Nerves, Arteries, and Veins in SI

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ABSTRACT *In this encyclopedic article, Jeffrey Burch discusses nerves, arteries, and veins with consideration to tissues, fibrosity, the impact of fibrosity on structure, and appropriate treatment (including both cautions and illustrative examples).*

Jeffrey Burch

Introduction

This article discusses the structural roles of nerves and blood vessels in our bodies; how they function well within our structure; how fibrosity in nerves and blood vessels contributes to alignment and mobility problems we as structural integrators observe; how we as structural integrators can recognize these problems, and by what means we can often work with nerves and vasculature to more efficiently achieve the goals of Rolfing® Structural Integration (SI).

On the way to these several goals, relevant features of connective tissue organization and maintenance are described, along with elements of the history of Rolfing SI, and the development of nerve and vascular manipulation. By adding awareness of vasculature and nerves, we can further improve our effectiveness and efficiency, while at the same time allowing our work to be more comfortable for client and practitioner alike.

History

Ida Rolf, PhD taught methods for assessing body alignment and movement that were principally visual. She stated her opinion that we can learn everything we need to know from observing the contours of a person's body. Rolf taught methods of working with fascia to improve the local and global functioning of the person's body and, ultimately, whole being. These methods were the application of pressure, often strongly, in an attempt to change the span of tissue. Sometimes a client would be asked to move in specific ways while the pressure was applied. The force she applied was often substantial, establishing Rolfing SI's reputation as a painful process. Methods have improved over the decades both in effectiveness and comfort, yet the work continues to be described as being painful.

Rolf's doctorate was in biochemistry. Research for her doctoral dissertation and subsequent published research was the elucidation of the lecithin molecule's structure and its many variations, all being from various animal sources. According to her son, Richard Demmerle LMT, DC, ND (personal communication, July 2008), the first person she trained as a Rolfer, she had limited knowledge of anatomy. No information has been presented that she ever took a course in anatomy. Her son Richard assisted her in teaching some of her early classes and describes asking his mother why she did not quiz her students about anatomy. She answered that she was not qualified. Her work was guided principally by visual assessment in a rather artistic, sculptural fashion, with limited attention to the details of anatomy, but rather, as if the body were clay to be sculpted.

In the more than seventy years since Rolf first developed her work, many others have contributed to the field. In addition to observation of static structure, we now include detailed assessment of both active and passive movement. Growing awareness of nervous-system responsiveness further informs our work. Additional treatment methods have been developed within our profession and even more methods have been imported from other professions, notably osteopathy, which could be considered SI's 'parent' discipline because of Rolf's attention to and interest in that field. With more detailed assessment to know the best place to work at each moment, and a larger treatment-method vocabulary, the results we achieve for our clients continue to improve while pain during treatment sessions declines. Awareness of nerve and vascular contributions to structural problems and the methods to resolve those problems is part of this growth.

Tissue Types

Fascia is one type of connective tissue. There are many more kinds of connective tissue including loose areolar, ligaments, pleura, peritoneum, dura mater, and periosteum. Rolf spoke and wrote principally about myofascia, the connective tissue associated with muscles. She also had interest in the peritoneum as shown by the presence in her library of the books by Gallaudet *(A Description of the Planes of Fascia of the Human Body, with Special Reference to the Fascia of the Abdomen, Pelvis and Perineum)* and Singer *(Fasciae of the Human Body and Their Relations to the Organs They Envelop)*, and the fact that those books were required reading when I was trained as a Rolfer in 1977, during Rolf's lifetime.

There is a current fashion encouraged by some prominent Rolfers and other bodyworkers to refer to all types of connective tissue as fascia. This brings awareness to the fact that the human body has only one piece of connective tissue, a continuous extracellular matrix, which branches, divides, and changes texture from one part of the body to another. Naming the whole web as fascia draws attention to its unitary and continuous nature, and at the same time distracts from how strongly differentiated one part of this matrix is from another. Speaking of the whole fibrous extracellular web as the 'connective-tissue matrix' can foster awareness of both continuity and differentiation. Regions of this web are variously named as fascia, ligament, cartilage, periosteum, peritoneum, pleura, dura, loose areolar tissue, etc., reflecting both differences in texture, and in some cases location.

The fiber content of the various types of connective tissue differs from each other in two aspects: types of fiber and quantity of fiber. Some fibers, such as the various elastins, are – as their name suggests – elastic or stretchy. Other fibers, the various types of collagen, are not elastic. All types of connective tissue contain both elastin and collagen but in very different proportions. For example, loose areolar tissue is mostly elastin with little collagen. Tendons are about half collagen and half elastin. Various kinds of connective tissue also differ in total fiber content. To use some of the same examples, loose areolar tissue has low total fiber content, tendon has much higher fiber content, and articular cartilage has the highest fiber content of the three.

Experience with releasing nerves and vasculature suggests that a large part of apparent fascial stiffness is actually neurovascular fibrosity . . . Focusing assessment and treatment precisely on neurovascular structures makes for a more effective and efficient treatment.

Maintenance and Repair of Connective Tissue

Connective tissue is extracellular and is created and maintained by certain migratory cell types of mesenchymal origin. Fibroblasts have shape and movement like amoebae, and function like silk worms producing fiber. They have been visualized crawling through tissue and streaming multiple strands of fiber from their trailing end. Another type of migratory cell, the fibroclast, removes fiber. In daily life, fibroclasts remove fiber from the body in small amounts here and there, and fibroblasts lay down new fiber in response to the recent history of mechanical forces on that area of the body. Thus, our connective tissue matrix is continuously remodeled to match our body's patterns of use. The half-life of collagen in articular cartilage is measured at 117 years, and in skin at fifteen years. When there is tissue damage this replacement process is accelerated as the fibroclasts remove damaged fiber, which is then replaced by the fibroblasts.

Think of a house damaged by a hurricane: there is some demolition to do before rebuilding can begin. Often when a hurricane hits there has been wholesale damage to a house, and sheets of plywood are promptly nailed over the now empty window and door openings to preserve the interior of the house from wind and rain damage. Temporary structural support may be supplied in various forms to prevent collapse. As repair continues, these quickly applied, early protective elements are progressively removed and replaced with a more refined final structure. Something similar happens within our bodies in response to an injury. Initial repair usually produces too much fiber, and an initial-repair fiber-content balance shifts strongly toward less elastin and more collagen than that tissue normally has. Later, the body removes part of this excess collagen for better fiber-type balance and more appropriate total fiber content. A number of factors can leave too much collagen, both in proportion and total content. Generally, the more severe the injury the more collagen is left. Re-injury or over-use after injury will contribute to excess residual collagen. Having a high normal vitamin D level at the time the injury occurs tends to lead to more appropriate fiber content during healing. Comfortable and gentle movement during healing promotes appropriate fiber content in the repair. In severe injury, appropriate movement may initially be quite small, even as little as just the intent to move. Very gentle external mobilization has been shown to reduce the incidence of adhesions (Chapelle and Bove 2012).

After an injury, completion of replacement and remodeling of this new fiber may take up to two years. Depending on nutritional status, activity level, and genetic factors, the final state of the connective tissue may be either excessively fibrotic, fairly good, or lax (insufficient fiber).

Content and Behavior of Fiber in Nerves

We are accustomed to thinking of nerves as the very long cells that carry information. Nerve cells have a bulbous portion known as the body and thin projections of various lengths up to one meter long called axons. The diameters of human axons are each microscopically small, ranging from .004 mm to 0.2 mm. At the very least, a magnifying glass is required to see one of them. We also have nerves that can be seen with the naked eye and easily palpated with the hand. The radial nerve at the wrist is about 2 mm in diameter. The sciatic nerve is about 20 mm in diameter. These macroscopic nerves are multi-conductor cables containing many individual axons. Like any multi-conductor cable, the individual conductors, axons in this case, must be covered in insulation to prevent crosstalk – a leakage of electrical charge between them. This insulation is connective tissue. As multi-conductor cables become larger, additional material must be added for structural support so accelerations from gravity or other forces do not rupture the cable. This structural material in nerves is also connective tissue. Histologic examination of macroscopic nerves shows the composition of each nerve to be between 50% and 90% connective tissue, with the axons making up the remaining minority of the substance of each nerve (Barral and Croibier 2007).

Nerves are usually embedded in loose areolar tissue – a low-density, mostly elastin part of the connective-tissue matrix – which facilitates movement of the nerve through other tissues as the body moves, and while buffering it from friction against neighboring structures. In healthy tissue, nerves glide extensively through the body during movement of all kinds ranging from simply breathing during sleep to extreme sports. Nerves are also elastic. In resting neutral position, nerves have a little tension in them like lightly stretched bungee cords. As we pull, stretch, and bend portions of our body's nerves, elasticity is engaged to elongate and shorten, accommodating to movements of neighboring tissues. This slight tension is an expression of the elastin component of the connective-tissue portions of the nerve.

Damage to Nerves and Associated Tissue

Both the connective-tissue components within nerves and the loose areolar tissue surrounding nerves are routinely damaged by any of several mechanisms including direct blows or abrasion, overuse, and allergen or other irritant exposure. Once damaged (even slightly), inflammation begins. Fibroclasts and fibroblasts congregate from the far reaches of the body to begin the repair process. The worse the damage, the greater the amount of inappropriate movement during healing, and the poorer a person's nutritional status is, the more likely healing will end with inappropriate (usually excessive) collagen fiber content reducing both the elasticity of the nerve and its ability to glide through neighboring tissue. In other words, when contractures and adhesions are formed, this limits the nerves' ability to move through neighboring tissue and to change length. These fibrosities make movement more effortful, may reduce range of motion, and may anchor body parts in less than ideal relationship to each other.

Examples include:

1. Stiff nerves emanating from the brachial plexus and traveling deeply through the shoulder structures anterior to the midline may contribute to a shoulder girdle held in protraction.
2. Shortened occipital nerves running from upper cervical roots up onto the back of the head may fixate the atlanto-occipital relationship in extension.
3. A fibrosed femoral nerve may increase lumbar lordosis and anterior tilt of the pelvis. It may also hold the femoroacetabular relationship in more flexion and external rotation of the femur.

Additional Consequences of Nerve Fibrosity

Our bodies are protective of nerves. When a nerve is less able to stretch and glide it is more vulnerable to being torn during quick movements or acceleration injuries. Our nervous system will engage musculature to protect the nerves, further limiting movement and producing fatigue-related discomfort from the overworked muscles. Skeletal muscle is meant to operate intermittently, not continuously.

Relationships Between Nerves, Arteries, and Veins

An artery and a vein accompany each nerve in the body, the three traveling together. Arteries carry oxygenated blood away from the heart. Veins return deoxygenated blood to the heart. Nerves have a very high metabolic rate and when deprived of blood supply die more quickly than most other tissues. All along their shared course, arteries supply many arterioles to nerves and many small veins return the blood from the nerve to the venous system. These vascular elements supplying nerves are called vasa nervorum. Similarly, nerves innervate the arteries and veins at numerous sites along their course with branches called nervi vasorum.

Assessment and Treatment of Nerve and Vasculature Fibrosity

Nerves and vasculature travel through the body in intermuscular septa and other planes of connective tissue. While the intermuscular septa and related tissues may be fibrosed, experience with releasing nerves and vasculature suggests that a large part of apparent fascial stiffness is actually neurovascular fibrosity. It seems that many times when we thought we were treating planes of fascia we were inadvertently treating neurovascular structures. Focusing assessment and treatment precisely on neurovascular structures makes for a more effective and efficient treatment. To be clear, working with nerves and vasculature will not accomplish everything; however, at many moments in the SI process, work with nerves, arteries, or veins is the most productive thing that can be done. Therefore, skills in working with neurovascular structures are essential colors in every structural artist's palate.

Mechanisms of Injury

This next section will examine mechanisms of injury to neurovascular structures.

Direct mechanical damage: Arteries, veins, and nerves can be bruised or torn by direct impact or abrasion. Such injuries may be very serious requiring prompt medical treatment, or they may be very subtle.

Ballistic stretch: Overstretching can injure nerves and vasculature. It is possible for a stretch to simply be too far, but the speed of the stretch is at least as important. Quick, sharp pulls on the body can be quite damaging. Examples include a quick movement by a dog pulling on a leash, or a sudden wind shift jerking the sheet in a sailor's hand; or, with whiplash injuries, the vertical arteries in the neck, notably the vertebral arteries, are routinely injured**.**

Inertial sidebending or distension: In impact injuries to the body, severe inertial forces damage tissues. If my arteries and I are flying through the air together and my body comes to a sudden stop on the ground, many arteries are still moving. The whole artery or the leading edge of the artery can be damaged by the inertial movement of the mass of blood inside of it. The cause of Princess Diana's immediate death in a 100-mile-per-hour motor-vehicle collision was a torn aorta. Her aorta was not directly hit, but rather, the tear was from an inertial injury. This type of injury was elucidated by research conducted in the late 1970s in France.

Pierce injury: Veins can become quite fibrosed from repeated hypodermic needle sticks. That is one reason why ports are installed when repeated injections must be done.

Chemical injury: Vasculature (particularly veins) is severely damaged by certain chemotherapy agents. Other allergen or irritant substances entering the body by oral ingestion, inhalation, or transdermal means can damage vasculature and nerves.

Reduced repair rate: We all get minor insults to vasculature from time to time. Repair of these injuries requires adequate levels of methyl folate. While methyl folate supplements are now available, our bodies normally make it out of folic acid (vitamin B12) utilizing the methyl folate transferase (MTHFR) enzyme. If a person has either insufficient folic acid intake or gene coding for inefficient MTHFR enzyme, or both, small insults to vasculature will accumulate or be poorly repaired. Like inadequate maintenance for a house or car, insufficient vasculature maintenance accumulates toward failure. Lack of dietary vitamin B6 produces similar effects for nerves.

Differences in Response of Arteries and Veins to Mechanical Insults

Arteries are far more likely to be fibrosed by mechanical damage than veins. Arteries and veins travel right together in the body, but the two respond differently to impact injuries or abrasion. Blood leaves the heart under substantial pressure and travels out through smaller and smaller arterial branches eventually losing its pressure in the capillaries. Blood must then return to the heart under very little pressure. To contain and tolerate higher pressure, the walls of the arteries are much firmer than veins. Palpating an adjacent artery and vein such as the radial artery and vein at the wrist, the artery has a distinctly cord-like, firm feel, whereas the accompanying vein has a softer feel resembling an uninflated bicycle inner tube. While arteries are constructed to handle more internal pressure than veins, the same structural difference makes them more vulnerable to jerk and inertial sidebend injuries. A familiar analogy is an oak tree and a willow tree standing side by side, both being bent down by a windstorm. After the storm the willow springs back up with little damage, while the oak lays shattered.

Cautions

Nerves, arteries, and veins are critical to life and are somewhat delicate. In some pathological conditions they may even be more fragile than usual. While some basics of assessment and treatment for blood vessels are described below, they are for illustrative purposes only; it is imperative that the reader receives good-quality, closely supervised training before attempting to assess or treat any nerve, artery, or vein. Training in nerve and vascular manipulation is available from several sources including: The Barral Institute (barralinstitute.com); Jon Martine (jonathanmartine.com); and Kirstin Schumaker (agilebodysi.com).

Additional Cautions

Even with proper training, there are other cautions to consider, both physiologic and philosophical.

Before attempting any assessment or treatment of any nerve, artery, or vein you must receive thorough, good-quality, and closely supervised training.

Physiologic cautions: Blood vessels are more fragile in some people than others. Consider the risk factors known and the ones from suspected kin or first-degree relatives (parents, siblings, and children). At a minimum, discuss risks and benefits with your client and proceed with utmost caution. The greater the severity and/or number of risk factors present or suspected, the more weight is given to *not* proceeding with neurovascular manipulation.

Risk factors include but are not limited to:

- advancing age
- aneurism including palpation or ultrasound imaging of aortic or other vascular anomalies
- diabetes
- easy bruising
- Ehlers Danlos syndrome – vascular type
- heart attack
- hemophilia
- hypertension
- low vitamin B12 level
- low vitamin B6 level
- low vitamin D level
- phlebitis
- serious MTHFR mutations
- stroke

Philosophical caution: Occasionally a practitioner will fall in love with nerve and vascular manipulation, using it disproportionately to working on other kinds of connective tissue. This is as great an error as ignoring nerves and blood vessels.

Practical Application

Source and Target Method for Nerve and Vascular Assessment and Treatment

While it is often useful to assess the glide of nerves and blood vessels at many specific points along their length, a great deal can be accomplished by using structures attached to ends, or certain other points of these long, narrow structures, as 'long-lever' handles.

Each nerve and artery supplies something. These structures can be referred to as *targets* of the nerves and arteries. With notable exceptions including the brain and pancreas, many of these supplied target structures are sturdier and more easily accessed than the nerves and blood vessels that supply them. We will first consider nerves.

Where a nerve emerges from the central nervous system may be described as its *source*. The bony elements of this source can serve as a long-lever handle on that proximal end of a nerve. Nerves emanating from the spinal cord supply most of the body. Each spinal nerve exits between two bones, usually two vertebrae. The present description of assessment and treatment will treat only spinal nerves, though these methods are readily adaptable to the other anatomic variations.

In the interest of completeness, here is a summary description of variations on this nerve anatomy theme. Cervical nerves exit between the occiput and first cervical vertebra. In adults, sacral nerves exit through the sacral foramina, each of which in children are portions of two sacral vertebrae. Coccygeal nerves exit the sacral notch, which is describable as a natural and appropriate spina bifida of the two inferior sacral segments. Cranial nerves exit apertures in the cranial base, some of which are wide spaces between two bones and some of which are apertures through an individual bone. The situation is a little more complex with autonomic nerves; however, these are also traceable to spinal segments and ultimately to brain nuclei.

If one contacts the bony segments of the axial skeleton that a nerve emerges from with one hand, and the target tissue the nerve innervates with the other hand, and slowly moves the target tissue away from the source along the anatomic line of the nerve, soon enough of the elasticity of the nerve will be used up so that the bony segments will be felt to move under the traction of the now gently stretched nerve. If the bony segments are observed to move too soon in response to the target-tissue traction, this indicates the nerve is strung too tight.

Flossing Treatment Technique

Several different manual therapy methods can be used to reduce fibrosity associated with nerves and vasculature. The flossing method was developed specifically for this purpose and is often a good choice. Here is a basic description of the flossing treatment technique. More complex versions are sometimes used.

Make two points of contact more or less distant from each other. The contacts should be arranged so that gentle stretch is possible between the two points. In some instances the path between the source and target will go around one or more anatomic 'corners'. Then, by moving the two hands slowly away from each other, load the tissue to be treated to a first barrier of stretch between the two contacts. A first-barrier load is the point noted when a structure is stretched, compressed, or bent in an extremely slow fashion, where the first modest step-up in force is required to further change the shape of the tissue. This is in contrast to a smooth force deformation curve for other materials that do not exhibit this step phenomenon.

While maintaining this gentle stretch, move both hands in the same direction but with the leading hand moving slightly faster than the following hand so both glide and stretch are maintained at first-barrier loads. When a limit of glide is reached, reverse directions without releasing the stretch load. The very gentle stretch elongates the nerve or artery. The moving back and forth at the same time helps reduce adhesions along the nerve or artery. Several small increments of both lengthening and improved glide will usually be felt. When movement is sufficiently improved or there is a larger, more general sense of release, it is an indication to stop. Also, if the slightest hint of fluid filling is felt, indicating even the slightest inflammatory response to the treatment, stop. This treatment should be entirely comfortable. Instruct the client to tell you about the slightest discomfort. If discomfort is felt, lower the forces used to a level comfortable to the client, or stop. As Loren Rex, DO said (personal communication to me from Tom Takeuchi, DO), "It is better to undertreat by a mile than to overtreat by an inch."

Here are some examples:

Radial nerve: The radial nerve originates from all nerve roots C5-T1. The C5 nerve root exits the spine between C4-C5, and the T1 nerve root exits the spine between T1-T2, thus traction on a structure innervated by the radial nerve may produce motion in any vertebra C4-T2. The radial nerve innervates the base of the thumb, along with other upper limb structures. Thus, if the client is lying supine, the practitioner can stand or sit at the side of the client facing his/her torso. If the right radial nerve is to be examined, the practitioner is at the right side of the table. Fingertips of the relaxed left hand are placed in contact with the spinous processes of C5-T1, while the right hand gently grasps the base of the client's right thumb. The fingers of the left hand monitor movement of the spinous processes while the right hand slowly tractions the base of the thumb distally. Ideally, the thumb can be moved about a centimeter before all of the monitored vertebrae are felt to displace laterally. If some or all of the vertebrae move in response to a shorter displacement of the thumb, this indicates nerves are strung too tight. Which vertebrae move indicates which roots of the nerve are tightest. For treatment, the left hand in contact with the vertebrae is then moved to the lateral aspect of the spinous processes. The right hand remains holding the base of the thumb and is slowly distracted distally until the first hint of movement of the vertebrae is felt. With this slight stretch, flossing treatment can be initiated.

Intercostal nerve: Each intercostal nerve originates from the spine between two vertebrae, associated with two costotransverse joints on either side of the intercostal space of interest. While additional details can be palpated separately, a good place to start is with one hand on the spinous processes of the two vertebrae associated with that intercostal space, and a fingertip contact on intercostal musculature at the anterolateral portion of the intercostal space. While this can be done with the client supine, a sidelying position is more convenient with the side to be treated up. The procedure is then the same as for the radial nerve described above.

Gluteal nerves: The gluteal nerves arise from L5-S2 nerve roots. Thus, one hand on the spinous process of L5 and the upper part of the sacrum and the other hand on the gluteus maximus provides 'handles'. As with the radial nerve example, gently traction the gluteus maximus muscle belly distal along its fiber direction toward the greater trochanter. Observe movement in the vertebral segments in the usual way.

Vascular Treatment

Restoration of stretch and glide of blood vessels is similar to that for nerves, however the source handles are of a different kind. Unlike nerves, vasculature does not present bony handles. Instead, relatively proximal portions of blood vessels are used.

Here are some examples:

Artery to deltoid muscle: The subclavian artery supplies virtually all of the blood to the upper limb, thus the subclavian artery is a good handle for vasculature to many shoulder girdle and upper arm structures. As a partial pre-test, standing at the supine client's side use the tips of a thumb and index finger to *gently* reach behind the mid portion of the clavicle. Gently traction the tissue first medially and then laterally, and compare with the other side. You will learn to recognize the feel of a stiff subclavian artery.

Developmentally, the deltoid muscle is formed as three separate muscles, which usually fuse together in maturity. These three are the anterior, middle, and posterior portions of the deltoid muscle, with all converging to its insertion at mid-shaft of the humerus. First traction each of these separate portions of the deltoid distally, noting their relative elasticity. Next, gently traction the subclavian artery on that side distally, and while maintaining a hold of the artery, again gently stretch each of the three deltoid portions distally to test the elasticity. If a deltoid portion that was stiff is now less tight or relatively slack, this indicates a tight vascular branch into that portion of the deltoid muscle. Use the belly of that portion of the deltoid muscle and the subclavian artery for the flossing technique. As always, this method of working should always be comfortable for your client.

Extensor muscles of the hand: A major branch from the subclavian artery is the brachial artery, running close to the humerus between the medial sides of the biceps and triceps muscles. Its pulse can be readily felt. This artery makes a useful handle for vasculature to forearm structures. Similar to what was done with the deltoid muscle, gently traction each of the extensor muscle bellies in the forearm distally, and note which are tight. Then gently traction the brachial artery distally, and maintaining this gentle arterial load again, gently traction the extensor muscle bellies noting which ones are now less tight. Floss between the brachial artery and that extensor muscle belly.

Gastrocnemius muscle: Posterolateral and posteromedial to the knee are the two popliteal arteries that supply blood to the lower leg. Anastomoses between the two popliteal arteries allow each of the two arteries to perfuse all parts of the lower leg. Such redundancy in vascularization is the norm in our bodies.

As pre-tests: 1) With the client supine, dorsiflex the ankle noting the range and ease of movement. 2) With a hand under the calf, gently traction the lateral head of the gastrocnemius distally, noting the ease and extent of excursion. Compare with the medial head of the gastrocnemius. 3) Locate the pulse of the lateral popliteal artery. Gently traction the artery distal, and maintaining this gentle load on the artery, retest the distensibility of the stiffer head of the gastrocnemius. If that head of the gastrocnemius now stretches farther and more easily, this indicates tension in an arterial branch from the lateral popliteal artery to that head of the gastrocnemius. Similarly, try slacking the medial popliteal artery. Any tight branch from a popliteal artery to a gastrocnemius belly can then be treated with flossing in the usual way.

After flossing, test again with these post-tests. 1) Having released your hold on the popliteal artery, traction the head of the gastrocnemius. Does it stretch farther or more easily than in the pre-test? 2) Dorsiflex the foot. Does it go farther and/or with less effort than before?

Conclusion

In some instances, astute assessment of the elasticity and glide of nerves and blood vessels are the only way a Rolfer can achieve portions of the goals of SI. In other instances, assessing and treating nerves and blood vessels is a more efficient, less effortful, and more comfortable way to achieve the goals of SI. Used appropriately, manipulation of nerves and vasculature is an indispensable set of skills. I look forward to a day when an expanded basic training of SI includes thorough training in nerve and vascular manipulation.

Jeffrey Burch was born in Eugene, Oregon in 1949. He grew up there except for part of his teen years lived in Munich Germany. Jeffrey received bachelor's degrees in biology and psychology, and a master's degree in counseling from the University of Oregon. He was certified as a Rolfer in 1977, and completed his advanced Rolfing SI certification in 1990. Jeffrey studied cranial manipulation in three different schools, including with French etiopath Alain Gehin. Starting in 1998 he began studying visceral manipulation with Jean-Pierre Barral and his associates, completing the apprenticeship to teach visceral manipulation. Although no longer associated with the Barral Institute, Jeffrey has Jean-Pierre Barral's permission to teach visceral manipulation. Having learned assessment and treatment methods in several osteopathically derived schools, he then developed several new assessment and treatment methods that he now teaches, along with established methods. In recent years he has developed original methods for assessing and releasing fibrosities in joint capsules, bursas, and tendon sheathes, which he is also beginning to teach. Jeffery is the founding editor of the IASI Yearbook*; he contributes regularly to this Journal and elsewhere. He is a longtime member of the Dr. Ida Rolf Institute® Ethics Committee. For more information visit www.jeffreyburch.com.*

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