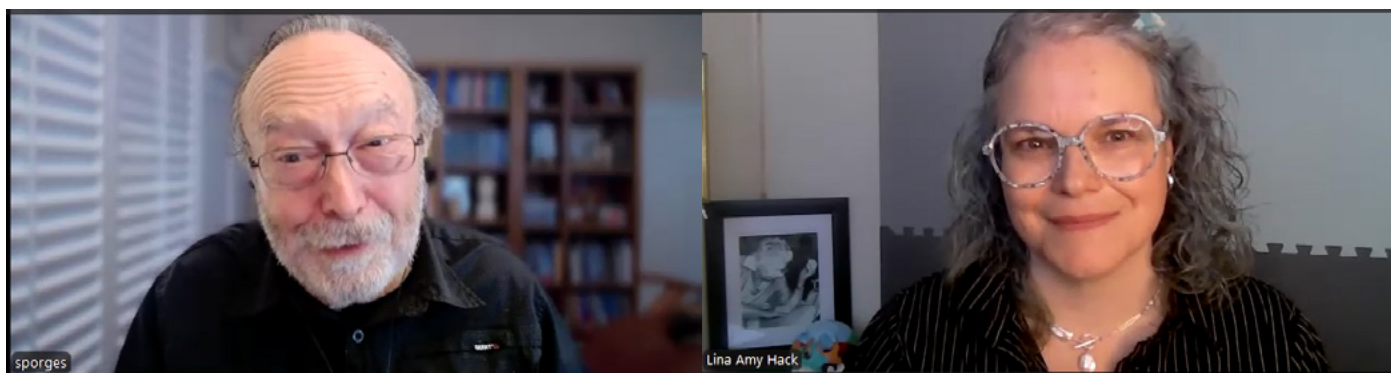


Figure 11: Stephen and Lina

has always been my central focus. Over the decades, I've been refining that understanding – trying to identify the underlying principles that support how we function, adapt, and connect.

In that sense, it becomes less about any single discipline and more about understanding how to optimize the human experience. When we begin to think in those terms, it naturally extends into many domains: how we structure schools, how we design hospitals, how we organize work environments, even how we think about our built spaces.

At its core, this is an effort to understand what the human body requires to feel safe, to engage, and to thrive – and what it does not tolerate well. Living in our world comes with a cost when the nervous system is asked to remain in a state of defense for too long. The challenge is not avoiding that cost entirely, but learning how to restore balance through experiences of safety, connection, and social nourishment.

Lina: Social nourishment; that's brilliant. That is going right into my pocket. That brings a natural closure point for our conversation, so much to ponder. I've enjoyed our conversation very much.

Stephen: As you can tell, I'm not a passive participant in interviews; I'm engaged and enjoying it. Curiosity is extremely important in life, and the passion to learn and understand. It's not just the accumulation of knowledge; it's how that knowledge can help you understand the human experience.

Lina: Yes – and to apply that knowledge to the one individual client in front of us. That's where the art meets the science.

Stephen: Yes, it is an art. We are part of a community of practitioners who have chosen to engage in this work – individuals who are both skilled and sensitive, working with some of the most vulnerable aspects of human experience. And they are doing so with care and effectiveness. There is much we can learn from that.

Lina: Thank you for helping us learn from you! Take care.

Stephen: You are welcome, nice job.

Endnotes

1. For Stephen W. Porges website, which has the psychophysiological

assessments and autonomic scales, including the Body Perception Questionnaire (BPQ), see <https://www.stephenporges.com/assessments>.

Stephen W. Porges, PhD, is a behavioral neuroscientist whose research has transformed understanding of how the autonomic nervous system shapes social behavior, emotion, and health. He is the originator of Polyvagal Theory, first introduced in 1995, a framework describing how brainstem autonomic circuits regulate responses to safety and threat and support social engagement through the ventral vagal complex – an evolutionarily derived neural system linking autonomic regulation with the neural control of the face, head, and voice. Dr. Porges is a Distinguished University Scientist at the Kinsey Institute, Indiana University, where he is the founding director of the Traumatic Stress Research Consortium. He also serves as Professor of Psychiatry at the University of North Carolina at Chapel Hill and Courtesy Professor in the Department of Psychiatry at the University of Florida College of Medicine in Jacksonville. He holds emeritus professorial appointments at the University of Maryland and the University of Illinois College of Medicine. He has authored more than 400 peer-reviewed publications, cited in over 65,000 scientific works. He has written several books translating autonomic science for clinical and public audiences, including Our Polyvagal World (Porges and Porges 2023) and Safe and Sound (Porges and Onderko 2025). His translational work includes the Safe and Sound Protocol™, a structured listening intervention he developed, and Sonocea® Sonic Augmentation Technology™ (SAT™), an acoustic neuromodulation platform codeveloped with Anthony Gorry. The Rest and Restore Protocol™ is an application of this platform designed to support autonomic regulation and restorative states. His work has also led to patented methods for monitoring and modulating autonomic function.

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Polyvagal Theory; autonomic nervous system (ANS); fascia; vagus nerve; ventral vagal; dorsal vagal; neuroception; interoception; social engagement system; coregulation; fascia as sensory organ; mechanoreceptors; nociceptors; cranial fascia; visceral fascia; skeletomotor fascia; heart rate variability, respiratory sinus arrhythmia; vagal tone; vagal efficiency; sympathetic nervous system; parasympathetic nervous system; face-heart connection; embodied regulation; trauma imprints; body perception questionnaire (BPQ); Rolfing Structural Integration; brainstem; phylogenetic evolution; diaphragm; pelvic floor; safety. ■

**Mammalian
autonomic regulation
includes specialized
circuits that support
social behavior and
the downregulation
of defensive states.**

Dr. Stephen W. Porges



Andrew Rosenstock

The Philosophical Touch

When Resilience Becomes Strain

By Andrew Rosenstock, Certified Rolfer®

ABSTRACT Many clients who seek Rolwing® Structural Integration appear highly capable and resilient, yet arrive with descriptions of pain, misalignment, or a persistent sense of bodily strain that does not correspond to an obvious cause. From a somatic perspective, this strain often reflects not failure but successful adaptation – the nervous system organizing itself around chronic demands such as time pressure, emotional self-regulation, and social roles that reward endurance over responsiveness. For this Philosophical Touch column, Rolfer™ Andrew Rosenstock draws parallels with critical theory of the Frankfurt School to argue that resilience itself can become a form of defense, normalized over time. Rolwing Structural Integration offers a means of restoring perceptual choice – not by overriding adaptation, but by creating conditions in which the body can differentiate between necessary effort and habitual holding.

One of the patterns I notice most often in my Rolwing® Structural Integration practice is not a lack of capacity, but the opposite. Many of the people I work with are capable, organized, and deeply competent. They manage complexity, carry responsibility, and function well in demanding lives.

And yet, they often arrive speaking about fragility – describing pain, discomfort, or a sense that something in their structure is off. They may talk about feeling misaligned, unstable, or as though their body is no longer supporting them in the way it once did. Over time, it becomes clear that what they are sensing is not so much a system falling apart, but the strain of a system that has been holding a great deal for a very long time.

Beneath this appearance of resilience, there is often something quieter and harder to name: a persistent sense of effort. Not acute pain. Not collapse. But a kind of ongoing holding that never quite resolves. A vigilance that never fully powers down. A body that can rest, but does not know how to arrive there.

Ease, when it appears, feels unfamiliar. Sometimes even threatening. Letting go feels riskier than staying tense. This raises an important question – one that sits directly at the intersection of structure, function, and lived experience.

What if resilience itself can become a form of strain?

Forces That Act Before Choice

In earlier The Philosophical Touch columns (Rosenstock 2024, 2025a, 2025b), I've explored how lived experience arises through the body – how perception, sensation, and meaning are not added onto the body, but emerge through it. The body is not a passive vessel receiving experience; it is an active participant in how the world shows up.

Lived experience does not arise in isolation.

Before a person reflects on their stress – and I intend this word in a broader sense than common usage – before they narrate it, before they even recognize it as



Over time, it becomes clear that what they are sensing is not so much a system falling apart, but the strain of a system that has been holding a great deal for a very long time.

stress, their nervous system has already organized in response to the forces acting upon it. In Rolf Movement® Integration, we are taught to look for anticipatory postural adjustments – patterns that appear before movement begins, before a task is undertaken, sometimes even before contact. These anticipations are not habits in the casual sense; they are learned responses to conditions the system expects to encounter.

These forces are often subtle. They rarely announce themselves. More often, they are woven into the fabric of ordinary life:

- Expectations of productivity.
- Persistent time pressure.
- Emotional self-regulation.
- Social roles that demand consistency over responsiveness.

- Environments that reward endurance more than sensitivity.
- The constant presence of gravity and how a body learns to organize itself in relation to it.

These are only a few examples among many. The list could be extended in countless directions, as each system organizes itself within its own constellation of demands, many of which are registered somatically long before they are understood conceptually. What matters here is less the specific force, and more the recognition that the body is always responding within a field of influences – many of which are never fully seen.

The body does not debate these conditions, nor does it analyze them.

It meets them, and it adapts.

From a somatic perspective, this is not pathology. It is an intelligence. The nervous system is doing precisely what it has evolved to do: organize itself in response to conditions in order to survive. But survival and integration are not the same thing.

Earlier, I emphasized that my usage of the word ‘stress’ is broader than the way we might typically mean it in casual conversation. What I’m pointing to here is not just how stress feels, but the conditions the system is organizing around. I’m not talking about feeling overwhelmed, anxious, or busy, though those experiences can certainly be part of it. I’m using the word more structurally to mean anything the system is organizing around. In this sense, stress is not only how something feels, but also the presence of a stressor itself



In this sense, stress is not only how something feels, but also the presence of a stressor itself – a demand, pressure, or condition that requires ongoing adaptation. Much of what the body holds does not arise from felt stress, but from what it has learned it must accommodate.

– a demand, pressure, or condition that requires ongoing adaptation. Much of what the body holds does not arise from felt stress, but from what it has learned it must accommodate.

A Critical Lens on Adaptation

It is here that the work associated with the Frankfurt School becomes relevant – not as political theory, but as a way of seeing. This twentieth-century school of thought developed what came to be known as critical theory – a way of questioning how experience is shaped by systems – including systems of inequality – often without being directly seen.

Thinkers associated with this tradition – such as Theodor Adorno (1903-1969),

Max Horkheimer (1895-1973), and Herbert Marcuse (1898-1979) – held distinct perspectives, emphases, and values. Some were more concerned with culture, others with reason, technology, or liberation. For the purposes of this discussion, however, those differences are less important than what they shared: a concern with how large, often invisible, forces shape human experience, long before that experience becomes conscious or chosen. For Rolfers™, who regularly speak of working with gravity – a constant, largely unseen force – as well as other organizing forces that are not always directly perceived, this orientation should feel right at home.

What interested the Frankfurt School thinkers was not simply oppression or suffering,

but adaptation – especially adaptation so successful that it becomes invisible.

This was a central concern of the Frankfurt School: not why systems fail, but why they succeed so well that their consequences are no longer questioned. This theme of stress becoming unseen appears in different forms throughout this article. We keep returning to it because some of the most powerful forces shaping human experience are often the ones that have become the hardest to perceive.

What happens when people adapt so thoroughly to their conditions that the conditions themselves disappear from awareness?

From a somatic standpoint, this question lands very close to home. We see it in

how a body prepares for what has not yet happened. In how tension organizes before contact, before movement, before demand is fully present. The system is not simply responding to stress – it is anticipating it.

In the Rolfing paradigm, we often speak about adaptability as a core principle of the work. Seen through this lens, adaptability can be understood more broadly – not simply as the capacity to respond to changing conditions, but as the ways in which a system has already organized itself in anticipation of them, often long before those patterns are consciously recognized.

Function Without Vitality

One of the central concerns of critical theory was what happens when function becomes detached from aliveness. A system can work remarkably well while quietly diminishing the very capacities that make it human. In fact, it is often precisely this effectiveness that allows the underlying cost to go unnoticed.

In bodies, this often appears not as breakdown, but as organization:

- Postural strategies that prioritize control over responsiveness.
- Muscular tone that supports endurance but limits sensation.
- Nervous systems optimized for vigilance rather than recovery.
- Movement patterns that are efficient, repeatable, and narrow.

Please note that these are not failures; rather, they are highly successful adaptations.

And because they work, they are rarely questioned.

But when efficiency – effective within a particular context – becomes the dominant mode of organization, it can replace responsiveness more broadly, and something subtle begins to erode. Sensation narrows, emotional range contracts, and rest becomes less accessible. This is not because the body cannot rest, but because it no longer trusts rest.

What once supported the system begins, over time, to limit it.

The system remains functional, but it is no longer listening – no longer orienting to what is actually present.

What interested the Frankfurt School thinkers was not simply oppression or suffering, but adaptation – especially adaptation so successful that it becomes invisible.

What we often call resilience, in these cases, is sustained effort.

When Resilience Becomes a Defense

One of the recurring insights of Frankfurt School thinkers was that not all forms of freedom are actually liberating. A system can feel autonomous, capable, and self-directed while remaining tightly organized around conditions it did not choose.

From this perspective, resilience can sometimes function less as a sign of health and more as evidence of how thoroughly a system has learned to accommodate what is demanded of it.

For example, I often work with clients whose bodies appear organized and stable, yet carry a subtle, continuous holding. On the table, there may be a persistent tone through the shoulders, a guardedness in the breath, or a pelvis that does not fully settle. Even when there is no immediate demand, the system remains organized as though something is about to happen. What appears as stability is often the continuation of a pattern that has not yet had the opportunity to reorganize.

Resilience is widely celebrated, and for good reason. The capacity to endure difficulty, to reorganize under stress, to continue in the face of challenge, is essential.

But resilience is not a single phenomenon.

There is a resilience that supports flexibility – the ability to meet stress and return to ease. And there is a resilience that defends against collapse by never allowing the system to soften at all. The latter does not arise from stubbornness or denial. It develops when conditions repeatedly demand self-management, control, and vigilance – when letting go

feels unsafe, impractical, or irresponsible.

Over time, this form of resilience becomes identity:

“This is just how I am.”

“I’ve always been tense.”

“I don’t really feel stress.”

From a critical perspective, this is not freedom. It is normalization.

From a somatic perspective, the cost is not always obvious, but it is felt:

- Reduced interoceptive clarity.
- Diminished access to pleasure or stillness.
- Difficulty settling, even when circumstances allow.
- A background sense of effort that never quite lifts.

Often, what disappears first under chronic pressure is not function, but *feeling*.

Stress That No Longer Feels Like Stress

One of the most challenging aspects of chronic stress is that it stops announcing itself.

When a stressor becomes ongoing, it no longer feels like an event. It feels like ‘baseline’. The system adapts so thoroughly that tension, vigilance, and holding are no longer experienced as responses – they are experienced as normal.

From the outside, these bodies often appear stable. From the inside, there is frequently a sense of contraction without a clear cause.

This is not because the body has failed to adapt, but because the adaptation has persisted beyond the conditions that originally required it.



What once supported the system begins, over time, to limit it. The system remains functional, but it is no longer listening – no longer orienting to what is actually present. What we often call resilience, in these cases, is sustained effort.

Critical theorists were concerned with precisely this phenomenon: when adaptation becomes so complete that the conditions requiring it fade from awareness. Somatic work encounters the same pattern, but through tissue, tone, breath, and perception.

The body remembers what the mind no longer questions.¹

What Rolfing® Structural Integration Can Offer

Rolfing Structural Integration does not aim to remove stress from a person's life. Nor does it attempt to override adaptation. Instead, at its best, it offers something quieter and more fundamental: the restoration of perceptual choice.

Through touch, presence, and relational attunement, we help make forces perceptible again. We support differentiation between support and strain, between necessary effort and habitual holding.

This is not about convincing the body to let go. It is about creating conditions in which loosening grips becomes an option.

Often, the first shift is not dramatic – it is the simple recognition that effort is present where it had previously gone unnoticed.

Change does not occur because we impose it. It occurs because the system senses new possibilities and reorganizes itself accordingly.

In this way, structural work can become a site of gentle critique – not of the

person, but of the conditions their body has learned to survive – a concern that sits very much in line with the critical orientation of the Frankfurt School.

Resilience Reimagined

Perhaps resilience is not best measured by how much a body can endure. Perhaps it is better understood as the capacity to reorganize – to sense, respond, and soften without collapse.

From this perspective, resilience would not be something the body proves. It would become something the body rediscovers when conditions allow sensation, responsiveness, and integration to return.

It becomes less about holding together,



Critical theorists were concerned with precisely this phenomenon: when adaptation becomes so complete that the conditions requiring it fade from awareness.

and more about no longer needing to.

And the question we might quietly leave with – for our clients and ourselves – is not:

How strong am I?

But something simpler, and perhaps more unsettling:

What would my body do if it no longer had to hold everything together?

Endnote

1. Here, "body" is being used in the broader embodied and somatic sense, referring not only to physical structure but also to subcortical, autonomic, and neurophysiological processes that shape experience prior to conscious reflection. From a neuroscience perspective, many

of the patterns of bodily organization we encounter clinically are organized below the level of conscious cognition long before they are conceptually recognized.

Andrew Rosenstock is a Certified Rolfer®, Registered Somatic Movement Therapist, Biodynamic Craniosacral Therapist, Board Certified Structural Integrator, Certified Yoga Therapist (C-IAYT 1000), meditation teacher, and educator. He writes The Philosophical Touch to explore the meeting place of somatic practice, philosophy, and lived experience. Find out more at rolfinginboston.com and andrewrosenstock.com.

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Keywords

resilience; chronic stress; somatic adaptation; Rolwing Structural Integration; critical theory; Frankfurt School; interoception; posture; postural adjustments; structural integration. ■

Biotensegrity

A Highly Probable Reality

By Dorothy Miller, Certified Advanced Rolfer™, and
Mary Bond, Certified Advanced Rolfer, Rolf Movement® Instructor Emeritus



Dorothy Miller



Mary Bond

ABSTRACT In this interview, Advanced Rolfer™ and movement educator Mary Bond reflects on her experience completing a three-month course in biotensegrity, exploring how this emerging paradigm reshapes our understanding of human structure, movement, and life itself. Bond discusses how the biotensegrity model – grounded in the interplay of tension and compression forces at every scale of the body – challenges conventional biomechanical thinking and offers a richer framework for understanding structural integration.

Editor's note: This conversation took place on April 14th, 2026, and has been edited by both authors for clarity. As a regular contributor to Structure, Function, Integration, Mary Bond kindly sat down with us for an interview to discuss the recently completed course "Advanced Concepts in Biotensegrity," taught by Susan Lowell de Solórzano, author of the 2021 book Everything Moves: How Biotensegrity Informs Human Movement. We asked Mary, as she is so knowledgeable about movement, to share how she was integrating these new biotensegrity ideas into her movement concepts. The course was offered through Embodied Biotensegrity (embodiedbiotensegrity.sutra.co)

Mary noted during the editing process that it will take much longer than three months to embody this revolutionary paradigm describing the nature of life.

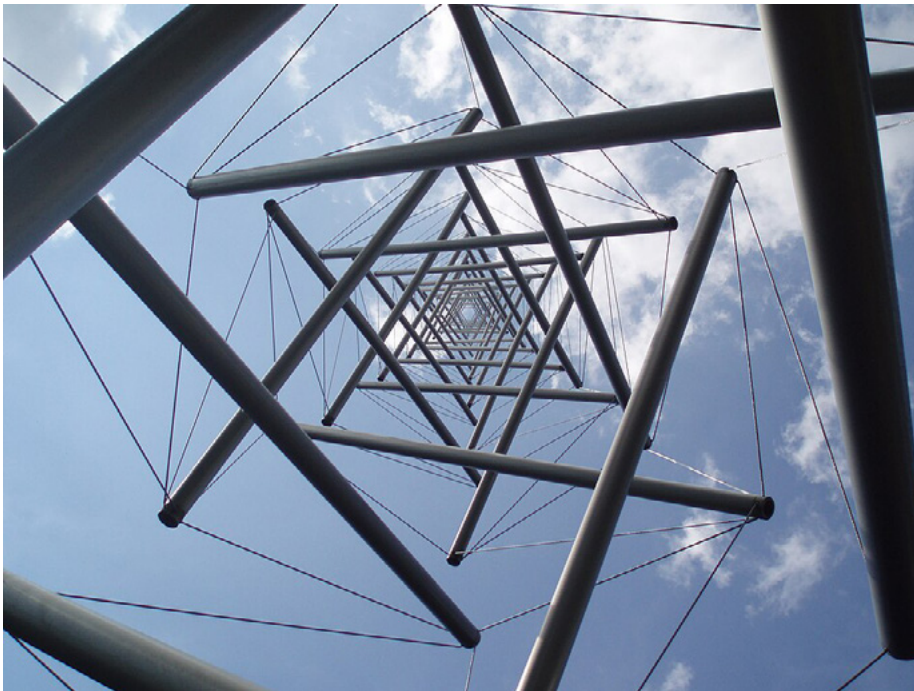
The Interview

Dorothy Miller: Hi Mary, lovely to chat with you. Thanks for taking the time.

Mary Bond: You're welcome. Always great to talk with you as well.

Dorothy: I understand that you recently took a three-month course about biotensegrity. As a posture and movement coach, student of Ida Rolf¹, and author, what stirred your interest in biotensegrity in particular?

Mary: When biotensegrity started to be mentioned in connection with fascia research I was intrigued; I scratched the surface of it in 2017 when I was writing about fascia for my book, *Body Mandala* (2018, 2023). I understood that tensegrity had to do with balanced tensions in a structure and balancing tensions within the body's structure is exactly what structural integration does.



Mary Bond: Well, my understanding was that the tensegrity principle involves discontinuous compression elements suspended within a network of continuous tension.

Image by Onderwijsgek of the Needle Tower II, August 6, 2006, in the Netherlands.
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Especially interesting to me was what author Danièle-Claude Martin (2022) described as *tensegral movement*. It sounded like the spacious structure and fluid coordination that emerge when someone orients adaptively to both the ground and their surroundings – what I had learned in classes with Hubert Godard². “Aha,” I thought, what I’m writing about is *perceptual tensegrity*! I introduced that idea in my book, but didn’t take it any further.

Later, during the pandemic, my interest was revived when the biotensegrity community organized what they called ‘biotensegri-tea parties’ on YouTube. Listening to their conversations, I began

to see that their inquiry and purpose are light years beyond what I had thought.

Dorothy: How so?

Mary: Well, my understanding was that the tensegrity principle involves discontinuous compression elements suspended within a network of continuous tension. In that case, the wooden struts in your model are the bones, and the rubber bands are the soft tissues. If you pinch one of the rubber bands, it distorts the whole thing. On first acquaintance with this model, you think, okay, so it represents holism, adaptability, and continuity – so what?

Dorothy: That was how I thought of it. In my training at the Dr. Ida Rolf Institute®,

they brought in a wooden tensegrity toy to illustrate Buckminster Fuller’s ideas³. The model shows how tension in one part of the body affects the whole. But there’s more to it, I guess.

Mary: The biotensegrity understanding of the model is dynamic, where those strings and struts represent the force vectors of tension and compression. When the forces are balanced, the structure stiffens omnidirectionally when it encounters an outside force. It’s impossible to see this if your model is constructed with rubber bands because placing a load on it makes the thing collapse. But you’ll clearly feel it if the model is made with a fishing line or a strong string. Then the model demonstrates that stability can be achieved with minimum energy expenditure.

Dorothy: Then it’s a model of energy management?

Mary: Yes, and minimal energy expenditure is one of the basic principles of living things. When a tensegrity structure takes on a compressive load, it condenses omnidirectionally; if something pulls on a tensegrity structure, it expands omnidirectionally. Both movements stop on their own, so resistance is inherent in the organization. But when a compression structure, like a brick tower or a person with the conventional idea of good posture, encounters either type of external load, extra energy must be recruited to sustain it. Either that or the structure begins to collapse.

Dorothy: This reminds me of how people, typically in non-Western countries, can carry massive loads on their head, such as rocks, baskets of food, or buckets of water. The weight does not seem to be pushing them down into the earth. In fact, they move with a beautiful spiraling movement in their spine.

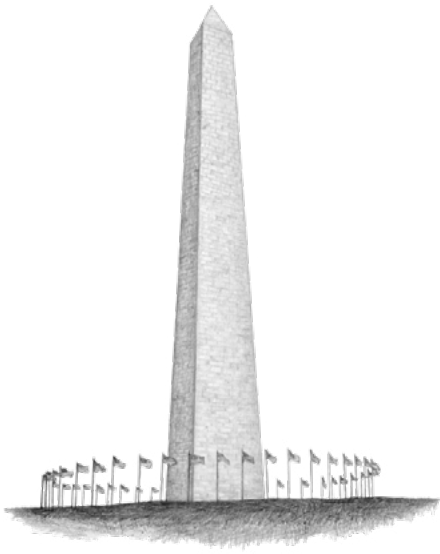
Mary: That’s a good example of how human tensegrity is a dynamic tension-compression system. This principle of balanced push and pull forces applies not only to whole organisms like people with the buckets on their heads, but also at every scale within the body, to the subcellular level. You might picture dozens of animated tensegrity models nested one inside another, like those Russian dolls.

The ideas of Fuller and other developers of the tensegrity principle actually arise from what biology has been doing for billions of years. So the biotensegrity endeavor isn’t



A young African woman walking across a sugarcane plantation while carrying a basket on her head (images by gloria mwivanda on iStockphoto.com).





A drawing of the Washington Monument illustrates a tensegrity structure (Bond 2018, 2023). The trunk of a tree is an example of a biotensegrity structure (photo by Mark Howard on iStockphoto.com).

just about applying tensegrity to human structure and movement; it's about showing that the tension-compression principle is the basis of all living things. The *bio* in biotensegrity distinguishes it from the purely structural application of the principle.

Tensegrity-in-Motion

Dorothy: You've touched on some of these ideas in your tensegrity-in-motion group, and when I follow your cues, I experience inner spaciousness, support, and ease. Is it the difference between having support from within as opposed to effort from the outside?

Mary: Yes. What you experience is your body's expansional balance. I find

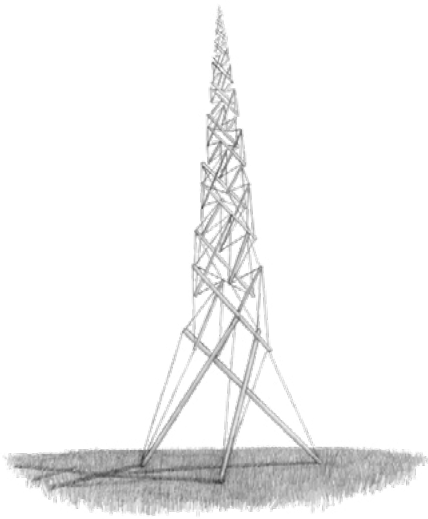
that many of Dr. Rolf's ideas dovetail with the topics discussed by the biotensegrity community. But very few of the people are bodyworkers. They are from diverse professional fields, including anatomists, biologists, physical therapists, mathematicians, puppeteers, philosophers, and vocal coaches. There's a horse trainer whose method is founded on biotensegrity ideas. The communal endeavor seems to be generating a new interdisciplinary science of nature.

Dorothy: That's brilliant. A diverse group is well poised to question one another along the way and be more open to new insights. Heterogeneous groups are way better at solving problems than homogeneous groups. What are the topics like?

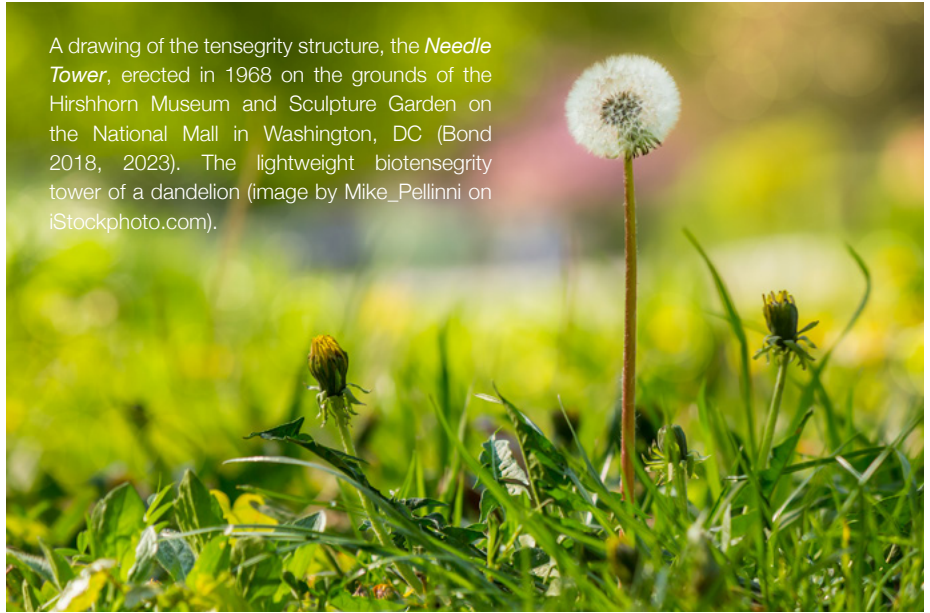
Mary: Truly, it is awesome, but also for me, a little daunting when the science gets complicated. One aspect of the inquiry involves chaos theory, the way order emerges in apparently chaotic systems. The biotensegri-tea party conversations range from soft matter physics and self-organization to the geometry of motion and the effectiveness of very light touch in therapy (Levin 2018). Sometimes there are guest speakers from the Fascia Research Society and other disciplines.

I was especially impressed by a presentation from an expert in ecological psychology, which is the study of how the environment influences behavior and of the physiological connection between perception and action. Incidentally, the Rolf Movement® themes of perceptual

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A drawing of the tensegrity structure, the *Needle Tower*, erected in 1968 on the grounds of the Hirshhorn Museum and Sculpture Garden on the National Mall in Washington, DC (Bond 2018, 2023). The lightweight biotensegrity tower of a dandelion (image by Mike_Pellini on iStockphoto.com).



orientation and premovement derive from this area of study. Those themes are familiar if you've been exposed to Godard's tonic function theory⁴.

Rolfer™ Ron Kirkby's 1975 Article on Tensegrity & What Dr. Rolf Thought of It

Mary: During one biotensegrity-tea party, the talk centered on a 1975 paper by Ron Kirkby, PhD, one of Rolf's advanced students. The article was *The Probable Reality behind Structural Integration: How Gravity Supports the Body*.⁵ It discusses tensegrity at length.

Dorothy: I recently read that paper per your recommendation. I also listened to the audio recording on the Dr. Ida Rolf Institute website, where you can hear Dr. Rolf talking about the Kirkby paper, and Ron Kirkby also explains his ideas.⁶ I was blown away by the conversations and questions. They were really looking at the work through a mathematical and physics lens.

Mary: It is amazing to listen to the audio file, and it makes me wonder about the whereabouts of Ron Kirkby and why the tensegrity inquiry didn't continue within the structural integration community. It is pretty clear that Roling [Structural Integration] addresses tension and compression forces in the body.

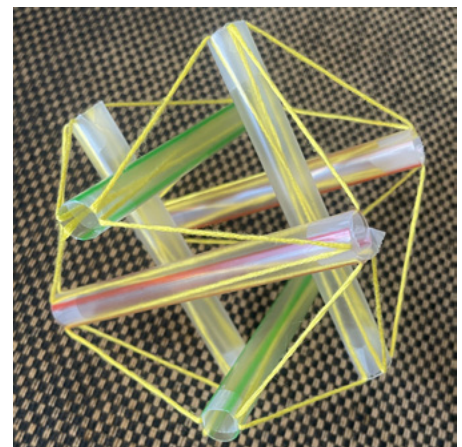
Lately I've been thinking about the core and sleeve idea in those terms. It's possible that Dr. Rolf was influenced by Fuller's ideas, but maybe she just came to it on her own. We often forget about her extensive science background. Let me read from *Ida Rolf Talks* (1978), page 181. This paragraph sums it up for me:

"Support is a balance of elements that aren't solid at all, elements that are incapable of withstanding the weight that presses down on them except as they are balanced. Could you translate this balance as tone? I don't know. I don't know what tone is in words, only in experience. I once equated it with span, but I don't know how to define span. When you get span in a body, you get tone; when you get tone, you get span. Span is a spatial thing; tone is physiological. Both words refer to balanced structure in a living body. Both tone and span indicate a readiness to act and respond that is the touchstone of a healthy body."

Dorothy: Sounds like tensegrity to me.

Mary: It does to me as well. I think that, as the Advanced Roling Instructors were formulating the curriculum after Rolf died, perhaps they translated her word 'span' as palintonicity. Span comes from *spannen* in German, meaning to connect, fasten, or stretch. It's about the expansion that occurs when the body's tension is balanced.

And although she wrote about balancing tensegrity-like properties of span and tone, Dr. Rolf prioritized the vertical line above all else. So how did her beloved verticals and horizontals fit in with the tensegrity idea? I was curious about that because all I could see in the usual six-strut tensegrity model were triangles. And Fuller's geodesic dome was all triangles.



Homemade six-strut tensegrity model (image by QuarterNotes, May 2, 2021, available under the Creative Commons Attribution-Share Alike 4.0 International license at https://commons.wikimedia.org/wiki/File:Icosahedral_tensegrity_structure.png.)



Montréal, Québec, Canada, biosphere on Saint Helen's Island designed by Buckminster Fuller for the 1967 World Expo (image by Simon van Hemert on iStockphoto.com).

But then I built a different model. I was skeptical at first, but making your own model really does help you make sense of these ideas. I made a cuboctahedron, a geometric shape that, according to Fuller, represents a perfect balance of forces. When you push on it, the thing changes shape from icosahedron to octahedron to tetrahedron – twenty

triangular sides, to eight sides, and then to four sides. The geometry and physics of it are still way beyond me, but when I push on my model, right angles appear and disappear as the shapes transform.

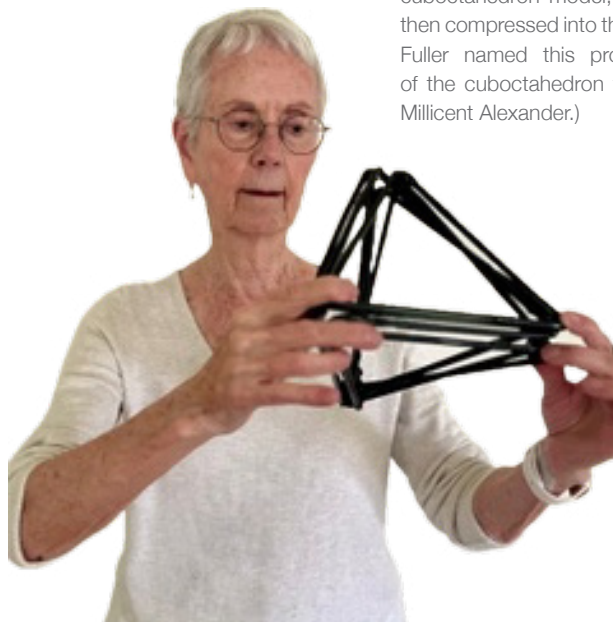
I had been struggling with Dr. Rolf's emphasis on the vertical, because I saw that she was interested in this tensegrity

idea, whether or not she framed it in those terms, and it is what happens when you receive a full Rolfing Ten Series®. Your body is more spacious, more fluid, and has more helical movement.

For many years, the idea of organizing the body around a vertical line has felt too static to me. What I saw when I played with the model was that, yes, there were all these triangles moving around in different configurations, but occasionally right angles would appear and disappear as the shapes changed.

The intermittence of the verticals and horizontals made me think of an upright stance. People don't stand in a vertical line for very long, unless they're in the military or are singing in a choir. Most of the time our bodies assume a myriad of other shapes as we interact with gravity from one movement to the next.

Seeing those right angles come and go in my model as I pushed on it helped me understand Rolf's insistence on the line. A biotensegrity structure doesn't depend on gravity to maintain its integrity in every moment – consider an eagle or a gymnast. When an earthbound creature evolves into a tensegrity tower, then that central plumb line becomes a foundational reference. But I see the line emerging in relationship to the tension-compression principle rather than being the thing that was there first.



Mary Bond holding her home-made cuboctahedron model, first fully expanded and then compressed into the four-sided tetrahedron. Fuller named this progressive transformation of the cuboctahedron the jitterbug. (Images by Millicent Alexander.)

Mary: When an earthbound creature evolves into a tensegrity tower, then that central plumb line becomes a foundational reference. But I see the line emerging in relationship to the tension-compression principle rather than being the thing that was there first.

Dorothy: It makes sense that the line would reorganize as needed. We are self-assembling organisms, and we continually assemble and organize in response to our environment.

Learning the Biotensegrity Language

Mary: Great. You're well beyond where I was when I heard about the biotensegrity course. The teacher was Susan Lowell de Solórzano, who had been Stephen Levin's assistant and colleague for many

years.⁷ Dr. Levin was the one who coined the term biotensegrity and initiated the field of study. Upon joining Susan's class, I found that other students had been studying it for many years, and so, for some of the conversations, I had to look up a lot of words. Later, though, I learned that everyone has to look things up. There's so much to comprehend.

Dorothy: What were some of the complicated concepts?

Mary: In the beginning, we were looking at things I thought I understood through a lens that showed different realities about

them. I know the body isn't a machine, but it's amazing how difficult it is to avoid mechanistic explanations of how it works. I learned about movement in terms of levers and pulleys, even though it's obvious there are no hinges in the body or anywhere in biology for that matter. The biotensegrity group proposes closed kinematic chains as an alternative way of describing movement.

Dorothy: Closed chains, like in exercise?

Mary: That's what I thought at first, but those are 'kinetic chains' – not the same thing. *Kinetics* pertains to the



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energy of an object when it's in motion. *Kinematics* describes the geometrical pattern of movement inside a structure as it changes shape or position. The idea is that kinematic chains form ubiquitous, interconnected loops within our bodies that are continually being reconfigured as we move. To understand the forces that cause movement requires a separate inquiry. Closed kinematic chains are like the changing patterns you see in a kaleidoscope, patterns that are separate from the action of your hand as it turns the toy.

Dorothy: Do these chains represent physical places in the body?

Mary: In theory, a chain link can be composed of bones, tendons, muscles, or other fascial forms. Joints between the components are not necessarily bone-to-bone joints like knees or elbows but can be intersections of any tissue type with another. That way, innumerable points within the body can link up and move as one. I found it hard to conceptualize this at first because it's been so easy to analyze movement in terms of levers and hinges.

It's helpful that Dr. Jean-Claude Guimberteau's endoscopic images of fascia are real life displays of closed kinematic chains (2019). Imagine the motion you see in his films scaled down to occur within cells or scaled upward to create the elegance of Balinese dance – with all in between scales of that motion occurring simultaneously.

Such complexities make it impossible to define the dynamics of even a simple movement, such as reaching for your phone. Because any action can be produced by a number of different chains, that puts a much wider frame around the notion of 'optimal movement'. And, to make things even more brain-rattling, the kinematic chain idea is only a model, like the lever/hinge/machine model. In time, there will likely be another model of movement, one that gets us even closer to reality. We're in the realm of *kinematic indeterminacy* – where we get to say, "I don't know," and feel okay about it.

The Properties of Soft Matter

Dorothy: Yet, even if movement can be produced by a variety of different chains, it still seems helpful to know anatomy and have a general sense of which muscles are working together to make a movement

happen, right? The biomechanical lens is still useful, but maybe it's just not enough?

Mary: A basic understanding of joint mechanics definitely improved my Rolfing skills. But even so, biomechanics is based on understanding how machines work, and machines are governed by the physics of hard matter, like metal or wood. We resort to mechanistic thinking to explain things because that's all we were taught. It makes so much more sense to understand our bodies as *soft matter*. This is a completely different domain that includes foams, gels, bubbles, and liquid crystals, as well as flesh. So maybe it's time to take our biomechanics with a sprinkling of salt.

Soft matter turns out to be a world where mysteries and strange events are the norm. For example, in soft matter physics, it's normal for a small local event to have a very large effect at a distance.

Dorothy: We see that in our treatment rooms all the time. It amazes our clients.

Mary: Yes, it amazes them. It amazes us. And consider Dr. Rolf's maxim that *where you think it is, it ain't*. The experience of our own hands confirms this, but mechanical thinking can't explain it. The term 'soft matter' wasn't coined until the 1970s, but remember, Dr. Rolf was a biochemist, so she probably knew about the investigations that led to its being recognized as a field of study.

Dorothy: Excellent point about her being a biochemist. I wish I could have been a fly on the wall for some of those conversations she had with her students back then. Based on the Kirkby recording, I assume she was indeed thinking along those lines. They were looking for a model to explain what they were seeing and feeling with the work.

Mary: Ron Kirkby's 1975 article was written the very same year as Dr. Levin's epiphany on the Washington Mall. Do you know the story?

Dorothy: I don't – please tell me.

Mary: Levin, an orthopedic surgeon at the time, was troubled that what he saw when he opened up a spine to operate was nothing like what he had learned in medical school. He saw that the vertebrae weren't touching each other the way they appeared in the books. On his quest to understand this, he went to the Smithsonian Museum and got curious about how dinosaurs could manage their long tails without always dragging them on the ground.

One afternoon, he sat on a bench outside the museum and gazed across the Washington Mall. To his right was the Washington Monument, a magnificent compression column. To his left was the Needle Tower, a sculpture created in 1968 by Kenneth Snelson⁸, who had been a student of Buckminster Fuller. The needle is a tensegrity mast constructed of aluminum compression struts within a network of tensioned stainless-steel cables. The parts are mutually supportive in such a way that the struts never touch one another. Levin had walked past this sculpture many times, but this time – bingo! That's how the spine could be organized – the vertebrae present but not touching within a tensioned webbing.

Dorothy: So when we are told that we are 'bone-on-bone' in a particular joint, we likely still have some space in the tensional webbing, but it's no longer balanced with the compression.

Mary: Yes. Levin speculates that osteoarthritis develops when soft tissue tension around adjacent bones is inadequate, allowing the articular surfaces to abrade.

Dorothy: Maybe inadequate in places and too much in others, resulting in imbalanced forces through the joint?

Mary: It's a different way to look at everything, right? Going back to soft matter, another of its properties is *auxeticity* – that's one of the words I had to look up. Remember that cornstarch semi-liquid we made in massage school? Ooblek? When you stretch it, it expands in all directions instead of just getting longer and thinner like elastic does. That's the auxetic behavior of soft matter.

In one of Dr. Levin's PowerPoint presentations, there's a photo of the young Schwarzenegger's ballooning arm muscles as Levin says something to the effect of, "The theory we've learned about muscle contraction with filaments overlapping and so on, is not correct." He continues, to paraphrase, "Muscles don't shorten when activated, they expand auxetically." Also, muscles aren't the principal generators of movement we've always assumed them to be. Muscles initiate motion, which is transmitted through the fascia by various routes, that is, by various kinematic chains, depending on the context of the action. In his paper, Ron Kirkby writes about muscles in a similar vein (1975).

Dorothy: Movement is so complex! Even when we're repeating a movement as we do at the gym, we never do anything the same way twice. So, when we make a small proprioceptive shift that changes the way movement feels, we must be tapping into different kinematic chains.

Mary: That's a great way to think about it. And every day we learn more about the proprioceptive capacity of fascia. Current ecological psychology theory is that we gather signals and form responses through the fascia. And these responses are much faster than those of the nervous system. They propose that the nervous system evolved to provide refinement rather than direction. From this viewpoint, we're just a few scales above jellyfish, who can do all the main things of living – they hunt, eat, hide, and procreate – with no nervous system and no brain. The nervous system takes a long time to develop, but fascia is there from the beginning. And that reminds me of another property of soft matter I'd like to talk about, but first I want to tell a little story.

Dorothy: Great. Please share!

Mary: A couple of years ago, a group of physical therapists took an introductory course with Susan, and ever since, they've met every week to refine their approach to physical therapy. Weekly meetings! That's a lot of enthusiasm. Instead of focusing on complaints, they're looking at bodies holistically. They're following rather than leading. They're unwinding and listening. Sound familiar?

Dorothy: Yes, it certainly does.

Mary: They came to this by being together in the biotensegrity headspace. And here is another property of soft matter: it can self-assemble, as the embryo does. And understanding that we are inherently self-organizing makes it clear that respecting the client's process – their pace and rhythm – is the most organic approach to therapy.

Dorothy: This makes sense, yet when I put my hands on someone, I find I need something to guide me. Anatomy helps with that. For example, I might think about nerve pathways – I floss a nerve and think, "Oh look, the muscle tone changes." It feels hard for my brain to see through all the lenses at once and listen to the whole.

Mary: Is it your brain? Or could it be that your education made you forget your own capacity for self-organization?

Dorothy: That sounds like a suggestion to trust my instincts. I will, that's why it's called a practice. One day it will come.

Mary: Of course it will. I'm so impressed that these physical therapists landed on the importance of self-organization while they were self-organizing themselves as a group. This speaks to the multi-scale level of the biotensegrity concept.

In my short association with this community, I've found that respect for self-organization is the ambiance of the whole endeavor. The remarkably respectful and inclusive way people speak with one another helps everyone's understanding evolve. And there seems to be a common agreement that nobody can know everything, no matter how long they've been involved. It just feels really human.

Dorothy: How lovely. And have you been able to blend what you're learning from this group with what you learned from Dr. Rolf and through Godard's work, into something that others can apply in their practices with clients?

Mary: I think it's a matter of using this lens to more deeply understand what I was already doing so I can speak with people about it – and hopefully write about it – in language that is clearer and richer.

Dorothy: That seems to be how it is with new ideas. You have to keep noodling the information until you can speak about it in your own voice.

Mary: Yes, and there's something more. Hanging with the biotensegrity community has illuminated for me what a small aspect of the Earth's ecology we humans really are. Last year I attended a webinar with Dr. Jean Claude Guimberteau through the Fascia Hub. I know you're a member; did you see that one?

Dorothy: Yes, they screened his film *Homofasciaticus* (2026), which explores the inner world of fascia. You only have to watch that film, and it will make you go, "Who am I?"

Mary: Afterward, someone asked Dr. Guimberteau what people would be like if they could fully embody the profundity of the fascial system. If they could really let themselves feel the aliveness within their bodies.

Dorothy: What did he say? I don't remember.

Mary: He said people would be closer to nature.

Dorothy: That's so beautiful.

Mary: And simple. Ecological psychologists tell us that we *are* ecology. We may donate money to save the bees, but to really feel within ourselves that we *are the bees*. . . . That's a different view of life. American Indians and people of indigenous cultures lived that way, but we've been captivated by the seeming efficiency of linear thinking.

Dorothy: You're talking about more than just big picture thinking – it's big picture being. Our capacity to zoom in and understand tiny details has resulted in amazing achievements like microsurgery. But when we maintain that granular focus, we risk losing our interconnectedness with everything beyond our immediate involvement.

Mary: Yes. I don't think we can recognize ourselves as ecology unless we go where Guimberteau is pointing; where the biotensegrity community is headed.

You know, some people consider biotensegrity to be a sidebar to fascia research. But maybe it's the other way around. Maybe fascia is the sidebar.

Dorothy: Hmm. . . . Now I see what you meant earlier, when you said that the biotensegrity inquiry is light-years beyond what you had initially thought.

Thank you so much for sharing all this with us.

Mary: You are so welcome. I hope to meet readers in the biotensegrity rabbit warren...

Endnotes

1. Ida P. Rolf, PhD (1896-1979).
2. French Rolfer Hubert Godard is a professional dancer, Rolting Instructor with the European Rolting Association e.V., and researcher.
3. Buckminster Fuller, American architect (1895-1983), developed numerous structures, including the widely known geodesic dome.
4. Hubert Godard's tonic function model, for an original source that describes this gravity response model, read the article by Rolf Movement Instructor, Kevin Frank

(1995). Also, tonic function has been recently described by Rolfing Instructor Per Haaland in *Tonic Function Model: The Human Gravity Response System* (2022).

5. To obtain this article for yourself, go to the Ida P. Rolf Library for Structural Integration by Pedro Prado found at <https://novo.pedroprado.com.br/>, where you will need to make a free user account. Once you have logged in, search for “Ron Kirkby” as an author search. *The Probable Reality behind Structural Integration: How Gravity Supports the Body* (1975) is his only article on that platform.

6. The audio recording of Ron Kirkby explaining his hypothesis of the spine as a tensegrity structure and Dr. Rolf's critique can be found at https://rolf.org/ida_teaches.php. You will need to scroll down to the section “Research, History, & Dissection” for the subheading “Ida Teaches: The Body is Like a Tensegrity Map-Research Paper.”

7. Dr. Stephen M. Levin is an orthopedic surgeon and has published many papers on biotensegrity. See www.biotensegrity.com for more information.

8. American sculptor Kenneth Snelson (1927-2016) sculptural works exemplified the idea of tensegrity, although Snelson preferred the descriptive term floating compression (Wikipedia Contributors 2026).

Mary Bond received her master's degree in dance in 1969 from the University of California, Los Angeles, and trained with Dr. Ida Rolf as a structural integration practitioner from 1969 to 1972. Formerly the chair of the movement faculty of the Dr. Ida Rolf Institute® (originally the Rolf Institute® for Structural Integration), Bond has been involved in movement education for structural integration

from the early days with Judith Aston, founder of Aston Kinetics®, to the current evolution of the work of French Rolfer and movement expert, Hubert Godard. She is the author of Balancing Your Body (1996), The New Rules of Posture (2007), and Body Mandala: Posture, Perception, and Presence (2018, 2023). Since 2020, Bond has been offering online workshops for structural integration practitioners and other somatic educators. She hosts a popular blog at www.healyourposture.com. You can reach her directly at mary@healyourposture.com.

Dorothy Miller is a Certified Advanced Rolfer™ living in Bend, Oregon. She is a lifelong learner and is passionate about furthering her understanding of the human body. She loves languages, traveling, hiking, skiing, swimming, and biking. You can reach her directly through her website, www.rolfingconnections.com.

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Keywords

biotensegrity; tensegrity; structural integration; fascia; soft matter; closed kinematic chains; kinematics; auxeticity; self-organization; ecological psychology; tonic function; palintonicity; Buckminster Fuller; Stephen Levin; Susan Lowell de Solórzano. ■



John Panter

On Breathing!

John Panter, MA, Certified Advanced Rolfer™

ABSTRACT Rolfer™ John Panter takes the reader on a tour of breathing, looking at the mechanical action, a molecular exchange of oxygen and carbon dioxide, and grounding the discussion in anatomy. He explains how the pleura, diaphragm, and thoracic expansion create a vacuum that draws air into the lungs, emphasizing that inhalation requires coordinated muscular effort. Abdominal breathing patterns are described, ones that rely on anterior pelvic tilt and shortened hip flexors, arguing that they disrupt spinal alignment and impair locomotion. Compared with a flatter lumbar spine and slight posterior pelvic tilt to integrate the thoracic and abdominal cavities into a unified body cylinder, for structural efficiency and power transmission. Refined breath awareness can extend through fascial pathways into the legs and even evolve into subtle pulse perception.

Breathing and respiration should not be confused, as they are not the same thing.

Respiration, properly speaking, is the process of oxygen and carbon dioxide passing through the cellular walls of the villi in the lungs. Breathing is an action.

Carbon dioxide goes one way, leaving the body, and oxygen goes the other way, entering the body. Molecules cross the alveolar membranes between the liquid medium of life, the blood, and the gaseous medium of air (see Figure 1). The human body is organized around this action. We breathe in air, with its 21% oxygen, and breathe out carbon dioxide (Sharma and Hashmi 2022). The lungs are a huge surface area of membranous fibers, all folded upon themselves, that have air-filled passages that resemble the branching of trees, separated from the fast-moving blood supply in the tissue.

These capillary fibers are semipermeable; they contain the cells and fluid of blood, allowing oxygen and carbon dioxide to pass between the air and the fluid in opposite directions. The oxygen is drawn to the iron atom held deep inside each hemoglobin protein and whisked to the body, and the carbon dioxide arriving from the body is jettisoned from hemoglobin.

Around the lungs is dense membranous sac, the pleura. This is a serous membrane that “folds back on itself to form a two-layered membranous pleural sac” (Mahabadi, Goizueta, and Bordoni 2024, online). The outer layer of the pleura, the parietal pleura, attaches to the chest wall. Between the inner layer, the visceral pleura, and the lung is a partial vacuum, a volume of reduced pressure. When we breathe in by expanding the diaphragm inferiorly, opening each rib laterally, and lifting the sternum anteriorly and

superiorly, that pleura-held space enlarges, so that the intensity of that vacuum increases, thus forcing the lungs themselves to expand into that newly formed space (see Figure 2). This sucks in air from the outside. It is effortful for the human animal to inspire. We breathe out by releasing these efforts, letting go of the expanded three-dimensional space; the vacuum is eased, the lungs return to a neutral state, and the air is expelled from the body. We expend some energy to compress the torso and force the carbon dioxide-enriched air out.

There are several actions that can expand the pleura (see Figure 3). Since it is attached to the chest wall, we can mimic the showmanship of a bodybuilder and expand the chest in that bravado way. We can inhale by raising the shoulders. I read long ago that in India, breathing from the shoulders was widely considered the sign of a sick man. This makes a degree of sense, in that the apical lobe of the lungs, which comes right up to behind and above the collar bone, just under the first rib, is very narrow, so adverse substances, just as dust or microorganisms, having been breathed in, can accumulate there

and cause disease, where in the other lobes they are more likely to get breathed out again.

Now, as mammals, we have diaphragms, which in other animal forms was the upper layer of the body wall that descended. Reptiles and amphibians breathe with their whole body. Birds have a completely different system involving hollow bones. For humans, in the back of the throat, behind the larynx and esophagus, there are muscles called rectus capitis anterior, rectus capitis lateralis, longus capitis, and longus colli, responsible for lateral flexion of the head (See figure 4). In the back of the abdominal regions are the 'anterior rectus muscles of the lumbar spine': psoas major and psoas minor. Psoas major is one of the two major flexors of the hip, along with Iliacus, which originates along the inner rim of the pelvic crest. These muscles are considered important in the Rolfing Ten Series® as part of the process of breathing.

I remember in my Phase I of Rolfing® training at the then Rolf Institute® (now known as the Dr. Ida Rolf Institute®), when we had learned how to access those anterior rectus muscles, in the cervical

and lumbar regions, I wondered how we could access the anterior recti of the thorax, with all those ribs in the way. We didn't because they don't exist. When we became mammals, those muscles descended along with the diaphragm to become the crura of the diaphragm. 'Crura' means 'legs'. They attach to the lumbar vertebrae, L1 to L3, and their intervertebral disks (see Figure 5).

So, when most people are doing what they call 'abdominal' breathing, what they are doing is tilting the pelvis forward to exert a tension on these crura, thus pulling the diaphragm down to increase the volume of that space inside the pleura. This creates a vacuum and expands the actual volume inside the lungs proper, and draws air in. It also positions the diaphragm more diagonally when viewed from the side, in an almost upright position. That tilt is done with the iliacus and psoas muscles, the hip flexors, which cross the hip joint in a common tendon, the iliopsoas.

In doing so, the lordotic forward flexion of the lumbar spine is increased, leading to a divergence of alignment between the thoracic and lumbar spines and a disruption of structure between the legs

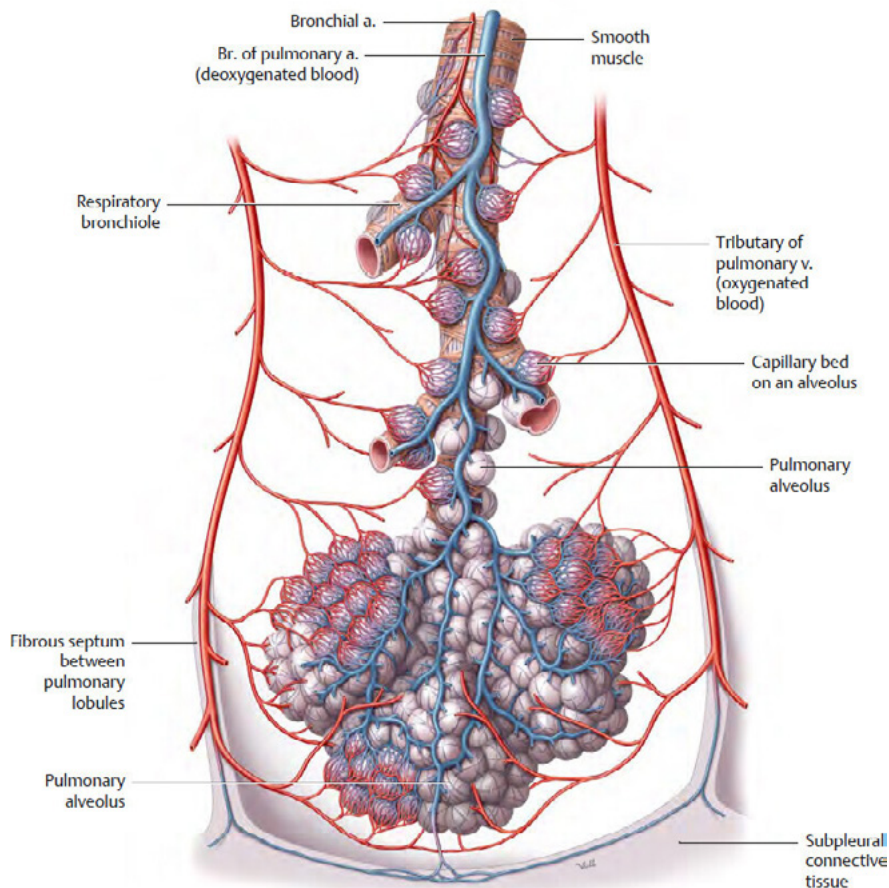
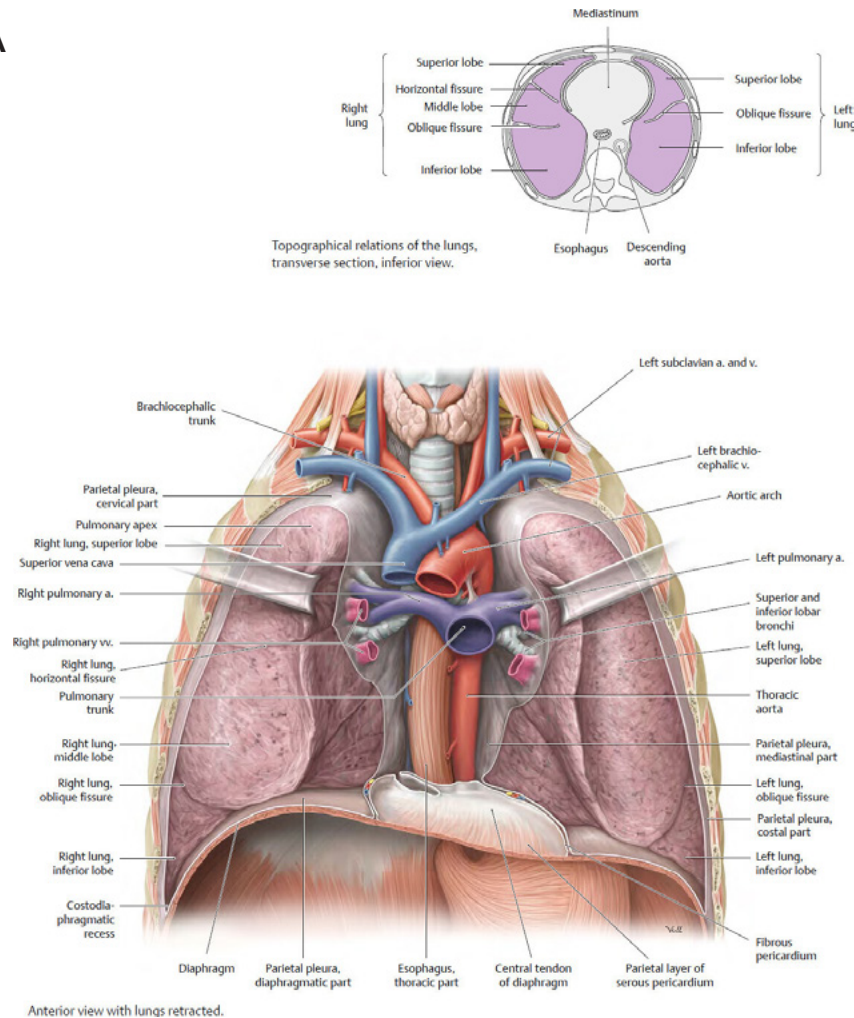


Figure 1: Deep in the lungs is found the pulmonary vasculature, where the gaseous exchange takes place. Pulmonary arteries bring deoxygenated blood to the alveolar capillaries. Once oxygenated, the blood travels to the heart via the pulmonary veins. Copyright Thieme® 2026, published with permission

A



B

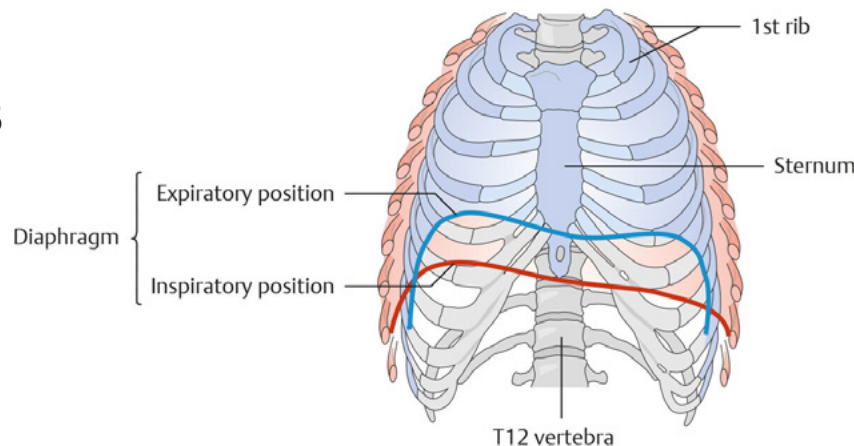


Figure 2: (A) The left and right lungs occupy the full volume of the pleural cavity. This is an anterior view of the pleural sac, with the anterior thoracic wall, the costal portion of the parietal pleura, some of the lungs, and the heart removed to show the lungs in situ. The pleural sac is bounded by two serous layers: the visceral pleura, tightly attached to the surface of the lung, and the parietal pleura attached to the endothoracic fascia of the thoracic wall. The two pleural layers are continuous with each other. (B) Respiratory changes in thoracic volume when breathing, showing the changes in diaphragm position. Images copyright Thieme® 2026, published with permission.

We can inhale by raising the shoulders. I read long ago that in India, breathing from the shoulders was widely considered the sign of a sick man.

and torso. Remember that when stepping or running forward, the power comes from the thrust of the back leg, driving the body forward. If the hip flexors are shortened or otherwise compromised, so is the thrust from the back leg of each stride. Consequently, compromised breathing structurally impairs the body's forward momentum.

Think of a car driving down the highway. To move the car forward according to basic Newtonian physics means the road is being pushed backward. That, in turn, means for walking that you have to transmit force from your feet, up through your spine, to your arms. If your back alignment is in a straight, vertical line, then when you lean forward to start walking, the transmission of forces is more direct through the bones. If your upper body is behind your line, because of a curvy spine, hanging your arms behind you, this is a disadvantage because you have to contract your abdominal muscles because of the backward bend to overcome that weight behind the center line.

This leads to considering an alternative way to draw the diaphragm down: flattening the lumbar vertebrae, which may involve a slight posterior tilt of the pelvis. This action is powered by the gluteus maximus, the most powerful skeletal muscle in the body, along with the hamstrings and the abdominals. This does not necessarily involve an actual backward tilt á la Wing Chun Kung Fu, just a bringing of the back of the pelvis to vertical. The result is a more horizontal

position of the diaphragm, with the abdominal muscles engaged. When this is done, instead of feeling the fullness of the air in the front of the abdomen, like a pregnancy, that pressure can descend to the area between the anus and genitals, the perineum, at the very bottom of the abdomen.

Another way to visualize this, as far as the torso is concerned, is to consider the body as one cylinder. The abdominal cavity with the digestive, elimination, and reproductive organs, the thoracic cavity with the heart and lungs, and the skull-spine cavity holding the central nervous system are like a tube in which air enters at the nose and travels downward. The sensation of breathing in can be tracked from the flaring of the nostrils, to the lift in our ribs, to the downward movement of the diaphragm, and to the pressure in the abdominal space that reaches the perineum.

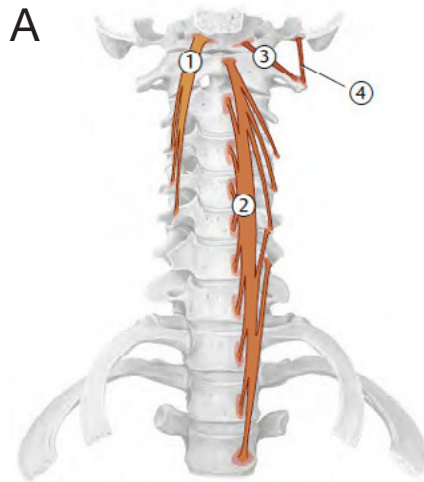
As I often explain to my Rolfing clients, imagine a tennis player taking his tennis balls to the court. He does this in a cardboard tube. If he wanted to move balls from one tube to another, he would merely bring the tube mouth-to-mouth and tilt. But if the tubes were not in line with each other, the balls could not move from one tube to the other! Now, our internal organs have to move around to perform their functions of keeping us healthy. They are restricted by the bony cages that contain them. With an aligned thoracic and abdominal cavity that meet and extend into the head, the body cylinder balances these organ cavities and optimizes healthy potential (see Figure 6).

One benefit of flattening the lumbar spine with a slight posterior pelvic tilt, from a martial arts point of view, is that the structural unity of the body is maintained instead of being broken between the abdominal and thoracic regions. These can move as one, instead of the thorax always having to catch up with the lower body. It also means that an incoming force is resisted down to the floor, and an outgoing force uses the mass of the planet as a foundation. It also leaves the hip flexors free to lift the legs for stepping or kicking throughout their entire range of motion, instead of having their stride compromised by the previously described tension.

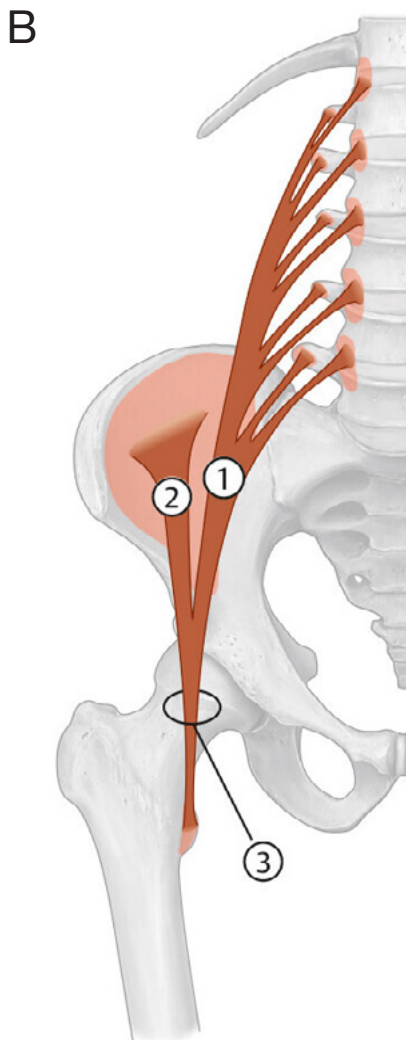
Going further with the flat-lumbar type of breath, it can be directed to breathe lower



Figure 3: (A) People showing their strength with expanded chests (Image by Kapook2981 on istockphoto.com). (B) A young woman working on her laptop on a café terrace, with her shoulders elevated, is an example of how people narrow their upper lung capacity (Image by dvulikaia on istockphoto.com).



Prevertebral muscles, anterior view.



Iliopsoas muscle, anterior view.

Figure 4: (A) Anterior view of the occiput, cervical spine, and upper ribs in part with the prevertebral muscles: 1. longus capitis, 2. longus coli, 3. rectus capitis anterior, and 4. rectus capitis lateralis. When these muscles contract unilaterally, the head flexes laterally on that side; when both sides contract, there is forward flexion of the head and cervical spine. (B) Iliopsoas muscle, anterior view of right side. 1. Psoas major, 2. Iliacus, 3. Iliopsoas tendon. Copyright Thieme® 2026, published with permission.

down in the body, past the pelvic floor, into the legs. I first got onto that years ago, when I would come home and get into bed. The lady I was living with at the time would already be in bed and asleep – we had different work schedules. So as not to wake her up, I would lie there and breathe just to slow my energies down enough to get to sleep. Well, I found myself sensing my breath down through the thighs, then lower to the lower legs and feet. There were obstructions at the acute angles of the hip and knee joints, and tension in the muscles throughout the legs. Of course, the lungs don't actually continue as actual cavities. Still, the fascial envelopes that surround and separate the bodily organs continue down between the structures in the legs, so the sensation of expansion during inhalation and retraction from exhalation can be felt as movement that can be tracked down the body all the way to the legs. To find this, I had to keep the hips open (lumbar spine flat) and a slight tension in the thigh muscles to keep the knees slightly straight, which helps get the breathing effect down through the shins to the feet.

More recently, I've been making an even more subtle observation: beyond the breath, I am finding that I can track the pulse of the blood down through the same pathways, thus keeping my feet warm on wintry nights! Sometimes, when I think about the details of vascular anatomy after observing my breath, I get a powerful pulse in my hands.

Now, when doing 'standing jong' meditation posture, I sometimes feel the breath and pulse rebounding off the floor and up from my feet. This is the energy that rises from the 'bubbling spring' points referred to in the teachings of

the esoteric Chinese Martial Arts. Many notable systems teach breathwork, one way or another. I submit that this pulse work builds on breath work; it is more subtle and has the potential for even deeper energetic inquiries.

[For those interested in the more esoteric aspects, I would recommend Waysun Liao's *T'ai Chi Classics*, Shambhala, 2023. He spends two chapters on breathing, and on converting breath into the esoteric energies, ch'i, and ching.]

John Panter, MA, is a Certified Advanced Rolfer™ with a Master's degree in History, a Bachelor of Arts, Honors, in History, and a Bachelor of Science in Psychology. He has been in private practice as Eastern Canada's only Rolfer since 1998.

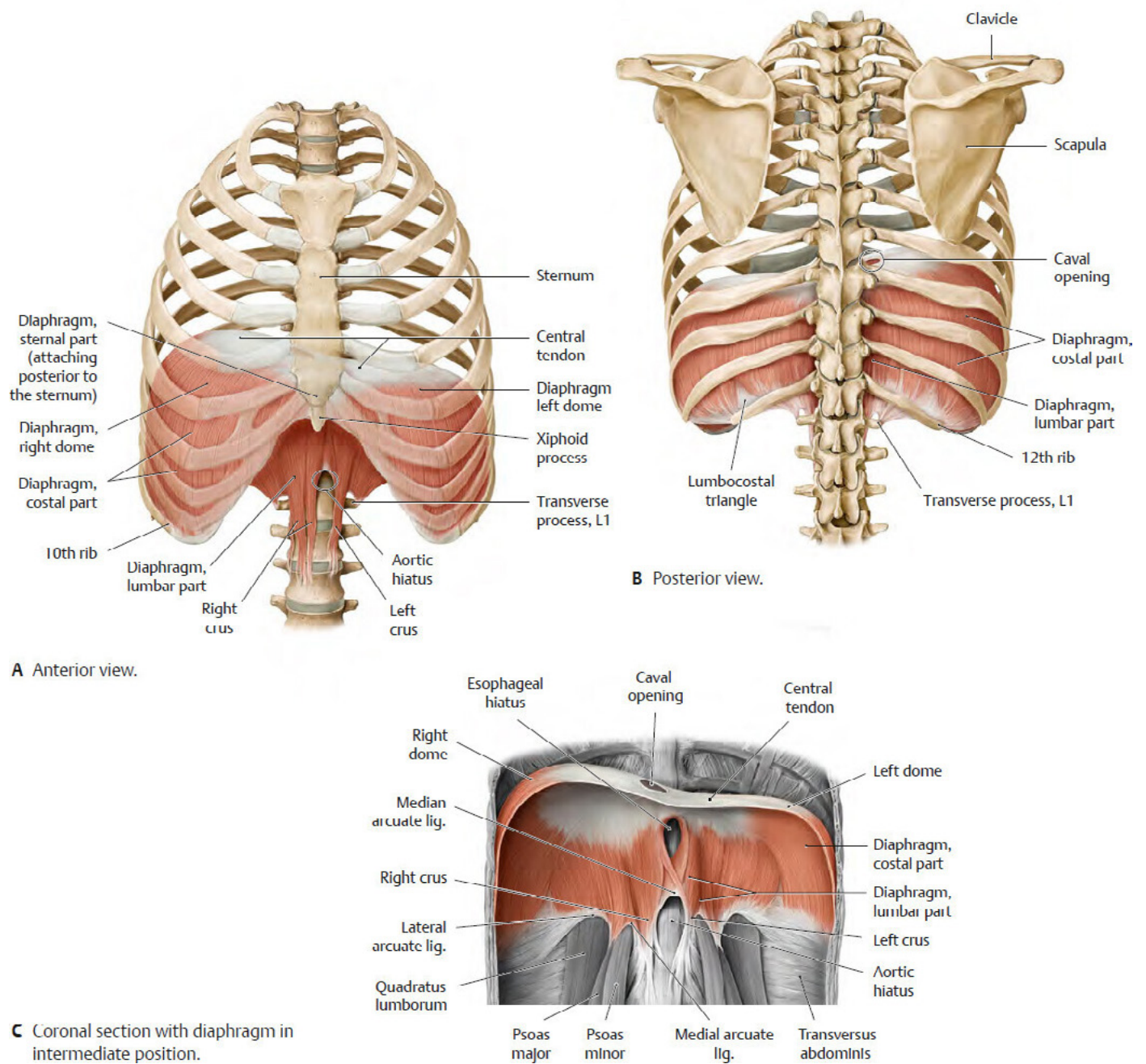
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Keywords

breathing; respiration; alveoli; gas exchange; pleura; diaphragm; crura; iliopsoas; pelvic tilt; structural integration; Roling Ten Series; fascial continuity. ■

Figure 5: The diaphragm that separates the thorax from the abdomen has two asymmetric domes and three apertures, one for the aorta, another for the vena cava, and a third for the esophagus. (A) Anterior view, (B) posterior view, and (C) coronal section. Copyright Thieme® 2026, published with permission.



Living Tensegrity

A Conversation with Miquel de Jong

By Lina Amy Hack, Certified Advanced Rolfer™,
and Miquel de Jong, Certified Advanced Rolfer™,
Rolf Movement® Practitioner



Miquel de Jong



Lina Amy Hack

ABSTRACT In this conversation with Certified Advanced Rolfer™ Miquel de Jong, we explore an embodied movement practice called ‘living tensegrity’ that can deepen the quality of touch for participants. De Jong describes a partner exercise in which two people use lightweight bamboo sticks held between their fingertips to practice sensitive, nonverbal communication. Originally developed while teaching contact improvisation in China, the exercise has since been brought into Rolfing trainings, peer groups, and wellness settings.

Authors’ note: This conversation was recorded on February 20, 2026, and has been condensed and edited by both authors for clarity. Miquel de Jong headshot by Martijn Kappers. The individuals pictured are Dutch Rolfers at an annual meeting who have graciously consented to allowing us to publish their photos.

Introduction

What does it feel like to truly listen with your hands? For Miquel de Jong, Rolfer™, dancer, and Rolfing® instructor-in-training based in Rotterdam, Netherlands, this question sits at the heart of his practice. Over the years of working with dancers, Rolfers, and clients, Miquel has developed a movement exploration he calls “living tensegrity,” a partner exercise using bamboo sticks to cultivate sensitivity, nonverbal communication, and embodied presence.

The exercise was born from necessity—out of a contact improvisation class in China, where the usual tools of verbal instruction were falling flat. What emerged became something Miquel now brings to Rolfers as a lens for understanding touch itself: how we communicate through contact, how we receive information from a client’s tissue, and how our own embodiment shapes the quality of a Rolfing Structural Integration session.

This interview traces Miquel’s path from classical ballet dancer to Rolfer, explores

the mechanics and philosophy of living tensegrity, and considers its potential as a professional development tool for the structural integration community.

From the Ballet Barre to the Treatment Table

Lina Amy Hack: When I heard about your living tensegrity movement exploration, I wanted to interview you about it for our Stressors, Forces, and Resiliency theme this June 2026 issue. For readers who don’t know you, could you tell us about your background?

Miquel de Jong: I have been a Certified Rolfer® since 2008, but I started to study Rolfing [Structural Integration] in 2003, and it took quite a long time because I was a professional dancer at the time. I was doing dance projects, and when I didn’t have a project, I would do part of the training, and then another dance project would come along resulting in me delaying more training for a year. So, it took a while to become a Rolfer.

Lina: What kind of dance was your specialty?

Miquel: I trained as a classical dancer – a real ballerino in that sense. But I never really performed that style. I always danced contemporary work, and later in my career, my work became much more theatrical. I was a human being telling stories with movement and dance. That was my first professional career. I started with a company in Holland, then one in France, then a second one in France, and then I met Russell Maliphant, a choreographer in London, UK. He was a Rolfer at the time, but I didn't know that when I went to work with his dance company.

Lina: Oh, Russell Maliphant – he worked with us for the November 2021 issue. The cover of that issue was one of my favorites, performer Dickson Mbi in Russell's *The Rodin Project* (Sadler's Wells/Russell Maliphant Production 2012). And we interviewed him as well, he has a memorable way of speaking about movement (Koepke and Maliphant 2021). Did that connection with Russell lead you to becoming a Rolfer?

Miquel: I worked with Russell in Lyon, France, as part of this movement piece he presented there. I was blown away by the way he worked with us dancers. Instead of a classical warm-up in the morning, we were doing contact improvisation, tai chi-type movement, yoga, capoeira, and before we knew it, we were doing his work. His choreography was such a relief to enter in his style of work. He led us to where the body was totally prepared, our minds were prepared.

While in that experience, I said to Russell, "I would like to work with you for future projects." And that became a kind of detour, I worked with him in London, UK. With Russell, as dancers, we would do hands-on work to help each other sometimes to start the day, and after rehearsal. We would have physical things left over from our intensive training the day before, and we were empowered to help each other. During one of our training sessions, he had invited me to help him with his shoulder, and as I touched his shoulder, he immediately looked up to me and said, "You have to become a Rolfer."

Lina: Oh, wow. That's so cool, such good guidance about what to do with talent and skill.

Miquel: I had no clue what Rolfing Structural Integration was. I didn't know



Miquel de Jong: To start, I have people break into groups of two. Each group gets two bamboo sticks, one in each hand. I invite the partners to face each other with each stick bridging between them – held in place by fingertip pressure on each end. No gripping. Just enough engagement to keep it up. Each person has to listen to how their partner communicates through touch, through the stick, and how to communicate back.



Miquel: The sticks function as a kind of force transmission system, a literal tensegrity between two bodies. The goal is to listen, respond, and stay in dialogue.

he was a Rolfer. So, he gave me books, Ida Rolf's book [PhD, (1896-1979)], and some others. I dove into them. In Europe at that time, the entry level course to Rolfing training was a three-week orientation in the German Alps, close to Munich. You would stay in a farm and there was a barn where we would do hands-on work and have anatomy and movement training.

Up until that point, as a dancer, I was already therapeutically touching dancers. They always came to me and said, "Ah, my knee. Can you help my ankle and my shoulder?" I had time doing that, but no education in how to do that. I was just following my hands; I followed what I was feeling. I knew I wanted to do something like this, helping my buddies was rewarding, and I could tell I had a good sense in my hands. But I didn't want to become a physiotherapist, nor did I want years reading of in the library. I can do what I need to, to understand, but in general, textbooks are not my thing. When I arrived at this introductory Rolfing course at the farm, I knew, "This is what I want to do."

Lina: I remember that interview with Russell (Koepke and Maliphant 2021), even just reading his words on the page was inspiring. He is so creative with movement and bodies, and honors the body in his works in such a special way, it's elevating to see.

Miquel: I connected so well with him because he has the same dance background as me. He was also a classical dancer doing Royal Ballet stuff, and then he moved towards doing capoeira movement after spending time in Brazil.

Lina: He's so informed when he talks about the injuries he's dealt with over the years.

Miquel: Exactly. He completed the Rolfing education and combined it with a way of working that engaged with the flow of movement, improvisation, instant composition, and contact improvisation. When I was with Russell Maliphant's dance company, Russell was teaching in various places around the UK, and at times, he would have me go and teach a class. He just dropped me into it. That's where I actually started to develop my own way of working with groups of people, it was movement inspired by Russell, and inspired by Rolfing education. Everything kind of came together like that.

I was often doing partner work in dance, so to hold somebody with your hands and

Miquel: As Rolfers we give physical input to the tissues, talking to the tissue, and also we are receiving the information about what the tissue then does in response. It's listening and talking through touch, receiving information, and still being able to actively move.

put them on balance, you have to have a sense of where their center of gravity is.

Lina: That's what I thought about when you said you were classically trained, that would mean you were lifting dancers.

Miquel: Yes, lifting them and supporting them to turn on one foot. To figure out where their balance point is and keep them there can be simple at times. But when doing promenade en pointe, that is very difficult because you have to walk around the person while they spin.

At that time, I was just dancing, and it was the most normal thing. But now, with all the years I've lived since then, I've realized that skill is still with me, it's in my hands. I know how a body should feel, how it moves, where it doesn't move, and where the center is. That's a great resource.

Living Tensegrity: The Exercise

Lina: Absolutely! Let's talk about your group movement exploration. Why do you call it 'living tensegrity'? How would you describe it in your own words?

Miquel: Living tensegrity is a good name because it captures something moving, dynamic, alive. A tensegrity structure on its own just stands there – it doesn't go anywhere. We have to animate it – living tensegrity. And you said 'group movement exploration', and that is also key. If you think about a group moving together, then you can make this bigger shape. What I really love about it is what it asks of the people doing it.

To start, I have people break into groups of two. Each group gets two bamboo sticks, one in each hand. I invite the partners to face each other with each stick bridging between them – held in place by fingertip pressure on each end. No gripping. Just

enough engagement to keep it up. Each person has to listen to how their partner communicates through touch, through the stick, and how to communicate back.

Lina: So, probably using their index fingers? Pointer fingers holding up these lightweight sticks?

Miquel: Yes, two sticks, one for each hand. Each stick is about 120 centimeters long, which gives you room to move and still maintain connection. And then I invite the participants to begin to explore: How much is my partner pushing me? How much do I push back? Is there something being communicated to me through the sticks? Do I resist it, or follow it? If I want to move in space, I can't just walk away – if I do, the stick falls. I have to bring my partner with me, to communicate my intention to move through the contact itself.

Participants are trying to keep the stick up off the ground but also communicate with the other person. It's not about holding the sticks in place, it is an inquiry – how do I, with my touch, with my intention, communicate to the other person what I'm doing? Where do I want to go?

The sticks function as a kind of force transmission system, a literal tensegrity between two bodies. The goal is to listen, respond, and stay in dialogue. It's a bit like tai chi push hands. Russell would have us dancers do push hands with each other, which is similar. But now, with the bamboo stick in between the two partners, that changes everything. It makes the communication visible. It slows things down. You cannot be forceful and expect cooperation. The stick tells you immediately.

Miquel: If the stick falls, you know something about that approach doesn't work – and now you adjust. I try to make it okay to drop the stick, because that's how to learn. The same is true in a Rolfing session: you can't be afraid to try something new and find out that it wasn't quite right. You recover and listen again.



Miquel: At the same time, it's very playful. It's done without speaking; I ask the participants to not use their words. Then, they have to go into their senses.

How it Began: Teaching Contact Improvisation

Lina: How did this exercise come about?

Miquel: I didn't develop it so much as it developed through me. I was teaching contact improvisation in China, and the bodies I was working with were very rough – not really sensitive to softness. The contact work was getting painful. I kept asking myself, "How do I help them slow down and get sensitive without using words?" Words flow into the brain, I wanted them to sense, not think.

Putting the bamboo sticks between them came to mind as an answer to that. Put something between people, and suddenly you can't just power through. You have to lighten up. You have to get sensitive. The bamboo became a kind of translator.

Lina: It's an inspired intervention – the prop literally creates space between people,

while still maintaining contact, especially across a cultural context where people may not be accustomed to improvised touch.

Miquel: Yes. Then I started doing this with the Dutch Rolfers as a movement exploration, a kind of embodiment in the morning, when we had our meetings. With time, I realized this is actually great for developing our touch. It brought forward questions like, "How do I touch a client?" It's feedback to myself. If I am forceful, I only receive resistance. It got me thinking about how we touch as Rolfers. How do we touch while also receiving input from the client, from the tissue? As Rolfers we give physical input to the tissues, talking to the tissue, and also we are receiving the information about what the tissue then does in response. It's listening and talking through touch, receiving information, and still being able to actively move.

Touch as Dialogue: Application for Rolfers™

Lina: It sounds like a very engaging nonverbal conversation – an awakening of bodily intelligence between partners.

Miquel: Exactly. And that's where it differs from a conventional touch workshop. If you say to someone, "Touch the superficial fascial layer." That request becomes cerebral; all the participants will be in their heads, wondering if they're doing it correctly. Put a bamboo stick between people and they stop wondering. They start investigating. The feedback is immediate and embodied.

Then, after five or ten minutes, I switch partners. They will have gotten comfortable with how to make it work with their partner and how to deal with the challenge, how to move with them. Next, they might have somebody who is rigid in the shoulders. They will notice,

Miquel: And you see people orient differently. A lot of people look at the sticks, as if they can control it with their eyes. Other people have their eyes closed and are going by feel. As facilitator, I get to see what resources they each have, and where they like to come from for their movement.

“This person doesn’t move as the other one did.” For the Rolfier, the learning is immediate; it is the perspective of each of your clients. Every client is different. We have to adjust our touch for every client, for every different place we work with in their body; different needs, different approaches.

Lina: And it seems like it would require the participant to maintain contact with their own proprioception – their own organization in gravity – while simultaneously tracking the connection with their partner.

Miquel: Yes, and they will notice immediately when they tense up. People get excited or worried about the stick falling. When the flow stops, the stick falls. It’s the same in a Rolfing session. If you’re not grounded in your own body, the session doesn’t flow. The exercise is a mirror of that dynamic.

Confronting and Playful: What Participants Experience

Lina: Did some of your participants find this confronting? If a person carries stiffness or relational tensions, does that get awoken by the exercise?

Miquel: Very much so. People get confronted with their personality, with what they want. I want to keep the sticks up, but it doesn’t work, so we have to ask – how do I have to change myself in order to get this happening? You can’t change the other

person, and you can’t control them either. So, in that sense, it’s very confronting. In a student setting, if someone cannot find ease with four different partners in a row and the sticks keep falling, that is quite confronting to sit with.

At the same time, it’s very playful. It’s done without speaking; I ask the participants to not use their words. Then, they have to go into their senses. This can make it playful. After a while, people get a feel for how it can work, and they learn, they can adjust to many people. People are rewarded for opening up, when they ask themselves, “How do I have to change to make this work?” Instead of teaching from the head how to touch, we want practitioners to sense it, and this tensegrity exercise is a direct way into it.

Lina: When I imagine myself doing this, I’m worrying about the other person and what happens when the stick falls?

Miquel: I used to say at the start, “Don’t let the stick fall, just make it float.” But after a while, of course, I would hear a stick fall. I would say, “Ah, great.” Because they are exploring. They are trying something new. If the stick falls, you know something about that approach doesn’t work – and now you adjust. I try to make it okay to drop the stick, because that’s how to learn. The same is true in a Rolfing session: you can’t be afraid to try something new and find out that it wasn’t quite right. You recover and listen again.

Russell would also talk about this; the body has an ability to organize and respond before the thinking mind catches up. The mind can be in the way of what we think we can do, but the body is so much more intelligent. When improvising in dance, the movement happens before you think of it.

Say you are running and you see a big stone on the path ahead of you. Do you think about every coordinated movement to get past the stone? No. The movement happens before you think about it, your body has dealt with it. Pre-reflective movement is the movement that happens before you think about it. Imagine if we had to wait, to think, before the body could move. You would have to think, “Oh no, the rock, I must now do this, then that,” and before you know it, you’ve rolled through your ankle. The body knows how to move. The brain interferes. The bamboo stick exercise puts you back in your body’s intelligence, because you are sensing, not planning.

Teaching this living tensegrity movement exercise, I have seen people do things they thought they could never do, like getting into physical positions and ranges of movement that they assumed were beyond them. They weren’t thinking, they were listening with their whole systems, and their bodies were free to move.

A Men’s Retreat in Ibiza: Living Tensegrity Beyond the Clinic

Lina: You showed me some pictures of a class of yours working with the sticks. Where was this?

Miquel: Yes, that was in Ibiza, a Spanish island in the Mediterranean Sea. I go every year for a week-long men’s retreat. Last year, I was asked to do some embodiment exercises in the morning. And told them, I would like to introduce them to the living tensegrity exercise.

They were nervous at first, wondering how a dancer was going to lead them with movement. But it went beautifully. Everyone enjoyed it, and particularly one man who was maybe twenty-two old. Afterwards, we had a sharing circle, and he described it as a very playful way to understand who you’re dealing with, to truly get to know the other person. He said it gave him a lot of insights about himself as well and how he relates to

people. We had done one hour working with the bamboo sticks, and he walked away with genuine self-knowledge.

Lina: What a wonderful invitation – to make contact without the pressure of touching.

Miquel: Yes, the sticks create space between people while still creating a real connection. And I could have then taken the sticks away and guided the people to make contact with their hands directly, inviting them to move with each other through the room, when they are ready for more information, more intimacy of contact. The stick is the preparation.

I keep it open in the beginning to see what is happening, and I'm checking the room. If I see that a person has gotten stuck in a place, then I invite them to communicate to their partner. I ask them to think about going somewhere in the room, and I always ask them, "How would you do that through the stick?" Not with words and not walking away, how would you bring your partner with you into the new space?

Many times, what happens automatically, somebody starts pushing and the other one starts going backward. Sometimes a duo will get all the way against the wall. And then, they're faced with not being able to go anywhere. So, then I invite them to consider, "You can resist somewhere to communicate." They start talking, with movement, saying – I want to go this way. So many times, it starts happening automatically, the group will have movement in the space.

A Tool for Body Reading and Assessment

Lina: When you're leading this exercise with Rolfers, are there specific invitations you make around how they use the sticks?

Miquel: Yes. While we are doing the work of Rolfing [Structural Integration], we are working with our touch sensing in our hands. But as we input our forces, we are also being moved by whatever part of our client's system we are listening to. As Rolfers, we experience whole body fascia in ourselves, and that of our client. Eventually, the movement between the pairs becomes fluid. And think about how it is similar to what we are doing in our Rolfing sessions.

We do this exercise for an hour. Before we start, I have them walk around and feel how they are doing today? Which body parts are talking to them? And then I invite them to feel through their bodies, and remember those parts. And after the hour of the stick exercise, I have them walk again, and inquire within themselves of how they feel? And they say, "I feel open. I feel free. I'm more grounded." In that hour, we were working on the quality of touch and how they relate with people. As a Rolfer, I have to know how I am with my client, and respond differently as each client is different. It works.

Lina: I'm imagining these living tensegrity duos, moving together to cross the room, and it's not two people, it's one system. And that is what happens in a Rolfing session: practitioners are in the system of forces being conveyed

to the client's body. And, their body is conveying forces back to us. That's what I hear you saying. This exploration amplifies awareness of being part of this system of giving gestures and noticing what happens afterward.

Miquel: Exactly. It's like you are getting information which leads to the next input, which leads to the next information available to you, which leads to the next input. And then, you enter into flow in your session, instead of just doing one thing, the next thing, and the next thing, now you are in tune with this client. You know what the needs are and what part needs to come next. It is told to you by their body; they give that information to you. You don't have to think, it's great. It's a communication channel that I get excited about.

Two Bodies, Three, Or More

Miquel: After a while, after they had changed partners a few times, I asked them to do trios. And that suddenly gave them information from two people at once. In that case, I direct people to think of the person to their left as giving information, and the person to their right as listening for information. And then after that, we do it with four people, and eventually, I put them all together as one whole group. We make one big group and then we do a little game. As a whole group, we move. And if the complexity of the movement leads to a stick falling, and you think it's your fault, then you step out. The group becomes smaller and smaller until there are two left. The quality of movement and the gestures can be quite beautiful and surprising.

With that complexity, the brain is going to new places, and the body is opening like crazy. Then, we go back to just working with one person again, and then they fly through the room. It's crazy to see, wow. Once they are back to how easy it is to deal with only one person, the flow is immediate.

Lina: That must look so beautiful, from the big group to the flowing dyads connected.

Miquel: Yes, it's very nice. And you see people orient differently. A lot of people look at the sticks, as if they can control it with their eyes. Other people have their eyes closed and are going by feel. As facilitator, I get to see what resources they each have, and where they like to

Miquel: It also reflects something I believe about life and about the body: the most resilient systems are the most fluid ones. Not weak, not passive – but able to receive movement, integrate that information, and respond with movement.

come from for their movement. As a Rolfing instructor, to see the students do this exercise is very helpful because I can help them broaden these resources, expand where they orient.

The living tensegrity exercise is a nice embodiment game; Rolfers can try it out for this kind of fun and to feel good. I have introduced this at Rolfing trainings as embodiment in the morning. It is a small help in getting ready for the instruction.

I have never done this exercise with a client. With a Rolfing client, I don't need the sticks because I am already doing it with my hands. The sticks are like training wheels for what your hands eventually become. Once you have developed the sensitivity, the bamboo is unnecessary.

Closing Reflections

Miquel: I offer living tensegrity for our Rolfing peer groups. When we meet to practice, here is a good embodiment game to play as well. You will come away from it feeling good and having worked on something real. Many practitioners have these community groups where they share and practice; this could be one more thing to bring into that space.

Lina: As a Rolfer, a professional dancer, and Rolfing instructor-in-training, I can see that you really care about us developing our sensitivity, regardless of where we are in our careers. This would be helpful for beginners, but me too, with decades of experience, we can benefit from experiencing this kind of opening.

Miquel: Yes, and it also reflects something I believe about life and about the body:

the most resilient systems are the most fluid ones. Not weak, not passive – but able to receive movement, integrate that information, and respond with movement. A rigid system breaks. A fluid one finds a way. That's what I invite people to experience by playing with bamboo sticks, and think about how similar that is to what we're offering our clients every time when we work.

Lina: That's a beautiful note to end on. Thank you so much, Miquel.

Miquel: And thank you, it's been a pleasure.

Miquel de Jong is a Certified Advanced Rolfer™, mentor, Rolf Movement® Practitioner, and teacher in training with the European Rolfing Association e.V., and practices in Rotterdam, Netherlands. He trained from the age of ten with the Royal Conservatoire of Dance in The Hague, eventually graduating in 1989 with a Bachelor's degree in dance. De Jong's dance career began at Scapino Ballet Rotterdam, where he danced for six years. In 1995, he moved to France, working as a soloist at France's most renowned and internationally recognized modern dance company, L'Opéra de Lyon, where he worked with top choreographers. It was there he met choreographer and Rolfer (at the time, now retired Rolfer), Russell Maliphant, who inspired him to discover a diversity of movement styles and techniques, such as contact improvisation, capoeira, acrobatics, as well as body-mind techniques like yoga, tai chi, meditation, and Rolfing Structural Integration. Now that de Jong has been a Rolfer for eighteen years, he's found a beautiful connection between dance

and Rolfing Structural Integration, where one inspires the other, and vice versa. Currently, in addition to delivering Rolfing sessions, he is a movement coach for choreographers and theatre directors. He teaches extensively at various academies in the Netherlands and teaches movement workshops nationally and abroad.

Lina Amy Hack, BS, BA, SEP, became a Rolfer™ in 2004 and is now a Certified Advanced Rolfer (2016) practicing in Canada. She has an honors biochemistry degree from Simon Fraser University (2000) and a high-honors psychology degree from the University of Saskatchewan (2013), as well as a Somatic Experiencing® Practitioner (2015) certification. Hack is the Editor-in-Chief of Structure, Function, Integration.

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Will Johnson

Psychedelics and The Line

By Will Johnson, Certified Rolfer®

ABSTRACT Will Johnson is on a decades-long exploration of Dr. Ida Rolf's lesser-known legacy: her vision of structural integration not merely as a manual therapy profession, but a path toward evolutionary awakening. Drawing on personal experience beginning in the 1970s, Johnson argues that Rolf's teachings contain two distinct elements – hands-on bodywork and a mystery school of somatic transformation centered on 'The Line'. Johnson reflects on how psychedelic substances used in conjunction with exploring 'Lined' states can catalyze profound shifts in consciousness. Situating these experiences within broader contemplative and cultural contexts, including Subud, Buddhist breathwork, and rave culture, Johnson calls on the structural integration community to reclaim these transformational teachings for themselves.

Editor's note: This article is presented as a personal and historical reflection rather than a clinical or professional recommendation. The views expressed are those of the author and arise from his lived experience within a specific lineage of somatic and contemplative practice. Psychedelics occupy a complex and evolving place in contemporary therapeutic, ethical, and legal discourse. We do not endorse the use of illegal substances, nor do we advocate practices that fall outside established professional scopes or regulatory frameworks. At the same time, we believe there is value in thoughtfully examining how practitioners understand altered states, embodiment, and transformation – particularly when these conversations are already occurring, often implicitly, within the field. By publishing this piece, we aim to foster informed reflection and dialogue, not consensus. Readers are encouraged to engage with the material critically, with attention to personal responsibility, professional boundaries, and the diverse contexts in which somatic work is practiced.

During the 1970s, as the work of Rolfin[®] Structural Integration began to take off, what drew the majority of students to the work of Ida Rolf, PhD (1896-1979) was her audacious and completely original suggestion that well-being and evolutionary awakening were a function of the body's relationship to the gravitational field of the Earth. While she had been developing structural integration for decades, she was a strong fit with

the contemporaneous birth of the human potential movement. Many of us who were there viewed Rolf's work as pivotal to the awakening of our greatest human potential. Concurrently with this moment in time was the advent and availability of psychedelic substances. This article is about how psychedelics were central to many of us in exploring the work as a path not just of physical healing, but of evolutionary awakening in ourselves.



Dr. Ida P. Rolf (1896-1979). Photo by David Kirk-Campbell.

Rolf's vocational teachings give us a continual supply of tools and strategies to help heal our clients' aches and pains. Accessing The Line reveals a path of practices that can initiate an altogether natural evolutionary transformation that allows people to experience deeper states of consciousness.

Two Tributaries: Hands-On Work and the Mystery School

Out of the wellspring and headwaters that were the genius of Rolf, two great tributaries have sprung. The first is the celebrated and renowned hands-on work taught by Rolf. Regardless of which structural integration school we have attended, doing Rolf's work means delivering the genius of fascia- and gravity-informed manual therapy. She taught in the 1970s an approach to touching bodies and a ten-session 'Recipe' of navigation that guides us as we bring more integrity to the random nature of the bodies that show up in our office. Today, numerous structural integration schools have sprung from Rolf's original insights. While each school may have different approaches to structural integration work, they are also fundamentally similar. All structural integration schools are vocational training schools, not unlike any school that teaches a trade that you can take out into the world and earn a living with, and they all provide a foundational understanding of how to touch intelligently and help our clients experience ease in their bodies.

The second great tributary is the *mystery school* aspect of Rolf's teachings, which, in my opinion, has been neglected, expunged from the paradigm, or given

lip service by the large majority of structural integration vocational schools. Rolf wanted to be recognized as a teacher of evolutionary transformation, not just a teacher of biomechanics, and she left us with instructions on breathing and exploring upright balancing that guides us in our personal evolution just as clearly as her insights on how to touch bodies guide us in our work with clients. The notion of a mystery school, a term mostly associated with the many clandestine schools in ancient Greece, appealed to many of us as we began experiencing radical transformations of embodied consciousness through exploring her teachings on structure and breathing as encapsulated in her image of 'The Line'.

Rolf's vocational teachings give us a continual supply of tools and strategies to help heal our clients' aches and pains. Accessing The Line reveals a path of practices that can initiate an altogether natural evolutionary transformation that allows people to experience deeper states of consciousness. It was clear to those of us who were fortunate to study with her personally that she wanted two things of us. First, she wanted us to learn how to touch bodies to help people in their journey from pain to ease, and second,

she expected that we would engage in a personal journey to experience how an exploration of The Line could radically affect and alter one's sense of embodied self.

Studying with Rolf

I was fortunate to have met and studied with Dr. Rolf in 1975. At that time, the predominant buzz around Rolfing sessions was not so much on how the hands-on work could relieve chronic pain, but on how it created a springboard for exploring evolved states:

"Today I hope that among you there are the kind of fish that will go out and bring in another school of fish . . . not to get their aches and pains taken out, not to have their symptoms removed, but that they may contribute to the understanding of energy in the human universe."

– Dr. Ida Rolf, personal communication

What was clear to me from her first lecture was that she viewed the work that bore her name not as a quick fix but as a *way of life* that could lead to evolutionary awakening and that our guide on this way was The Line. She was clearly fascinated by the elegant, upright



Image by kapulya on iStockphoto.com.

Rolf would say that a direct experience of The Line would allow a phenomenal thing to start happening. Because you can relax so many unnecessary tensions, what she called *evolutionary energies* that had long been suppressed would explode open and start moving through the body. And when that would occur, consciousness would be evolutionarily awakened.

structure of Egyptian Pharaonic statuary, its representations of the divine rulers, not as expressions of beautiful bodies but of the higher consciousness that emanated from a body so vertically aligned. She spoke of the statues as teaching tools for consciousness-raising directed toward the Egyptian people: work to bring greater vertical alignment into your body, and you, too, can experience the higher consciousness in which the gods and goddesses who rule the land abide.

When Rolf's class was out for the week, some of us would head to the mountains, forests, or the seashore and explore

how playing with The Line affected our condition of consciousness. And this brings me to what I really want to address in this article. Some of you may feel deeply resonant with what I'm about to share; others of you may feel irritated, but my personal experience and honest observation are that those of us who were exploring Lined states while taking psychedelic substances – cannabis, psilocybin, MDA, LSD; also referred to as entheogens (god-inducing) – were experiencing at times explosive personal awakenings that others of us not inclined to combining 'Lined' explorations with entheogens just weren't having.

What was it that we were opening into? I hesitate to use the phrase "altered states of consciousness" because the radical revelation of a far more expansive consciousness beyond the purely egoic sense of a separate self felt not altered but innately natural, even if awe-inducingly unfamiliar. It's who I am behind who I think I am. Furthermore, because we really did have to let go of unnecessary tension in the body to access Lined states, these awakenings felt like the logical conclusion to a body drawn to working to free itself of unnecessary fascial holding.

This is my personal journey, and I share it as such – not as an endorsement of illegal drug use. More and more, the medical and therapeutic communities are seeing the value of psychedelic substances for some people in their healing journey. It is a good idea to seek medical and therapeutic support for these kinds of choices. And I endorse compassion when addressing people who struggle with addiction; they deserve to be treated medically and supported fully. What I'm talking about is light and moderate explorations, in safe and supported environments, to allow for a deepening of the experience of The Line. Follow the laws where you live, and in your professional life, stay within your scope of practice. What I discovered, I share with you here for your own contemplation.

An Unexpected Opening

In the teaching I do with meditation students, I emphasize two primary principles, and both of them come directly from Rolf. We could call them *physiological hacks* or *somatic koans*.

The first is her vision of upright verticality. Playing with upright balancing guides you to a sweet spot that feels as though it transforms your experience of gravity from a force against which you have to brace into a sea in which you metaphorically float instead. Rolf would say that a direct experience of The Line would allow a phenomenal thing to start happening. Because you can relax so many unnecessary tensions, what she called *evolutionary energies* that had long been suppressed would explode open and start moving through the body. And when that would occur, consciousness would be evolutionarily awakened.

Such an extraordinary statement! These evolutionary energies were extremely

powerful, and she directly linked the evolution of consciousness to their physical stimulation and liberation.

The Dance Begins

My first explosive awakening through The Line occurred about six months after I'd completed my initial Ten Series. I recall smoking a joint in the late afternoon and then walking down to the garden of the hundred-acre ranch I was caretaking. It was a beautiful moment. I began playing with this strange notion of The Line and the effortless balancing about which my Rolfer™ so passionately spoke. And, suddenly, it happened. I felt my body spontaneously shifting something in how it was standing, and began to feel a *lightning* start coursing through its entire length.

"Oh-my-God! This is what Dr. Rolf must be talking about!" I remember feeling elated.

And then my body erupted in energy. Powerful, explosive sensations started coming alive, and as they built in intensity, they began to move my body. The first thing I can recall, as the sensations kept building and blossoming, was that my left arm was lifted up in response. The first motion turned into the next, and then the next, and the next. It was just happening naturally, and everything just kept changing. I'd certainly never experienced anything even remotely like this before. It felt like I was being led down through layers of my psyche: one moment a huge, blossoming glow that would morph into deep compression, both physically and emotionally, then release into an even brighter glow. And through it all, everything kept moving.

And then, about twenty minutes into the opening, I got scared. The awakening energy and the motions they created made their way up into my cranium, and very weird characters started expressing

themselves through my face. I was twenty-four years old, out alone in the forest. What was occurring was powerful beyond anything I'd ever experienced, and I remember feeling a very real concern that maybe the release of these energies wasn't such a good idea after all.

And so, I stopped it. Two things happened. The first was that I saw I could shut it down. "Okay, that's good," I thought. I'm not completely out of control and going crazy. The second was that, as soon as I stopped it and went back to *normal*, it felt so awful in comparison to what I'd been experiencing. I said to myself, "Here goes nothing," and surrendered once again to the awakened energies and the movements they made.

Fifteen minutes later, it started slowing down. This was the beginning of what I've always called *my dance*, and I've pretty much kept surrendering to and exploring it ever since. Sometimes I do this standing, other times sitting upright in meditation posture. I know that many of you reading this have had similar experiences, but we don't talk about them very much, do we?

Only many years later would I learn about the *Subud Latihan*, a spiritual practice that originated in Indonesia, in which the body starts making spontaneous movements and sounds that emerge from our inner being. It became clear to me what had spontaneously opened in me that day at the edge of the garden. There was talk about the Latihan amongst circa-1970s Rolfers, and I recall Emmett Hutchins (1934-2016), who was the teacher for my Rolfig training, speaking of his original Rolfer being a member of Subud.

And then there was the story I heard of Dr. Rolf meeting John G. Bennett (1897-1974), British academic and writer on psychology and spirituality. He was a student of P. D. Ouspensky (1878-1947), himself a student of the teacher of mystical awakening George I. Gurdjieff (1866-1877-1949). Bennett told Rolf that the first time he was opened to the Latihan, he finally had a direct experience of everything that Ouspensky had been talking about all those years.

I hadn't known until recently, though, while viewing the beautiful tribute film, Dr. Ida Rolf – *Mother of Fascia* (Urbanczik 2026), that Rolf had officially joined Subud in England and would have personally been exploring the Latihan. And it makes sense to me how that had to influence her later vision of what actually happens

**Rolf's vision was that the force of
breath could move through a Lined body,
not unlike how a wave moves through a
body of water.**



Image by Piches Kanthawong on iStockphoto.com.

while exploring The Line: the letting go of tension and eruption of dormant, deeply buried, and very powerful energies are intimately accompanied by allowing spontaneous movements to occur throughout the body. Furthermore, you don't get one without the other. The Line unleashes a healing force that causes motions to occur as it touches into and releases deep patterns of holding from the inside out in much the same way that our hands touch our clients' bodies from the outside in.

The Breath as Body

The powerful breathing practice that I explore and teach is a companion and logical outcome to surrendering to Lined states. This comes directly from Rolf, although it took me at least fifteen years after hearing it from her before I really began to digest and have glimpses of what she was talking about.

Toward the end of my auditing class, the first phase of Rolfing training in the 1970s, there was much discussion about the evolved human, and someone asked her the question of how the evolved human would breathe. Her response was that, because the body could deeply relax, it no longer had to brace itself against gravity, the contraction of the diaphragm during inhalation would generate a force that would transmit motion through every joint of the body, including the sutures of the skull and joints between the small bones in the feet!

Many years later, I came across the instructions on breathing from the *Satipatthana Sutta*, an early Pali text whose words are ascribed by many scholars to the historical Buddha himself. While the initial instruction is simply to remain aware of the breath at the front of the body (the classical foundation of mindfulness training), the culminating instruction (which, interestingly, virtually no one in the Buddhist world goes anywhere near) tells us not just to watch the breath at the front of the body but to *breathe through the whole body*.

Rolf's vision was that the force of breath could move through a Lined body, not unlike how a wave moves through a body of water. Buddha's culminating instruction on breathing described exactly the same thing. And what gets doubly fascinating is that while the Buddha's opening instruction to focus

awareness on the breath is primarily a mental exercise, the culminating instruction describes an entirely somatic practice, which is why I think the mind-focused orientation of contemporary Buddhism has so many challenges in understanding how to access it.

The culminating instruction doesn't even mention the mind or awareness. Buddha isn't saying: as you breathe in, be aware that you're breathing through the whole body. He's saying just figure it out for yourself how such a breath can occur. Feel the inhalation touch into and stimulate every cell of the body while expanding the entire body as well. It's like filling a balloon and then emptying it on the exhalation. Just do this, the Buddha seems to be saying, over and over and over again, and experience what starts happening when you do. Just keep breathing like this, and the transformation of consciousness happens on its own.

A dear friend and fellow Rolfer, Tom Pathe, who trained a year before me, heard Dr. Rolf express the same sentiment but in a far more lyrical way:

The body is something wrapped around the breath;

Let the wraps flow freely like silk scarves.

This little phrase has become my go-to koan to teach meditation students how this awakened breath works. Let every breath, like an amoeba, expand through the flesh and sensations of the entire body on the inhalation and retract through the exhalation, relaxing everywhere. The body stays in constant, altogether natural motion that never comes to a standstill or sits still, and deep holding patterns embedded in the body's tissues start to let go.

We often associate wraps with Egyptian mummies: hardened, solid, and unmoving. When I conceive of the body as something wrapped around breath, not like a mummy wrap but like silk scarves, I'm guided to relax tension everywhere as I feel an expansion and retraction of the breath throughout my entire body, and it gives a clearer understanding of what the Buddha was telling us and why.

Entheogens as Catalyst

Let's get back to the observation that, for some people, psychedelics can radically accelerate the awakening down through

the layers of self to what Rolf visioned as an evolved condition of consciousness. Again, you may be pleased or annoyed by what I'm about to say, but both of the above practices – allowing spontaneous motions while exploring the dance of upright balancing and breathing through the whole body – appear to be powerfully accelerated when you explore them while taking some kind of entheogen. My preference is for a small amount of cannabis, and at times, psilocybin (a naturally occurring psychedelic compound produced by several species of fungi) or LSD (lysergic acid diethylamide, commonly known as 'acid', is a potent synthetic hallucinogen). Many of us have experienced these substances as powerfully healing on their own. What I'm talking about isn't just about taking the substance; I'm not talking about abusing substances, and some people should not take psychedelics for their health and wellness. Talk with your doctor about these decisions. The practice I'm describing explores the koans of The Line with moderate use of the substance for support.

Over the course of centuries, as Buddhism migrated to new territories with new spiritual worldviews, its practices would naturally change and evolve. The gentle Chinese monks sailed to Japan, where they encountered the samurai and Zen, becoming fierce. The teachers from Northern India climb the Himalayas onto the Tibetan Plateau, where they encounter the shamanistic and animistic culture of the Bon-po, the indigenous people of Tibet, and the teachings of what has become Tibetan Buddhism far more closely resemble the practices of the Bon-po than what the Buddha was teaching so many centuries earlier.

The teachings are on the move again, and this time they are clearly coming to the West. Looking back, as I near my ninth (!) decade on the planet, I can cite two homegrown, explosively spiritual events that have occurred in the culture into which I was born. These, I believe, need to find a place in the creation of a uniquely Western form of practice. One, rave culture, electronic dance music parties where *everyone is moving*, and second, the advent and availability of psychedelics. For me, both are key to the evolution of embodied consciousness that occurs for someone exploring Dr. Rolf's ultimate koan: The Line.

Reclaiming the Mystery School

Over the decades, the fascination with the transformational Line that permeated my auditing class with Dr. Rolf appears to have taken a distant seat to our focus on helping people overcome their aches and pains through the hands-on work. I certainly have no problem with this and, to this day, love getting regular work. It supports the practices on awakening I've been speaking of.

In thinking about how the focus on Rolf's legacy has been largely consolidated on the genius of the hands-on work, I've come to a conclusion that there's also a natural, and legitimate, reason for this shift away from much interest in exploring Lined states. In our attempts to be viewed ever more *professionally* as being able to provide relief, we've had to conform our standards of practice to those of a professional culture that still looks on psychedelics as decidedly off-limits to how we present our work and provide services to our clients.

Psychologists and medical practitioners are currently challenging the taboo against entheogens, and many research groups are investigating the potential of psychedelics as medicine (Stringer 2024). Courageous psychotherapists are seeing rapid and profound shifts in many of their clients who are grappling with issues like post-traumatic stress disorder, addictions, and major depressive disorders through professionally supervised sessions that include entheogens.

To my Rolfing community, let me challenge us and publicly voice what to me is obvious: There is an extraordinary place for these substances in the big picture of what constitutes Rolfing Structural Integration. Furthermore, without the support of entheogenic substances,

the eruptive awakening that I've been describing doesn't appear to occur. In my opinion, exploring The Line without psychedelics is . . . *meh*.

When I was recently asked if I'd undergo the transformation that occurs while exploring Lined states without the support of an entheogen, my honest and immediate answer was, "I can't. It doesn't work for me without the psychedelic catalyzing. Simple as that." I'm not saying that this is for everyone. People need to make informed choices about their therapeutic experiences, and for many, this kind of awakening is neither interesting nor appropriate. But this awakening does exist, it's very real, and it's a direct product of exploring Rolf's vision of The Line. Even if neglected, it's an integral and literally extraordinary part of our heritage, and for that reason alone, it warrants our committed exploration.

Many of us in the greater structural integration world have been drawn to spiritual practices outside of the religious traditions we were born into. We end up exploring things like Buddhist dharma (vipassana, Zen, the Vajrayana), Hindu yoga, martial arts, and Sufism. What I want to stress here and leave with you is this:

Dr. Rolf has given us the keys to transformation. As students in the school of philosophical inquiry that Rolf created, we're the rightful custodians of this technology for profound spiritual awakening. And, if we don't claim ownership of these teachings, they will either be lost or appropriated by someone else.

I've benefited so much from my exposure to all the above-mentioned teachings. Over the decades, as I learned to shun Buddhism's shadows in order to experience its light, I've had to inject into

them Dr. Rolf's two great principles of transformation – playing with the dance of upright balancing while opening to a breath that can be felt through the entire body – while simultaneously letting go of the shame that these traditional practices have directed toward the homegrown, explosively spiritual events of my lifetime. The mix continues to be extraordinary.

Will Johnson has been a Certified Rolfer® since 1976. He and his wife, Coco, run the Bambu Hueco Retreat Center in Costa Rica, where they invite serious students to come and explore the practices presented in this article. Johnson is the author of sixteen books, two of which have won awards as Best Spiritual Book of the Year, all of which speak of the body's role in spiritual awakening and address The Line as the secret door to that awakening. His website is www.embodiment.net. You may contact him at will@embodiment.net.

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Keywords

Rolfing Structural Integration; Ida Rolf; The Line; entheogens; psychedelics; psilocybin; embodied consciousness; somatic practice; evolutionary awakening; spontaneous movement; breathwork; mystery school. ■



Andrew Rosenstock



Michael J. Shea

Stressors, Forces, and Resiliency

An interview with Michael J. Shea

By Andrew Rosenstock, Certified Rolfer®, and Michael J. Shea, PhD

ABSTRACT *Biological, cultural, technological, and cosmological forces act on the human system, and when those forces become stressors that exceed a system's capacity. Michael J. Shea, PhD, traces how pre- and perinatal overwhelm reduces the margin available for later demands. Shea speaks of an "era of grief," a collective condition placing sustained pressure on everyone's well-being.*

Opening Frame

This interview is drawn from several conversations recorded across four episodes of the *Touching Into Presence* podcast.¹ Rather than presenting those exchanges separately, we've woven them together here – allowing recurring questions, images, and tensions to gather into a single, cohesive conversation. What follows is not a transcript of one sitting, but a synthesis that reflects how these themes unfolded over time.

Across those four talks, we kept returning to a shared inquiry: how forces – biological, cultural, technological, developmental, and collective – act on the human system; how and when those forces become stressors; and how resiliency may be less about endurance and more about the restoration of capacity. This conversation doesn't aim to resolve those questions, but to stay with them long enough for something honest to appear.

Our Conversation

Andrew Rosenstock: Across our conversations, we keep circling back to the idea that the human system is under a lot of input – almost like a constant bodily load. When you look at the landscape of health right now, what do you see as the primary forces acting on us?

Michael J. Shea: One of the biggest is social media and the way it shapes perception. It's a pervasive environmental force that changes how we relate to ourselves and the world. Alongside that are the ongoing internal forces – metabolic health, vascular health, and the continuous biological demands that never really turn off. And then there's primary respiration, which I see as a fundamental force moving within the system itself.

Andrew: You often talk about these forces as being nested inside something larger.

Michael: Yes. I don't see the body as existing in isolation. There are larger cultural, cosmological, and spiritual frameworks acting on us all the time. My background in Buddhist psychology, studying with the Dalai Lama, and apprenticing with a medicine man on the Navajo reservation all shaped how I understand those influences. They give context to how spiritual and energetic forces are always in play, even when we're not naming them.

Andrew: And then there are the metrics modern culture imposes.

Michael: Exactly. Take *body mass index* (BMI). It's an outdated metric based on myths, yet it carries enormous authority. It pressures people to judge their bodies against a number that has very little to do with lived reality.



Michael J. Shea: I don't see the body as existing in isolation. There are larger cultural, cosmological, and spiritual frameworks acting on us all the time.

Andrew: You also speak about what you call the 'era of grief'.

Michael: Yes. That's a global force. A collective condition that places sustained pressure on the heart and on spiritual well-being. In this era, heart health, metabolism, and meaning are deeply linked. Each one exerts force on the others.

Andrew: Even the forces we apply intentionally in clinical work fit into this.

Michael: They do. Whether it's Rolfing® [Structural Integration], myofascial work, or biodynamic cardiovascular therapy, we're applying force. In cardiovascular work, we even use visual and energetic forces – like the five heart colors from

Michael J. Shea: Stressors manifest as blocked pathways in the cardiovascular system. Because heart health, metabolism, and spiritual well-being are linked, stress in one area places demand on the others. In the era of grief, that sustained pressure often shows up as a lack of vitality in the heart, with long-term metabolic and vascular consequences.

‘Medicine Buddha’ practice – to support the heart.

Andrew: And sometimes the forces are very immediate – technology, travel, and environment.

Michael: Yes. Poor audio connections, internet outages, jetlag. These seem trivial, but they place real demands on presence and speech. All of this – biological, technological, cultural, cosmological – belongs to what I call *the living mystery of being*.

Stressors

Andrew: At what point do these forces stop being background conditions and start exceeding a system’s capacity?

Michael: One place we see that very clearly is in pre- and perinatal trauma. That’s where capacity is overwhelmed before the nervous system has the resources to meet what’s happening. I see this clinically in infants and children with neurological issues and developmental delays – but those early loads don’t disappear. They’re often carried into adulthood.

Andrew: So the system organizes around overwhelm early on.

Michael: Exactly. And later in life, when additional demands appear, the system is already working from a reduced margin.

Andrew: You see something similar with cultural metrics like BMI.

Michael: Very much so. BMI becomes a stressor when it’s internalized. Once someone lets that metric define their sense of self, it creates body shame. That shame disrupts interoceptive awareness – the ability to sense the body from the

inside – and fractures the relationship with the body itself.

Andrew: Instead of sovereignty, there’s fragmentation.

Michael: Yes. The body becomes something to manage or correct rather than inhabit.

Andrew: And biologically, this shows up in the heart and metabolic system?

Michael: It does. Stressors manifest as blocked pathways in the cardiovascular system. Because heart health, metabolism, and spiritual well-being are linked, stress in one area places demand on the others. In the era of grief, that sustained pressure often shows up as a lack of vitality in the heart, with long-term metabolic and vascular consequences.

Andrew: Even small environmental disruptions can tip things.

Michael: They can. Jetlag combined with technical disruptions is a good example. Presence feels less settled. Speech changes. These are modern stressors that directly affect the nervous system’s ability to engage.

Resiliency

Andrew: If stressors are already layered on top of early overwhelm, what does recovery look like if it’s not just about pushing through?

Michael: It requires stepping away from a purely biomechanical model that treats the body as something to fix. In a biodynamic approach, healing isn’t something we impose – it’s always here. The question is whether the system has the conditions to access it.

Andrew: That’s where your work with the biodynamic heart comes in.

Michael: Yes. We use somatic compassion practices to support a clear and vital heart, especially in the era of grief. Interoceptive awareness is central here. It gives the system sovereignty – the ability to remain centered and self-regulated even when external forces are intense.

Andrew: You even extend this into daily activities, like eating.

Michael: Absolutely. Contemplative eating practices help the body absorb metabolic load rather than compensate for it unconsciously. It’s another way of restoring relationship instead of overriding sensation.

Andrew: And in cardiovascular work, you go beyond physical touch.

Michael: We combine touch, primary respiration, and visualization – like the five heart colors – to unblock pathways in the heart. Because these systems are linked, supporting one supports the whole.

Cost, Capacity, and Stillness

Andrew: There’s a real cost in all of this. I think about moments when presence itself feels compromised.

Michael: That cost often shows up as subtle changes – speech, pacing, a sense of not being fully there. The system is adapting, but under strain. From the outside, everything may look fine.

Andrew: That’s where resilience gets confused with endurance.

Michael: Exactly. Endurance can look impressive, but it often means the system is compensating. True resiliency is about restoring capacity, not tolerating more.

Michael J. Shea: We use somatic compassion practices to support a clear and vital heart, especially in the era of grief. Interoceptive awareness is central here. It gives the system sovereignty – the ability to remain centered and self-regulated even when external forces are intense.

Andrew: Which brings us back to development.

Michael: Yes. If capacity was overwhelmed early, pre- or perinatally, then later stressors land very differently. What looks like an overreaction is often an honest response from a system already carrying unfinished business.

Andrew: So healing becomes less about intervention and more about allowing something to complete.

Michael: That's right. Stillness is essential here – not passivity, but a dynamic stillness where the system can sense itself without being overwhelmed. When we stop forcing adaptation, the system reorganizes according to its inherent capacity.

Closing Frame

As the conversation comes to a pause, one thing remains unsolved. If resilience is not the ability to tolerate more, and if many stress responses reflect intelligent adaptations to conditions that once exceeded capacity, then the question shifts. Rather than asking how to become stronger or more resilience, we are left with a quieter – and more demanding – consideration:

What conditions allow capacity to return?

Endnotes

1. The *Touching Into Presence* podcast is an interview show where Andrew Rosenstock and his team talk with a global community of bodyworkers. They published the first episode on May 5, 2020, and now have over 90 episodes of authentic, informative conversations with structural integrators, bodyworkers, yoga teachers, healers, movement therapists, and academic experts of many kinds. Rosenstock asks what inspires them, what brought them to where they are now in their careers, and what their approach is for addressing the wellness of the body, mind, and beyond. All episodes are available at <https://open.spotify.com/show/5Llswp0FKjDqRaQFJ9VnG9>. Conversations with Michael J. Shea, PhD, can be found on:

- Episode 51 (March 28, 2022),
- Episode 58 (October 3, 2022),
- Episode 66 (August 14, 2023), and
- Episode 93 (August 18, 2025).

Michael J. Shea, PhD, is an educator and author in the fields of somatic psychology, myofascial release, and craniosacral therapy. He leads seminars throughout the United States, Canada, and Europe. Shea received his master's degree in Buddhist Psychology at Naropa University and a doctorate in Somatic Psychology at The Union Institute. He has been a Florida-licensed massage therapist since 1976, completed his Rolfing training in the early 1980s, and was a Certified Craniosacral Instructor with Upledger Institute in 1986. Shea brings a unique cross-cultural perspective to teaching health and healing, with a teaching style grounded in a spiritual practice of developing compassion with the use of manual therapy. For more information see www.sheaheart.com. Shea's books include The Biodynamics of the Immune System: Balancing the Energies of the Body with the Cosmos (2023) and The Biodynamic Heart: Somatic Compassion Practices for a Clear and Vital Heart (2025), are now available at Inner Traditions and Amazon. Shea has a new book to be available soon, Biodynamic Embryology, Morphology, Mythology, and Clinical Practice.

Andrew Rosenstock is a Certified Rolfer®, Registered Somatic Movement Therapist, Biodynamic Craniosacral Therapist, Board Certified Structural Integrator, Certified Yoga Therapist (C-IAYT 1000), meditation teacher, and educator. Find out more at rolfinginboston.com and andrewrosenstock.com.

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Keywords

resiliency; stressors; biodynamic; interoception; somatic psychology; trauma; heart health; primary respiration; contemplative practice; structural integration; myofascial release; craniosacral therapy; grief; Buddhism. ■



Luca Williams

Contacting Reality in my Human Body

One Rolfer's™ Experience of Ankle Fracture and Hypermobility

By Luca Williams, Certified Rolfer®

ABSTRACT Rolfer™ and author Luca Williams chronicles her recovery from a complex ankle fracture that included coming to an understanding about her lifelong hypermobility. Drawing on emerging research connecting hypermobility spectrum disorders to fascial dysregulation, Williams examines how these systemic connective tissue characteristics produced unexpected surgical outcomes and confounded standard physical therapy protocols. Through direct application of her Rolfin® Structural Integration training, Williams describes how she navigated her recovery.

Read books and study nature.

When the two don't agree,

Throw out the books.

– William Albrecht, PhD (1888-1974), renowned soil scientist.

(Note that this quote is considered a paraphrase from his writings rather than a verbatim passage, often attributed to his 1975 book, *Albrecht's Foundation Concepts*.)

Where This Story of Forces and Stressors Begins

My mountain bike tires slipped on a wet clay berm. As I was thrown off my bike, I attempted to run it out, but my foot collapsed beneath me. When I tried to stand up, I realized that my right foot was hanging off the tibia, slightly supinated and rotated externally. Thankfully, there was no blood. I yelled to my friends behind me, "I'm down, and we're going to the emergency room for surgery!"



Luca Williams at the trailhead with her bike.
Photo by Jimmy Breitenstein.

Instructions given during the Beighton scale:

One by one, I will bend your left and right little fingers to see if they can go as far as 90° to the back of your hand.

[1 Point (Left) + 1 Point (Right) for passive extension of the fifth finger.]

I will bend each of your thumbs back and see if they can reach the front of your forearm.

[1 Point (Left) + 1 Point (Right) for passive thumb apposition to the forearm.]

I am going to bend each of your elbows and see if they bend backward.

[1 Point (Left) + 1 Point (Right) for passive elbow hyperextension.]

I am going to see if each of your knees can bend backward.

[1 Point (Left) + 1 Point (Right) for passive knee hyperextension.]

Can you put your hands flat on the floor with your knees straight?

[1 Point – with the ability to bend forward and place palms flat on the floor with straight legs.]

Total Possible Points = 9

Figure 1: The Beighton score is a screening technique for hypermobility. It is a nine-point scale that requires five maneuvers: four passive bilateral and one active unilateral (Physiopedia contributors 2025).

Strangely, I felt little pain as we splinted my leg or while they half-carried me and I half-scooted on my butt out of the forest towards the logging road where the ambulance picked me up. In fact, I spent most of my time in the ambulance and the emergency room, cracking jokes and sharing stories with the paramedics, nurses, and doctors.

Hypermobility means different things to different people. For me, it means that when I was younger, I used to do a lot of fun party tricks like walking with backward knees mimicking a Barbie doll. When I was thirteen, my family doctor told me that I would one day struggle with pregnancy because of my lumbar lordosis. I heard him, but he didn't identify what I could do to change it.

Using the Beighton score for hypermobility, I scored 7 out of 9 at an adult age when many have lost their flexibility (see Figure 1). But I never knew that hypermobility was diagnosable until this foot injury.

Dr. Tina Wang and colleagues (2025) state that those with hypermobility Ehlers-Danlos syndrome (hEDS) and hypermobility spectrum disorders (HSD) often have joint hypermobility and instability, skin hyperextendibility, and connective tissue fragility. People

who have hEDS/HSD struggle with having a fascial system that includes a dysregulated extracellular matrix including disorganization of type I, III, and V collagen. And they have altered fibroblast-to-myoblast activation in dermal tissue and the deep fascia. This leads to denser tissue in some areas, lax tissue in other areas, chronic low-grade inflammation, and pain. In addition, the myofibroblasts remain in the tissue longer than normal when the cellular repair mechanisms are activated during

wound healing and fibrosis. Ultrasound studies demonstrate that those with hEDS/HSD have altered deep fascia of the sternocleidomastoid, iliotibial tract, thoracolumbar fascia, and fascia iliaca.

Prior to this injury, I didn't feel much pain or discomfort unless I stretched too far. Then the pain felt 'nervy', and I was unable to sleep until I helped the nerve find its way home again. I have to be cautious about who works on me and the type of bodywork I get. More than twenty years

Hypermobility means different things to different people. For me, it means that when I was younger, I used to do a lot of fun party tricks like walking with backward knees mimicking a Barbie doll.

ago, before I found Rolfing® Structural Integration, the pain was systemic in my knee, hip, head, neck, and left ankle. I was a wreck with very flexible hip, knee, and ankle joints, while my lumbar, thoracic, and back of the neck fascia felt dense and twisted.

As Rolfers™ know, and as Dr. Wang and colleagues have described (2025), fascia is important for structural support, proprioception, systemic communication, and mechano-transduction. Not only did Rolfers and Rolfing students help smooth and untwist my fascia in 2005 when I went through my Rolfing training, at the time I was a recovering twisted snowboarder, they also helped me become embodied, to pay attention to the gentle, quiet pain signals before they became screams. Yet, I don't think any of us recognized my hypermobility as an issue, although I would beg practitioners to not pick up my foot when I was laying supine, because I don't like the feeling of my knee hyperextending in space.



Anterior x-ray of Luca's right ankle after the bike accident.

**When I looked in the mirror,
I could see that not only did I break
my fibula, but my femur was
adducted and medially rotated.**

So, why don't I feel much pain? I attribute my low pain level to my diet, receiving many hours of Rolfing sessions, the fascia work I do on myself regularly, and my movement practice that includes daily stretching and loading my joints while carrying heavy loads like hay bales and water buckets, and while enjoying hiking and downhill skiing. But a low level of pain does not mean someone is structurally balanced or functioning well. It just means the pain hasn't hit yet.

When the emergency room osteopath showed me the X-ray and pointed out the broken fibula, which was displaced, and the very large, clear medial space between my talus and tibia, all I could think was that my road to recovery would be a long one. The clear medial space, which is a radiographic measurement to diagnose ankle fractures, is considered too large if it is above 4 millimeters. Mine was 13 millimeters. He didn't mention that every toe, metatarsal, and tarsal was rotated and/or translated. But I could see the rotations in the X-ray and my big toe, which peeked out from the splint. The most the DO could do for me was to apply traction to my fibula, put me in a cast, and recommend surgery.

The most discomfort I felt was at my medial meniscus of my right knee, which I feared would tear with the weight of the cast and the rotations of my femur and tibia. When I looked in the mirror, I could see that not only did I break my fibula, but my femur was adducted and medially rotated. Thankfully, Advanced Rolfer Jon Martine had taught me how to gently rotate my medial meniscus when I had strained my anterior cruciate ligament in 2005. So, while I sat on the couch for twelve days waiting for ankle surgery, I did what I could for the rotations of my pelvis, femur, and medial meniscus.

Having Surgery While Hypermobile

At the pre-operation appointment, the surgeon suspected that I had completely torn my deltoid ligament, along with breaking the fibula, and tearing the syndesmosis, the fibrous joint binding the distal tibia and fibula together by a strong sheet of connective tissue. I begged him to be careful with my easily hyperextendable knees during surgery. But he didn't seem concerned when he determined that I don't have hEDS. Before the surgery, my pain level remained at a two. Although I was uncomfortable sitting and lying down for so many hours.

Today, both hEDS and HSD are considered multisystemic connective tissue disorders featuring not just musculoskeletal issues but also including immune system dysregulation, chronic pain, low-grade inflammation, as well as visceral and nervous system dysfunction. Now we know, *fascia is everywhere!* Those with hEDS/HSD also tend towards proprioception deficits and frequent injuries.

Interestingly, my husband and younger son are also hypermobile. My older son, who is adopted, has no hypermobility. He has never been able to touch his toes. Although we are all athletic, my husband, younger son, and I all fall a *lot* while skiing. My oldest son rarely falls at all. And while playing soccer, my youngest son falls more than any of his teammates, even though he is quick and agile. And he sprains his ankles far more than his teammates.

The last thing I said to the surgeon and his team before the anesthesia knocked me out was, "Please, please, please be careful not to hyperextend my knees." The surgeon screwed a plate along my distal fibula with seven screws and

Today, both hEDS and HSD are considered multisystemic connective tissue disorders featuring not just musculoskeletal issues but also including immune system dysregulation, chronic pain, low-grade inflammation, as well as visceral and nervous system dysfunction. Now we know, *fascia is everywhere!*

Those with hEDS/HSD also tend towards proprioception deficits and frequent injuries.

Luca Williams



X-ray after the surgical repair of Luca's right ankle.

attached a button to my tibia to anchor my deltoid ligament from the calcaneus to the tibia. Then a cord was attached from my deltoid ligament to the button on my tibia, then pulled across to the fibula. Because my lower leg was still unstable, he also screwed my fibula to my tibia to allow the syndesmosis to heal.

Three days after the surgery, the pain level lowered from a six to a three, but a dull nerve ache began in my calcaneus, especially when I slept on my back. It felt as if someone was pushing my calcaneus and tibia posterior into the bed or sofa. And my knee felt chronically hyperextended. It was the strangest sensation, which often kept me up at night. My sense is that

during the surgery, the combination of anesthesia and hypermobility made my lax ligaments even looser, and the tibia and fibula shifted posteriorly relative to my talus and calcaneus. Then the surgeon screwed me back together.

Surgical Recovery in a Hypermobile Body

Six weeks later, when I was cleared for a walking boot and physical therapy, my work of untwisting the bones of my foot, leg, and pelvis began. Because I am so flexible, the physical therapists assumed that I would regain function quickly, and

were obviously surprised when I didn't. The hamstring and calf stretches they suggested to increase dorsiflexion were no help. Eight weeks after the boot came off, plantarflexion remained extremely difficult, causing my foot to supinate into a kidney bean shape. Dorsiflexion also remained limited at 8 degrees, whereas I had about 12 to 15 degrees on my unaffected leg.

All along the metal plate, along the periosteum of my tibia and fibula, and along my Achilles, especially by the calcaneus, the fascia wouldn't release easily. This made me think that the injury and surgery led to increased fibrosity, where the fibroblasts transitioned to myofibroblasts, creating densification in the whole region (Wang et al. 2025).

In bed, I had to wrap a cashmere scarf around my lower leg and knee, then tuck the ends of the scarf into a sock near the heel to keep my tibia from dropping posterior relative to my talus. I did a lot of taping the ankle at night, as if I had a lateral sprain, and it helped a bit, but not as much as the scarf.

Ida P. Rolf, PhD (1896-1979) wrote, "The bones of the legs have to be directly above the ankles" (1978, 97). Since the accident, my right leg bones are not. They are behind the ankle. With every step I took after the surgery, especially in the morning, it felt like my weight landed on my heel rather than mid-foot.

When a physical therapist tractioned my foot distally, attempting to release the fascia and give my ankle joint more space for the talus to move, it felt like they were detaching my foot and stretching it into a clown foot. This type of traction probably works well for most. But it made me sick to my stomach. I think this is due to a combination of the hypermobility and the traction when they pulled on the foot in the emergency room and during the surgery.

Strangely enough, although my tibia felt posterior and my knee felt hyperextended while lying flat, when upright in gravity, I was unable to straighten my knee. It wasn't until I wrapped my hands around my calf and slacked my leg toward the hip

Between slacking the tension of the leg, general and thorough fascia release, and cupping the dense tissue at my Achilles and along the fibula, eventually the fascia along my lower leg began to lengthen and become more organized.



Luca, right after she had her cast removed, it was the beginning of seeing how mangled her foot was, and all she could think was how much work she'd be doing on her right foot and legs for months, if not years. Photo by Jimmy Breitenstein.

socket, and rotated my femur externally, that I began to feel a stretch in my calf at the ankle. Between slacking the tension of the leg, general and thorough fascia release, and cupping the dense tissue at my Achilles and along the fibula, eventually the fascia along my lower leg began to lengthen and become more organized. Nowadays, when I exercise or do my stretches, I imagine that the muscles and tendinous slings strengthen and contract upwards to keep my tibia and fibula from collapsing onto my talus.

At six months post-surgery, I still could not dorsiflex or plantar flex enough to run. Part of the issue may be that the screw between my tibia and fibula is limiting rotation. With every step I take, especially during push off, I often feel the strain around the cuboid, fourth and fifth metatarsals, the talus, the metal plate, and the bone break. My foot often curves into the kidney bean shape and stresses the bone break if I haven't stretched my adductors and calves enough. In one of my notebooks from an annual meeting, Advanced Rolfing Instructor Jan Sultan said something to the effect of, "In order to have a functioning transverse arch, the lateral arch needs to function well." And the structure of my lateral and medial arch is compromised, which means I can't push off well, and I lack spring in my step.

The Advantages of Being a Rolfier™

If I didn't have my Rolfing skills, I don't know what I would have done. Every morning, in order to walk with minimal pain, I have to push my tibia and fibula anteriorly, rotate the fourth and fifth metatarsals and cuboid internally while translating them medially, and slack my tibia and fibula superiorly and medially. As time goes on, I can feel my connective tissues becoming stronger and holding the bones in place better. But from prior injury experience, it will be about a year before I won't have to work on my foot daily.

Strangely enough, the most helpful therapy has been skiing. Once I could get into a ski boot, I was forced to lean forward. My Achilles stretches in this position and it feels less dense, longer, and less interwoven with the fascia around my ankle.

Rolfers, We Deal with the Unexpected

When I have shown the rotations in my ankle and foot to the foot-specialist physical therapists, they appear confused. Osteopathic books don't seem to address the twists I see in my foot. And this is why I love Rolfing® Structural Integration! Because it taught me to trust my eyes and hands, even if they don't match what books and experts say.

Rolf wrote,

"Our job is to learn to contact reality as the reality exists in the human body. Not to contact names, not to know the names, not to know abstract patterns" (1978, 206).

"The whole trick of Rolfing [Structural Integration] is going around and around and around, and not barging through" (1978, 83).

"Fascia is the organ of posture" (1978, 124).

When I come up for air from working on my foot and ankle, I remind myself that because fascia connects to everything, to look above, look to the other side, and to think about how the accident affected the organs. The work on my trochanter helps my ankle and foot. The work on my third and fourth lumbar vertebrae helps the ankle and foot. Stretching my adductors helps the ankle and foot. Strengthening my core in the bridge yoga pose helps the ankle and foot. While focusing on the upper segments of my body, I self-slack, supporting my long bones towards the acetabulum and sacrum. This limits how much they collapse onto the talus.

Moshé Feldenkrais (1904-1984), founder of the Feldenkrais method, wrote, "In order to change our mode of action, we must change the image of ourselves that we carry within us" (1980, 10).

I find that as my core becomes stronger from the daily yoga bridges that reduce my lumbar lordosis, my image of myself as a floppy person is changing. I am

standing taller. My quadriceps, which have been strong and contracted from pregnancy and years of skiing, biking, and sitting, are lengthening, as is my psoas. It's a different kind of taller than what I feel while experiencing Rolfing sessions, or even with stretching and yoga, because I am strengthening my weaknesses, which are partially due to my lifelong hypermobility.

Who knows how much the loss of knee extension, ankle dorsiflexion, and plantar flexion is due to the twists in my foot, pelvis, femur, tibia, and fibula, or due to the hardware, or due to hypermobility? This is what I know: I will never stop learning and working for fluid movement in gravity, despite hypermobility and hardware.

Author's note: All my thanks go to my Rolfing instructors and colleagues. I am so grateful that I found this career and this way of looking at the human body. It saved my life once and my mobility many times. This article was inspired by Rolfing Instructor Valerie Berg's March 2020 article, "The Complexity and Reasoning of Keeping 3D Hands and Fingers," about healing her arm after a car accident, and science journalist James Nestor, and his 2020 book, Breath: The New Science of a Lost Art. I love it when writers investigate their own healing process.

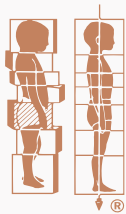
Luca Williams is a Certified Rolfer® and newly Certified Functional Medicine Nutritionist, who will one day become a Certified Advanced Rolfer when she's ready to leave her family for six weeks. Her website is lucasrolfing.com. She also writes fiction with a Panamanian-American magical realism angle under the name of Luca Brite. See lucabrite.com

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Keywords

hypermobility; hypermobility spectrum disorder (HSD); Ehlers-Danlos syndrome (hEDS); Rolfing Structural Integration; fascia; ankle fracture; fibula deltoid ligament; syndesmosis; structural recovery; ankle; fascial densification. ■



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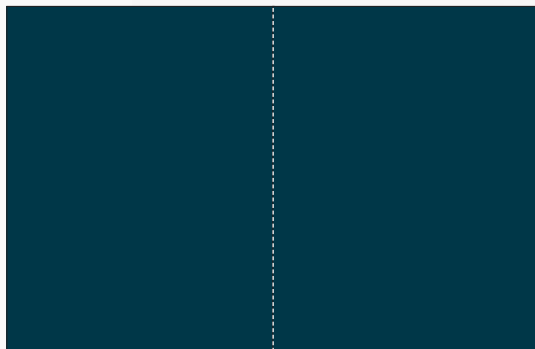
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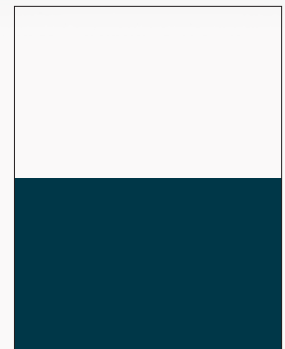
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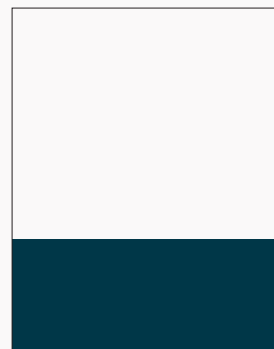
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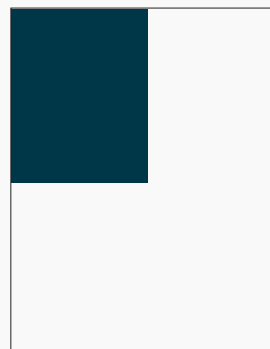
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Body Structure, Movement Patterns, and Fascial Treatment

A Case Study in Rolwing™ Structural Integration

By Hubert Ritter, Certified Advanced Rolfer™



Hubert Ritter

ABSTRACT Movement education is a key ingredient for many clients to experience lasting structural and functional changes; manual work with the fascia alone, no matter how skillful, is often insufficient. This case study examines a forty-three-year-old former dancer presenting with lower back pain, hyperextended hips and knees, and an anterior pelvic shift. Before and after pictures of the Second Hour of their Rolwing Ten Series are presented and discussed. This client's Second Hour intervention included movement awareness exercises based on the principles of 'Normal Function'. Structural analysis and gait observation were used to distinguish between structurally and functionally determined patterns in the fascial network, guiding targeted manual interventions on the lower legs, hip joints, lower back, shoulder blades, and neck. Movement education using tactile and verbal cues repositioned the hip and knee axes into their physiologically advantageous directions – hip behind, knee in front – resulting in greater body length, improved left-right symmetry, and significantly better shock absorption during gait. This case demonstrates that lasting structural order requires the complementary use of both fascial manual techniques and movement education, inclusive of an understanding of the lumbar lordosis as a physiologically necessary feature of adequate shock absorption.

Editor's note: This article was originally published in German in pt Zeitschrift für Physiotherapeuten (2016), the leading physiotherapy journal in Germany. They have given permission for this English reprint. The author has done this English translation.

Introduction

Even in my basic Rolwing® training, I sensed that manual work on the fascia alone – no matter how skillful – is not sufficient to effect lasting changes in clients' structural and functional patterns. This initial observation has been confirmed throughout my years of practice as a Rolfer™. Releasing restrictions in

the fascia does not automatically lead to better alignment, and even when it does, the changes often are not lasting. For almost all clients, some form of movement education is a beneficial addition to manual work. For many, it is the key ingredient to lasting change.

Some structures are more resistant to change than others. Patterns of hyperextension at the hip and knee level are often particularly vexing. Since we cannot tighten or shorten fascia – we can only lengthen, soften, and mobilize it – additional length in tissues that already exhibit excessive mobility can be counterproductive. If there is already excessive mobility and softness in a given area, additional length in the tissues is not

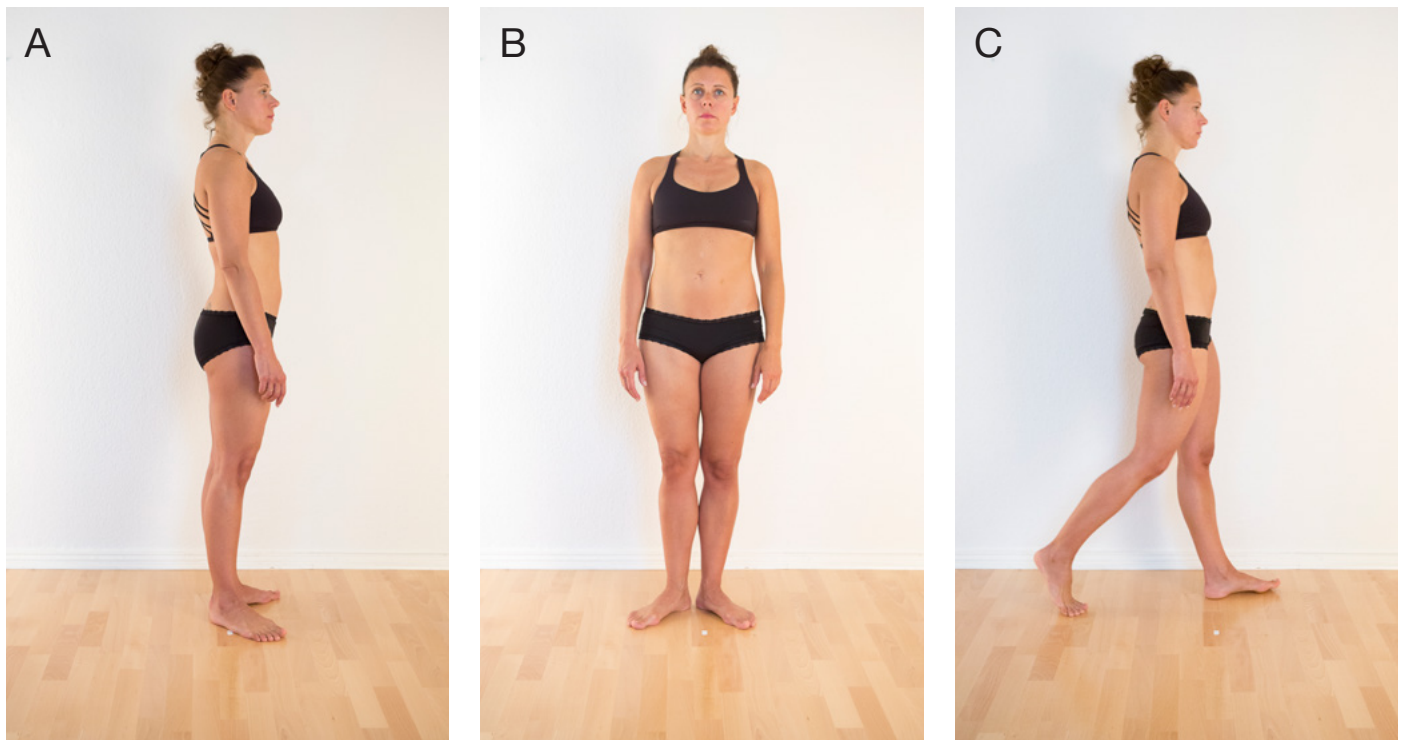


Figure 1: (A) Standing lateral view before session 2. (B) Standing anterior view before session 2. (C) Lateral view while walking before session 2. Photo credit: Jorge Albarracin.

helpful. Under the influence of gravity, it may even deepen the existing pattern.

To address this, I use ‘Normal Function’ (Flury 1991), the system of movement education developed by the late Swiss Rolf, Dr. Hans Flury (1945-2023). His system provides precise instructions to find the most economical form of any given movement. However, economy is not an end in itself in this regard. Rather, the most economical form of movement is usually the one that is physiologically most appropriate for our bodies.

The process starts by helping clients find positions of support in gravity while sitting, standing, and walking. From these points of support, movement is initiated by letting go of excess muscle tension, aided by gravity and passive tension in the fascial net. The main axes of motion (hips, knees, and ankles) are encouraged to move in their physiologically intended direction, enabling them to act as effective shock absorbers. Initiating movement by “letting go” and using minimal muscular

force once in motion, creates length in the entire body and reduces strain on tissues and joints.

This article is based on an informal case study I conducted with a client who exhibited a strong pattern of hyperextended hips and knees. To achieve lasting structural order and physiologically appropriate movement, I used a combination of classical manual interventions known as the Rolfing Ten Series® and specific movement awareness exercises based on the principles of Normal Function (Ritter 2012).

Case Study

Ms. Winter (name has been changed) is a forty-three-year-old former dancer who intensely practices Ashtanga Yoga, a dynamic, athletic form of yoga. Ms. Winter reports pain in her lower back, which occurs particularly during certain yoga exercises. She has a feeling of imbalance between the left and right sides of her

body – the left side feels more stable. She also feels tension between her shoulder blades and her neck.

Structural Analysis

The standing lateral view (see Figure 1A) shows a forward shift of the pelvis relative to a plumb line through the base of support with a slight anterior tilt of the pelvis. This shift of the pelvis out of alignment is compensated cranially by a slight hyperextension and backward lean of the trunk. Caudally, compensation is achieved by hyperextending the knees.

The anterior view in a standing position (see Figure 1B) shows a strong external rotation of the legs (slightly stronger on the right than on the left) and a lateral shift of the pelvis and torso over the left leg.

Here is the crucial question: To what extent does the image described and shown above actually reflect the client’s structure? Are we really seeing the shape of the body as determined by the

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tension pattern of the fascial network? It should be noted that most people stand habitually with their pelvis shifted slightly forward, regardless of their structure. This position feels comfortable, at least in the short term, and requires little conscious attention. This habitual posture pattern can distort the picture.

The characteristics observed when standing are even more pronounced in Ms. Winter when she is walking (see Figure 1C). This suggests that the forward shift of the pelvis observed when standing and the associated compensations are structural in nature, i.e., caused by the shape and tensional pattern of the fascial network.

The pattern described here has a number of adverse effects that may contribute to the development of Ms. Winter's symptoms:

- The hyperextension of the torso leads to permanent compression of the lower back when standing and walking.
- The hip and knee joints are moving against their physiological direction at the moment of impact. As a result, the shock-absorbing effect of these joints is largely lost.
- The combination of a backward-leaning and hyperextended torso and hyperextended knees causes the body weight to land on the heel when stepping. This prevents the

ankle joint and arch of the foot from performing their shock-absorbing function.

- The sum of these factors leads to a *hard gait*, in which the impact of the foot strike is transferred to the body with virtually no shock absorption.
- The lateral shift of the torso over the left leg means that Ms. Winter puts uneven weight on both sides and is less stable.

Analyzing the Gait

To determine whether the observed shift is structural or functional, it is helpful to analyze the gait. The movement sequence of walking, which is much more complex than standing, seems to cause us to move in a way that is dictated by our structure. A pelvis that is shifted *forward* not only functionally, but also structurally, will remain in this position when walking. A pelvis that is structurally shifted *backward* usually moves back toward the vertical line, at least a little, when walking.

Distinguishing between structure and function is helpful in understanding the shape of the fascial network. The better we understand the shape of the fascial network, the more targeted and specific our manual work on the fasciae can be. It is also helpful for movement education to know which patterns are inherent in the fascial network and which are more functionally determined.

Procedure for the Second Session

As part of the Roling Ten Series, the treatment documented here took place during the client's second visit. The photos were taken immediately before and after the session.

As part of the structural analysis, I explained the client's typical posture and movement patterns to her. Then I used Roling-specific manual techniques to release the shortened and tightened areas in the fascial network. She then developed a new movement pattern under my tactile and verbal guidance. The manual work was performed while the client was lying down and also while sitting. I concentrated on the front of the lower legs, the front of the knees, all myofascial structures in the hip joint area, especially the fascial structures at the back of the hip joints, the lower back area, and the region between the shoulder blades. To close the session, I released the fascia in the neck and throat area, and at the transition between the neck and head.

Structural and Functional Work to Complement Each Other

When releasing tightness and eliminating shortening in the fascial network, it is important to remember that this does not always automatically lead to a repositioning of the segments towards the vertical line. In some structural

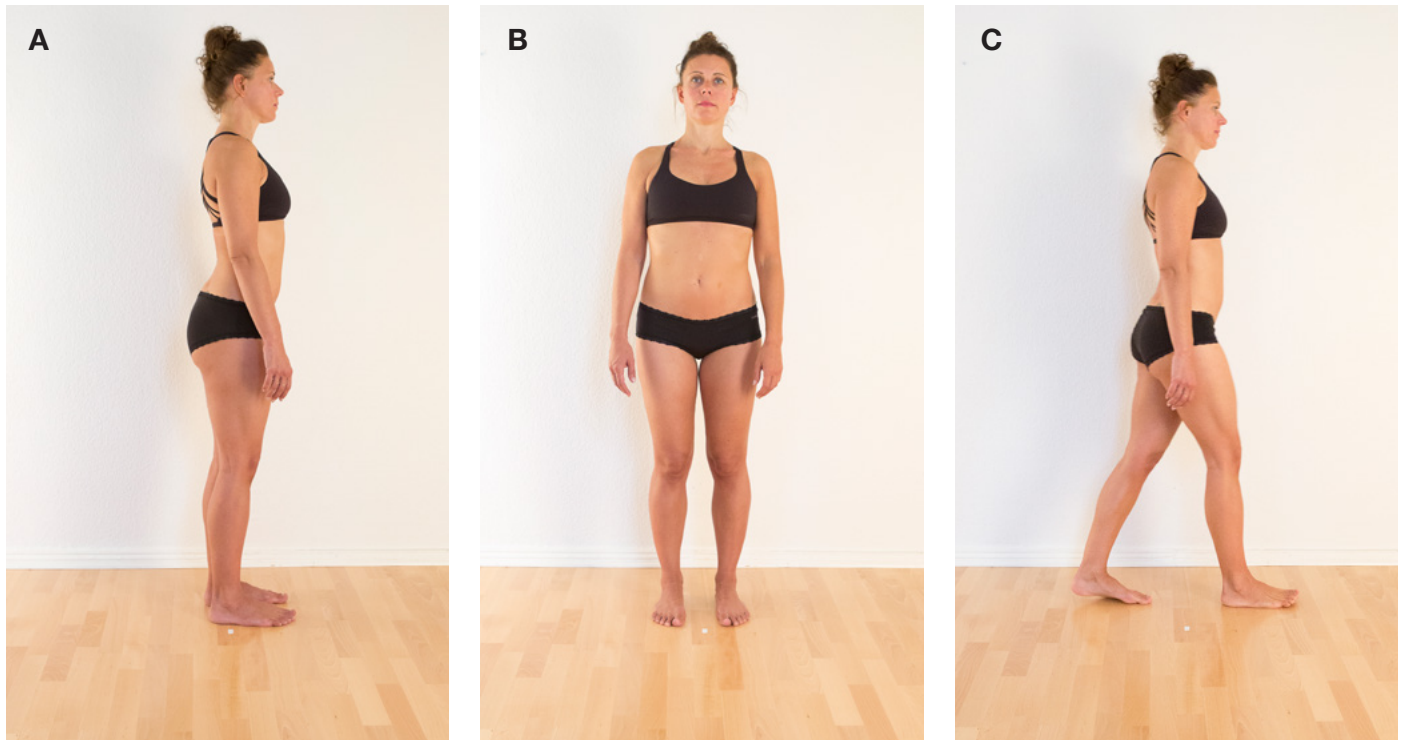


Figure 2: (A) Standing lateral view after session 2. (B) Standing anterior view after session 2. (C) Lateral view while walking after session 2. Photo credit: Jorge Albarracin.

constellations, the additional length and suppleness of the fascia can even cause the body segments to shift or be pulled slightly further out of alignment under the influence of gravity. For the treatment to be successful in the long term, it is helpful to educate the client about movement, encouraging them to consciously feel and perceive the difference between the old and new patterns.

The movement education was carried out with the client standing and walking. I showed her the new pattern using tactile and verbal cues. Particular attention was paid to the hip and knee axes in order to bring the deviation from the gravity line “hip in front – knee behind” (like in Figure 1) into the physiological advantageous direction of “hip behind – knee in front” (see Figure 2A).

This arrangement provides better support for the body, and the lower back in particular is less compressed. Note that the repositioning of the axes and the associated

improvement in alignment and support are not achieved through the use of muscle activity, but through targeted relaxation.

In the frontal plane, after the second session, we observe a clear stretching of the entire body and improved left-right symmetry (see Figure 2B).

The gait pattern at the end of the second session also shows an elongation of the torso and a better alignment of the neck and head region (see Figure 2C). The ankle, knee, hip, and shoulder axes are all closer to the plumb line. This arrangement allows for slight flexion of the knee and hip at the moment of stepping, as well as physiologically advantageous function of the ankle joint and arch of the foot. The entire body is thus better supported and requires less energy for upright posture and locomotion. At the same time, the impact is significantly better cushioned and thus gentler on the entire body.

The repositioning and reorientation described above represent a considerable

challenge for Ms. Winter. On the one hand, the improved support and reduced strain on the lower back are usually clearly noticeable. On the other hand, the new pattern feels strange at first. The shortness of the fascial net, in this case, particularly in the groin and lower back areas, becomes apparent and more noticeable from within.

In subsequent sessions, I focused specifically on these areas to further lengthen the fasciae using manual techniques. The aim is to reduce the anterior tilt of the pelvis and the lordosis of the lower back. This will elongate the entire body even more, resulting in better posture when standing, walking, and sitting. At the same time, the client will become more and more accustomed to the new pattern and will no longer perceive it as strange. The advantages of the new arrangement, such as better support and less compression, will thus become more noticeable.

Lumbar Lordosis is Necessary for Shock Absorption

The criticism occasionally expressed that shifting the hip axis backward causes greater lordosis of the lumbar spine ignores several aspects:

- Lordosis is not caused by the reorientation of the pelvis; it only becomes more apparent.
- The shape that can be seen after the second session is not the end point of the treatment, but the beginning of a process.
- From a structural point of view, it is not enough to consider the shape of the spine alone. The decisive factor is whether the torso as a whole gains more length and better support.
- The view that the lordosis of the lower back is inherently problematic can be considered outdated. The reason is that lumbar lordosis is not a misalignment. It is physiologically normal and necessary for adequate shock absorption.
- In the end, it is not the external appearance that is most important, but the sensation perceived by the client from within, which is usually described as relief in the lower back.

Conclusions

Most clients of Rolting Structural Integration benefit from movement education, in addition to manual fascia work. For those with patterns of hyperextension, movement is the key to lasting change. The case study shows how to work with clients with patterns of hyperextension at the hip and knee axes. Manual fascia work is complemented by verbal and tactile movement cues to reorganize the axes of motion in their physiological directions, resulting in greater length, improved stability, and better shock absorption during movement. Informal case studies are a good way to demonstrate potential problem-solving strategies and encourage further inquiry and discussion.

Hubert Ritter is a Certified Advanced Rolfer™ and has been practicing Rolting Structural Integration since 1994. He lives in Berlin, Germany. He belongs to the following organizations: Dr. Ida Rolf Institute® (www.rolf.org), European Rolting Association e.V.® (www.rolfing.org), the Swiss Society of Structural Integration (www.sgisi.ch), and Rolting® Verband Deutschland e.V. (rolfingverband.de). He can be reached by phone: +49-030-313 98 79 or by Email: hubertritter@yahoo.com; his website is: www.rolfing-ritter.de.

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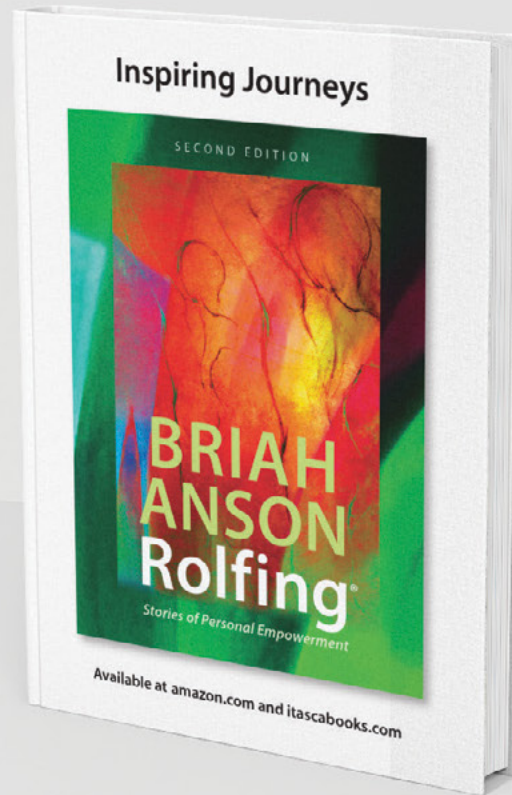
case study; Rolting Structural Integration; fascia; fascial network; manual therapy; movement education; Hans Flury; Normal Function; hyperextension; structural integration; structural analysis; gait analysis; pelvic shift; shock absorption; lumbar lordosis; hip axis; knee axis; body alignment. ■

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Hello from Lafayette, Colorado

The Dr. Ida Rolf Institute® (DIRI) continues to expand educational access and strengthen organizational infrastructure through ongoing strategic planning, faculty development, and hybrid learning initiatives. Over the past year, DIRI has focused on enhancing support for students, practitioners, and faculty while continuing to uphold the standards and legacy of Rolfing® Structural Integration and Rolf Movement® Integration worldwide.

Current initiatives include expanded continuing education opportunities, outreach to past members, and increased efforts to strengthen communication and gather input from the current membership community. DIRI also continues to collaborate with international regions to support the growth of Rolfing education globally while advancing long-term planning efforts centered on sustainability, research, outreach, and practitioner engagement.

In March 2026, Executive Director Samantha Sherwin completed her Doctor of Education (EdD) in Educational Leadership, with research focused on faculty retention and hybrid educational delivery within specialized somatic education programs. Findings from this work continue to inform DIRI's ongoing efforts to support faculty development and educational innovation.

DIRI remains committed to preserving the integrity of Dr. Ida Rolf's work while continuing to evolve in response to the changing needs of students, practitioners, and the broader somatic and manual therapy professions.

Join the European Rolfing® Community in Innsbruck, Austria

Rolfers™, structural integration practitioners, students, and structural integration enthusiasts from around the world are invited to gather in Innsbruck, Austria, for the European Rolfing® Association e.V. (ERA) Biennial Meeting 2026. From September 23rd to 29th, 2026, the European Rolfing community will come together for a vibrant week of workshops, lectures, movement, and exchange in the heart of the Alps.

Hands-on workshops, inspiring lectures, movement sessions, and the Rolfing® Gathering Days create a unique space for professional exchange, learning, and community. With renowned speakers including Peter Schwind, Robert Schleip, Pierpaola Volpones, and Russell Stolzoff. The biennial meeting offers rich opportunities for connection and inspiration – both professionally and personally.

For the first time, parts of the programme will also be accessible online, helping even more members of our global community stay connected.

For more information and registration: <https://rolfing.org/about-us/biennial-meeting-2026>

Rolfing® Structural Integration and Modern Pain Science

This new online course explores Rolfing Structural Integration through the lens of contemporary pain science. Designed for Rolfers™ and structural integration practitioners worldwide, the program examines current research on pain, including biological, psychological, and social factors. It explores how structural and hands-on approaches may contribute to pain management and recovery.

Across eight weeks, participants will explore topics including persistent pain mechanisms, posture and pain, fascia research, sensorimotor changes, and the role of touch, perception, and therapeutic context. The program combines live online classes, pre-recorded lecture modules, reflective learning material, and clinical discussion.

The online course starts in October 2026. More information can be found in the 'Continuing Education' course section on the ERA website: <https://rolfing.org/find-a-course>

Connecting Fascia Research, Medicine, and Structural Integration

The ERA has been represented at the Munich interdisciplinary Fascia Symposium (Münchner Faszientag) on June 20th, 2026, a conference organized by the Clinic for Internal Medicine, Naturopathy, and Homeopathy in Munich Harlaching (KfN) in cooperation with the Fascia Research Group of the Technical University of Munich and Ulm University.

Among the speakers are Professor Dr. Robert Schleip, fascia researcher and Research Director for the ERA, and Dr. Peter Schwind, Certified Advanced Rolfing® Instructor, presenting on fascia research and the structural concepts developed by Dr. Ida Rolf. The event reflects an interdisciplinary dialogue between scientific research, clinical perspectives, and structural bodywork approaches.

Course Listings

2026 & 2027 USA Rolfing® SI Certification Training Programs

Start Date	Location
August 10, 2026	Lafayette, Colorado
August 10, 2026	Atlanta, Georgia
March 5, 2027	Lafayette, Colorado
August 9, 2027	Lafayette, Colorado

2027 USA Advanced Rolfing® Certification Training Programs*

Start Date	Location	Instructors
June 7, 2027	Lafayette, Colorado	Juan David Velez & Bethany Ward

2026 USA Continuing Education Classes*

Start Date	Location	Instructors
June 27 to July 9, 2026	Lafayette, Colorado	Kevin Frank & Caryn McHose
Rolf Movement Integration: The Ten Series as Skills of Perception and Coordination		
October 22 to 24, 2026	Lafayette, Colorado	Tessy Brungardt
Pelvic Girdle and Legs		
October 26 to 28, 2026	Lafayette, Colorado	Tessy Brungardt
Spinal Biomechanics		

* All USA classes can be found at <https://rolf.org/courses>

The Dr. Ida Rolf Institute® is committed to cultivating academic growth and therapeutic skills in all of its graduates. Continuing education studies can cover a broad range of relevant subjects. Certified Rolfers® may take workshops in specific manipulative techniques or may explore other related subjects such as craniosacral therapy or visceral manipulation. Classes are continually being added – please visit www.rolf.org/courses for the most recent updates or to register.

LEVEL 1 Trainings with European Rolfing® Association e.V. 2026-2027 in Stockholm, Sweden (English)

Part 1: September 10 to 20, 2026

Part 2: November 26 to December 6, 2026

Part 3: April 8 to 18, 2027

Instructors: Rita Geirola, Thomas Sonleitner, Jakob Reichardt, Pierpaola Volpones, and Konrad Obermeier

Registration and further details:

<https://www.rolfing.org/education/level-1-myofascial-foundation/level-1-myofascial-foundation-stockholm>

2027 in Munich, Germany (English)

Part 1: March 11 to 27, 2027

Part 2: May 20 to 30, 2027

Part 3: July 22 to August 1, 2027

Instructors: Rita Geirola, Gerhard Hesse, Nicola Carofiglio, Jakob Reichardt, Thomas Sonleitner, Katrin Grobelnik

Registration and further details:

<https://rolfing.org/education/level-1-myofascial-foundation/level-1-myofascial-foundation-munich-0>

2027 in Albinen, in the Valais region of Switzerland (English)

Part 1: June 18 to 28, 2027

Part 2: August 20 to 30, 2027

Part 3: September 17 to 27, 2027

Instructors: France Hatt-Arnold, N.N.

Registration and further details:

<https://rolfing.org/education/level-1-myofascial-foundation/level-1-valais-wallis-switzerland>

2027 in Amsterdam, Netherlands (English)

Part 1:

Movement 1 – September 10 to 12, 2027

Anatomy 1 – October 15 to 17, 2027

Touch 1 – November 26 to 28, 2027

Part 2:

Movement 2 – January 14 to 16, 2028

Anatomy 2 – February 18 to 20, 2028

Touch 2 – March 10 to 12, 2028

Part 3:

Movement 3 – April 21 to 23, 2028

Anatomy 3 – May 19 to 21, 2028

Touch 3 – June 23 to 25, 2028

Instructors: Åsa Åhman, Thomas Sonnleitner, France Hatt-Arnold, Jakob Reichardt, Pierpaola Volpones, Rita Geirola

Registration and further details:<https://rolfing.org/education/level-1-myofascial-foundation/level-1-myofascial-foundation-amsterdam-0>**Advanced Rolfing Trainings with European Rolfing® Association e.V.**
2026-2027 in Munich, Germany (English)

Part 1: August 5 to 13, 2026

Part 2: November 4 to 12, 2026

Part 3: January 20 to 28, 2027

Instructors: Pierpaola Volpones, France Hatt-Arnold

Registration and further details:<https://rolfing.org/education/level-4-advanced-rolfingr-training/european-advanced-rolfingr-training-2026-2027>**2027-2028 in Munich, Germany (English)**

Part 1: November 17 to 25, 2027

Part 2: February 8 to 16, 2028

Part 3: May 3 to 11, 2028

Registration and further details:<https://rolfing.org/education/level-4-advanced-rolfingr-training/european-advanced-rolfingr-training-2027-2028>**Rolf Movement Training with European Rolfing® Association e.V.**

Part 1 - Functional Embodiment of the 10 Rolfing Sessions

October 14 to 25, 2026

<https://rolfing.org/education/rolf-movementtm-training/functional-embodiment-10-rolfing-sessions-part-1-rolf-movement>

Part 2 - Introduction to Leading Rolf Movement Groups

March 3 to 14, 2027

<https://rolfing.org/education/rolf-movementtm-training/introduction-leading-rolf-movement-groups-part-2-rolf-movement>

Part 3 - Strategy and Design of a Rolf Movement 3-Series

July 28 to August 8, 2027

<https://rolfing.org/education/rolf-movementtm-training/strategy-and-design-rolf-movement-3-series-part-3-rolf-movement>

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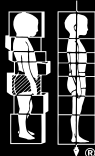
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