The Functional Rationale of the Recipe

by Monica Caspari, Certified Advanced Rolfer, Rolfing Instructor
Rolf Movement Practitioner, Movement Instructor

"Although man needs continuity, form and limits, he is open to the infinite and to the universe."
Berdiaev[1]

This paper is an attempt to synthesize the author's years of study and teaching of Rolfing® and Rolf Movement with the concepts she has learned from Hubert Godard – Rolfer, movement educator and dancer, brilliantly articulate on many occasions in Brazil, America and Europe. The author wants to express to him her deepest gratitude for his capacity to share his academic knowledge and wisdom of experience.

With this work, the author wishes to honor the genius of Ida P. Rolf; and to thank Vivian Jaye and Jane Harrington, who planted the seeds of the author's personal curiosity about movement and who, together with Pedro Prado, nurtured her vision of Rolfing. She also wishes to acknowledge the community of Brazilian Rolfers, whose members have contributed generously to the development of the "Brazilian personality" in Rolfing. She also thanks her Rolfing instructors Jeff Maitland, Stacey Mills, Michael Murphy, Gael Ohlgren, Peter Schwind, Heather Starsong and Jan Sultan; and her colleagues – especially Lael Keen, Robert Schleip and Adjo Zorn – and all those who have studied with her. They all contributed. Finally, she thanks Heidi Massa for her input and assistance with this paper.

ABSTRACT

This paper describes the functional logic of the recipe and proposes a point of view that addresses the client's subjective experience of function. For each session, it describes the functional goals and poses pertinent questions about perception (concerning the space-time relationship) and about coordination (concerning the centers of gravity and biomechanics). It also explains the difference between structural lesions and functional inhibitions, and indicates considerations relevant to teaching Rolf Movement. It suggests an approach that aims to treat clients not only for them to "look better" or "feel better," but also for them to express themselves better and take fuller advantage of the human condition – which includes the body and its inherent movement potential. Therefore, it proposes a 50/50 blend of structural and functional work.

INTRODUCTION

All of us have wondered what makes some structural integration processes more successful than others. At all times, we are dealing with three sources of limitation: the practitioner, the client, and the technique itself. It is not enough to look at the practitioner's and client's limitations. We cannot discard the possibility that some cases are less successful than they might have been because of limitations in Rolfing itself, as currently practiced. It is in this spirit that the community has been exploring cranial-sacral and visceral manipulation, biomechanics, and many other techniques, to see how they work in the context of Rolfing. This article argues that the logic of the recipe is absolutely functional; and that if we really integrate function into our toolbox, our success rate will certainly improve.

LESIONS VERSUS INHIBITIONS

Life is about action – especially interaction and exchange with the environment and others. This dynamism of life is the key to its capacity to renew itself. It differentiates living organisms from machines. But until now, as a community, we have been better at defining the static line than the dynamic line in motion. Accordingly, we have been better at working with the body in a static state than with the body in motion. While the structural work liberates fixations in the tissues, functional work addresses fixations in movement patterns. While structural work gives conditions for the appearance of the line, functional work gives the line life.

To differentiate structural fixations from movement fixations, Godard calls the first lesions and the second inhibitions. Lesions – unlike inhibitions – manifest as restrictions of fascia or joints when the client is tested for passive range of motion. Lesions are best addressed at the manipulative or biomechanical level, while inhibitions must be addressed at the perceptive and coordinative levels (the perceptive level having to do with the senses and the coordinative level with neuromotor pathways and muscle firing sequences.)

Long-term inhibitions often become lesions, which may appear at the site of the inhibition, or somewhere distant from it. Consider: we average 16,000 to 20,000 breaths and 11,000 steps per day. Inhibitions that affect our breathing and walking can create much of our restriction, malfunction and pain.

Godard calls posture the potential for action. Each of our movements is initiated by largely unconscious Anticipatory Postural Activity (APA, or pre-movement), which frames the potential for action and coordination. The APA sets the initial condition, or the starting place, from which we move. The APA is a function of our perception of where we are in space and in relation to gravity – which perception, in turn, affects and is directly affected by the coordination.

Inhibitions are not restrictions in the tissues, but rather holdings or attitudes in the APA. Inability to perform a particular movement is often linked to an inhibition in perception – i.e., a lack of correct information. In such cases, to enhance the client's potential for movement, we must first address perception. If someone cannot perceive a bodily sensation, we help the person to develop a vocabulary of sensations. If the difficulty persists, we might use other sensory channels – such as sight, hearing or touch –

to access the missing feeling.

Inhibitions arise from the body image (dictated by our subjective experience, personal history and beliefs) – not from the body schema (the "animal" in us). Inhibitions originate in how we perceive the world, which implicates our emotions. Therefore, the release of APA inhibitions often occurs in part at the psychological level.

HOW TO TEACH MOVEMENT

As Rolfers, we are after grace, pleasure, aliveness, and coherence of the body in motion. Deliciousness, joy and happiness are more important than perfection.[2] Thus, the first step is to develop a kinesthetic compassion for the client, to establish a kinesthetic conversation, to receive the client's movement. To this end, we read the client's body through our own body, allowing ourselves "to be touched" in a broader sense by the client. We must, at least initially, suspend all interpretations and only feel what we see. Remember that there are always benefits – be they antalgic, structural, psychological or social – in the client's existing posture and movement patterns. We do not want to deprive the client of these, but to offer greater and healthier possibilities by taking all the sub-systems of the body to the next possible level of integration.

We could speculate that the human being was designed for walking and running, but not so much for sitting. It was not designed at all for flying or swimming under water. We were made for living outdoors, sticking our heads out and up to see where we were going and to make sure no big cats were after us. Primitive man walked or ran about eight miles per day to find food – barefoot, with feet adapting to the irregularities of the ground.

Even though breathing never required our ancestors' conscious attention, our "problems" with it might have originated with the need to control it in order to speak. We also went indoors and got more complex in our way of relating to kin. We tucked our necks and heads inward and started relating more to the eyes of the other than to the distance outside. Thus, by means of socialization we tended to lose the "up" direction, the orientation towards space. More and more we liked to stay inside and to sit. This requires little stamina, so our breathing became more abdominal, weakening our deep abdominal muscles. Then we decided to wear shoes, which became more sophisticated as time went by, until we no longer had to use our intrinsic muscles of our feet and we became even softer. Our steps became shorter, we stopped using our knees as they were designed, and thus we developed knee and sacroiliac pains, which in turn... The story goes on and on: one day we had the idea of eating highly refined food – of creating fast-food chains and grocery stores – and our guts started to malfunction...

Movement instruction is not about correcting, fixing, or changing the client. Rather, it is about increasing the possibilities for the person to be in the world. To teach movement is to address the phenomenology of the most basic movements.[3] Phenomenology aims to understand – rather than to explain – phenomena, and takes the experience of the person as the starting point. It considers the experiencer, and the fact that any experience occurs within a certain context. For Rolf Movement, this means to recognize that the client experiences movements in the context of both relationship to things and other persons and to the force of gravity.

Because it occurs in context, a movement is more than the sum of its deconstructed biomechanical parts. It follows that we cannot teach a movement by deconstructing it. This is not to say that we should forget biomechanics, but only that – however important the biomechanical aspect might be to the practitioner – it is generally not the best route for introduction or reinforcement of new openings for the client. Beyond cognition of movement, we want consciousness of movement. In other words, we want awareness combined with reflection, and the ability to concretize experience in language.

The look of a movement is a gestalt: a structure, configuration, or pattern of physical, biological, or psychological phenomena so integrated as to constitute a functional unit with specific properties. Look at the figures on this page. They are gestalts: you can see the old lady, the young girl or the moustached man – but you cannot see more than one of them at once. The same is true with the "two faces" versus the vase. To teach any movement, we must first see its gestalt. To know the functional logic of the recipe and to own the functional goals of each session helps us to see the gestalt of the movement we want to evoke in each session.

The biggest problem for motor activity is perception because, prior to any movement, we must orient to our surroundings. Perception is neither proprioception nor sensation – which requires transition from the physiological to the emotional and cognitive levels. Perception does, however, concern our senses, especially with respect to how we orient to the information coming from proprioception, touch, sight and hearing, as well as smell and taste. The senses can be focused inside or outside the body. We have all experienced times when we were so focused on "seeing" our own thoughts that we failed to see or hear some-

Figure 1: Old lady or young lady?

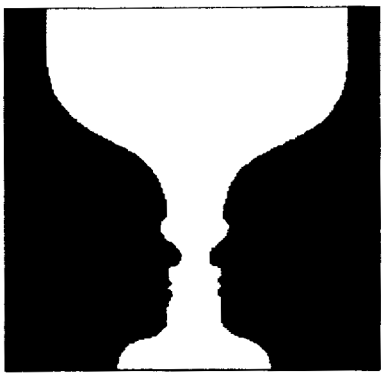


Figure 2: Two faces or a vase?

Examples of Gestalts

one right in front of us or talking to us (in these cases, seeing and hearing are focused inside). We have also experienced being so engrossed by our surroundings that we have "forgotten" to eat or drink.

Intra-sensoriality refers to this dynamic of orienting one of our senses either inside ourselves or outward into the environment. Inter-sensoriality, on the other hand, refers to the phenomenon of one sense seeming to assist another. Does your sense of smell enhance your ability to taste? Is your hearing better when you are wearing your eye glasses? A similar phenomenon occurs in blind people who "see" through their highly developed sense of touch.

Perception is fundamental to spatial orientation. Thus, to teach movement, which depends on perception, is to address how the client organizes space, both internal and external. Through our personal history, culture and symbolic constructions, the perception of our bodies – as well as of the immediate surrounding external space in which we can act (the kinesphere) – diverges from objective reality. This divergence can distort the kinesphere – in essence, flattening it. When we reconstruct our perceptions of both the body and the kinesphere into ones less divergent from objective reality, we restore our possibilities of being.

In fact, we cannot really teach movement cortically because the person's coordinative structures, which depend on the person's perception, are too strong. All we can do is change the landscape that forms the context for the person's movement. This does not mean to change the person's surroundings, but rather to change the way the person perceives them, and therefore relates to them.

Perception and coordination come together like the two faces of a coin. Coordination refers to the interplay between tonic and phasic muscles[4] and local and global muscles[5], as well as the sequence of their firing. The moment we affect perception we change coordination, and vice-versa. What's more, as we affect perception, we affect the sensations. And because sensation is the bridge between the physical and the emotional, we can affect the person's psychology through work with perception and coordination in the context of gravity. Perhaps this is a gravity- oriented psychology, and we have arrived at the Rolf Movement Circle of Being, with its physical, mental (rational/cognitive), emotional and spiritual aspects.[6]

Organization of perception and coordination should involve the deep stabilizing muscles, which are the most important ones to stimulate in order to evoke the intelligence of the body. However, proper action of these muscles depends on the initial condition of the APA – which, in turn, depends on perception and the ability to project (imaginary) vectors in space. When working with perception, we must address the imaginary – not the imagination. We do not want to create stories, but to evoke the representation of a potential movement. The imaginary process creates the possibility of vectors in space that allow the flow of movements.

In teaching the flow of a movement, its coordination should be addressed before its form. The key is to allow plenty of time for exploration of the movement, and to reinforce it many times and in many different ways. The more plastic the coordination, the better it is – and the more the person will be able to maintain it with changes of context.

We want to teach movements that flow – not sequences that are imposed. For this, we as practitioners must put 99% of our effort into "hearing" with our own bodies, and the remaining 1% into evoking the desired movement in our own bodies. One must become an appropriate body schema that communicates wordlessly – but empathically – with the body schema of the client. The client will then unconsciously entrain with the practitioner and mirror the practitioner's movement or tonic state. In this manner, the Rolfer induces the desired function in the client. Godard calls this phenomenon metakinesis.

To evoke fluid movement, the practitioner needs to give precise information with the correct organization and timing. This is not easy, and requires relating to the client in a clear and clean manner. The practitioner must orient in at least two directions: I must be in myself and with the other at the same time. But implicit in this "ambi-valence" is the existence of a boundary between the client and myself. Along with the possibility to go to the other, I must have the option not to go. Only if I have my own kinesphere and spatial orientation intact can I effectively touch the other.

This quality of touch is especially powerful for clients with poor proprioception. When I touch my client where there is a hole in the sense of touch in his skin – and therefore also in his proprioception – it restores the lost proprioception, and with it, the possibilities of the other senses. Therefore, I must touch my client in 3-D, from my own substratum (base of support) and space orientation. This implies that I must change my own tonic organization to inform my client at the somatic level. When teaching movement, the first challenge is not to change the client, but to change ourselves.

Similarly, in body reading, the initial question is not about the client, but about the practitioner. We must first rest our analytical eyes and be open to receiving information through our own bodies and in our own bodies, with kinesthetic empathy (not kinesthetic sympathy, lest we lose our own centers). We must cultivate the ability to receive, to resonate, to welcome the movement of the client. As Godard says, "The practitioner should give benediction to the movement of the client even when he does not succeed and [then] start all over again, from the anticipatory postural activity."[7]

A good body reading captures the melody of the client. We must read the client's movements in all three planes (flexion/extension in the sagittal plane, abduction/adduction in the frontal plane, and rotations in the horizontal plane). No model of seeing the static will suffice. We know what the static line looks like, but what does the dynamic line look like? A functional model of seeing should imagine the best possible flow of movement, given the specific anatomy of the client. With a good idea of what this movement might look like, the practitioner can identify the impediments to it, whether they be lesions – or inhibitions at the levels of perception, coordination or meaning.

To know by heart the functional (and structural) goals of each session is fundamental to movement work in the context of Rolfing. However, in any session, the most important questions in a body reading are:

- Does the client have support from the substratum (ground) and from space?
- Where are the gaps in the client's perception?
- Where are the gaps in the client's coordination?
- What and where are the client's resources?

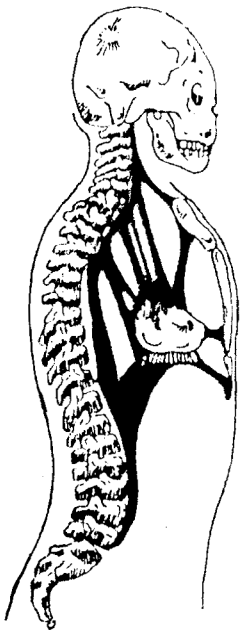
- Where and how can the practitioner meet the client?

THE FUNCTIONAL LOGIC OF THE RECIPE

"No, I don't have a new path; what I have anew is the way of walking." Thiago de Mello[8]

SESSION 1

Structurally, Session 1 concerns the relationship of the thorax to both the pelvis and the shoulder girdle: we want to differentiate the thorax from each of these, mobilize the pelvis around a horizontal axis, and free the breathing pattern. Functionally, it concerns coordination between the thorax and the pelvis and release of shoulder girdle impediments to thoracic motion. If any of this is not good enough, the lumbars will become problematic, which will affect the breathing. Walking will also become problematic due to the attachment of the psoas to the lumbars. To paraphrase Vivian Jaye[9], the way we breathe is the way we walk, and vice-versa.



Observe the interplay between the diaphragm and the curves of the spine. The diaphragm also shares a pattern of mutual influence with gait, as it relates to the spine via the psoas. From *La Respiration*, Ph.-E Souchard, Portuguese language version, p. 19. Brazilian edition by Summus Editorial, 1989, ISBN 853230360-9.

As already noted, posture is the potential for action – including the action of breathing. If the thorax is behind the pelvis, the weight will go down to the heels and the feet will lead the gait. This pattern tends to have abdominal breathing. However, if the thorax is slightly in front of the pelvis, the person will have more balance in walking, with more forward and outward movement. This pattern tends to have thoracic breathing. Finally, if the thorax is behind the pelvis but the shoulders are medially rotated, the person will show tense superficial abdominals and the pelvis will lead in walking. This pattern tends to have thoracic breathing with more lateral expansion.

Breathing also requires a balance between the directions upward into space and downward to the base of support. More specifically, inhalation orients up into space, which requires freedom in the neck and head. Exhalation orients to the ground, which requires support from below.

There is much discussion about which is "correct" breathing: abdominal or thoracic. Ideally we would like to have both available, depending on the situation. Pure abdominal breathing is better suited for relaxation (parasympathetic activation). It uses about 25% of the lung space, with the central tendon of the diaphragm descending and substratum orientation being dominant. It is the release of the transversus abdominis that allows the descent of the central tendon.

Thoracic breathing is better suited for action and rapid motion (sympathetic activation). It utilizes up to 75% of the lung capacity, using the central tendon as the fixed point against the action of the infra-umbilical portion of transversus. The dome of the diaphragm elevates with the chest. The transversus activation that facilitates thoracic breathing also stabilizes the lumbars. If the lumbars act as the fixed point, the proximal portion of the crura will be pulled downward. (What we call the "diaphragm" is really two different muscles: the dome of the diaphragm – with its central tendon – and the crura. They have different embryological origins and innervation.) Thoracic breathing opens the torso and is congruent with orientation to space – although it is still necessary to connect with the substratum to activate the transversus and the lower internal obliques).

Average breathing is a mixture of these two extremes, starting with descent of the central tendon, followed by elevation of the lower chest.

Over-activation of the external obliques and rectus abdominis causes posterior pelvic tilt – which, in turn, diminishes the lumbar curve and directs the descending force of the diaphragm to the pelvic floor (which is not so good, as we shall see later). When the transversus abdominis and internal obliques work properly to stabilize the lumbars, the normal curve of the lumbars is preserved, and the descending force of the diaphragm goes toward the sub-umbilical region, where it is countered by the transversus. The rectus abdominis can stay relatively soft. Should the transversus and internal obliques not engage adequately, the rectus will activate and inhibit thoracic breathing by restraining the sternum.

Starting the series with the breathing has an ontogenic logic: the first thing a newborn does to adapt to the new environment is to take a deep in-breath.[10] It is automatic, and depends on basic neurological and biomechanical mechanisms.[11] But the experience of breathing, just like any other experience, is by no means common; it is unique for each of us.

The main *functional goals* of Session 1 are:

- Does the client have support from the substratum (ground) and from space?
- To optimize the coordination between the thorax and the pelvis.
- To free the chest from the shoulder girdle and arms.
- To organize the orientation to space (eccentric breathing tends to take us into extension, while concentric breathing tends to take us into flexion.).
- To organize in the sagittal plane the relationship of G′ — the center of gravity of the trunk, head and arms, found at or near the level of T-4/T-5 – in relation to G (the center of gravity at the pelvis, found at or near the level of L-5/S-1). To organize the general center of gravity G in relation to the line joining the front of the malleoli is a subject of the second session to reinforce from below the work of the first session.
- To organize with the horizontal axis between the heads of the femurs the relationship between G′ and G. This has to do with G′ and G in relation to anterior and posterior pelvic tilt.

The main *questions of perception* (space-time relationship) are:

- Does the client have the potential to adapt to changes – or is the client too generally rigid to do so?
- Does the client have the potential to breathe in the chest?
- Does the client have the potential for the yes?
- Does the client have the potential to receive?
- Does the client have the potential to open towards space?
- Does the client need to develop the connection from the inside towards the outside?

The main *questions of coordination* (biomechanics and centers of gravity) are:

- In relation to G', do the arms rotate slightly laterally when the client inhales?
- Do the arms have the capacity to reach?
- Can the client have a more congruent angle for the head?

SESSION 2

In Session 1, we worked with orientation to space (reaching) and coordination between the thorax and the pelvis through the mobilization of the pelvis around the horizontal axis that joins the heads of the femurs. The latter affected the spine, perhaps evoking more resilience and responsiveness in the multifidi, which rotate and stabilize the vertebrae. In this respect, we were already improving the orientation towards the substratum and the system of support and the continuity through the spine.

Nothing in the integrated body works in isolated planes, which is why one sign of integration is the appearance of contralateral motion. Contralaterality occurs on three levels – the spine, the girdles and the limbs – the most important of which is the spine. Spinal motion takes the form of spirals and torsions. In walking, the torsion from the lower body should meet the counter-torsion from the upper body at or near T8 / T9. Similarly, at or near C7, the torsion of the thorax meets the counter-torsion of the neck. Many traditions recognize energetic centers – the solar plexus and the *Da Zhui* acupuncture point, for example – at or near these functional centers. Difficulties arise when the action of one spiral overpowers the action of another.

Integrated walking depends on the spinal torsions and counter-torsions that occur within the span between the feet and the head. The points where torsions change to counter-torsions are the points where a lordosis meets a kyphosis. This spinal movement is itself generated by myofascial tension originating in the legs during walking. First, biceps femoris triggers both multifidus and transversus abdominis, and longissimus lumborum and iliocostalis. Then, the iliotibial tract triggers gluteus maximus and the contralateral latissimus dorsi. These forces, acting on the bony structure of the axial complex, allow the alternating torsions of the spine. The shape of the bony structure also allows the efficient transmission of these forces to generate equal and opposite motion of the pelvis, on the one hand, and the shoulder girdle, on the other.

Imbalances in the relative lengths of the *functional* lordoses or kyphoses (the *functional* lengths of these curves do not necessarily correspond to the *anatomical* definitions of the lumbar, thoracic and cervical regions) will distort contralaterality in the spine.[12] Such imbalances in the spine are frequently caused by disturbances in the breathing pattern. So, as we treated the back to improve breathing in the first hour, we were already addressing walking. In the second hour, we shall take both walking and breathing to a higher level of integration.

In infants, the head – with its vestibular apparatus[13] and sub-occipital muscles dense with proprioceptors – is the first center of gravitational orientation to develop. The second is the feet, the soles of which have thousands of baroceptors to inform the brain stem and the cerebellum. These brain regions organize our verticality and balance in standing and in walking. Thus, the feet are key to our relationship with gravity – functionally, as well as structurally.

The legs must generate the tensions that produce the spinal torsions, yet the position of the feet and head must be independent of those torsions to maintain forward orientation. What happens biomechanically during the unipodal phase of the gait? First, the body weight transfers from two feet to one foot via the tibia and fibula of the standing leg towards the talus – and from there to the lateral arch, composed of the calcaneus, the cuboid, and the 4th and 5th metatarsals. The weight then goes to the transverse arch, from whence it is distributed to the medial arch. Meanwhile, the femur of the standing leg medially rotates in relation to both the pelvis and the tibia (the *screw-home*).

Now, the foot of the standing leg can push off against the substratum. This causes the pelvis to shift over the standing leg. The broader the pelvis, the larger this shift, and the more pronounced the internal rotation of the femur. In a narrow pelvis, the rotators and adductors tend to counter-balance – and sometimes even oppose – the medial rotation of the femur. Lateral shift of the pelvis over the standing leg causes the sacrum to side-bend to the opposite side.

Here is a template to help us see walking:

Broadly speaking, we are looking for movement in three planes. As the weight shifts from one leg to the other, we want to see the pelvis shift laterally in the frontal plane. When the non-weight-bearing leg swings forward as the standing leg remains fully extended, the pelvis rotates in the horizontal plane. Finally, an adequate relationship with both the substratum (*down* direction) and space (*up* direction) requires balanced movement in the sagittal plane. Excess motion in any plane will inhibit motion in the others.

We want to see coordinated transmission of weight through the arches, but we do *not* want to see the legs dissipating the torsional forces. Proper differentiation of the lateral and medial arches allows the foot to maintain a sagittal orientation upon weight transfer as the tibia laterally rotates and the fibula descends to transmit the weight to the cuboid and the 4th and 5th metatarsals. The standing tibia should slide freely anterior over the talus, even as the heel remains in full contact with the ground. If the tibiotalar joint is not free to articulate fully in the sagittal plane, we will see locking or compression of the spine.

We also want functional toes, especially the hallux, 2nd, and 3rd toes. Without an articulating hallux, we will not see full extension of the posterior leg. The hallux and its two neighbors must take full advantage of the floor and use it to propel the body forward – just as the tires of a car push the road back to propel the car forward. What's more, absence of hallux articulation is a sign of a shortened psoas, as articulation of the hallux corresponds to the lengthening of the

Notice how the aboriginal person (far left) and Jesse Owens, who won four gold medals in Berlin 1936 (far right), have their whole bodies and senses oriented in the same direction – extending their legs back (using their toes) and looking where they're going – while the vision of the runners in the center picture is oriented away from the direction of travel. Also notice how the aboriginal person's front heel is reaching into the ground, while the heel of the person in the foreground of the center picture is not.

psoas, which can then contract efficiently through the stretch reflex. Finally, the hallux should orient straight ahead. Any muscle action that impedes the medial rotation of the femur will diminish the economy of the movement. If the rotators cause the leg to rotate laterally, the walk will come from the adductors, creating unnecessary friction of the hallux with the substratum (and sometimes even creating or reinforcing bunions).

The effect of aesthetic norms on foot structure. Schematic of the bony structure of a Chinese woman's wrapped foot, compared to an x-ray of a foot in a high-heeled shoe.

The knee of the extended leg should extend fully, opening the "knee lordosis"[14] and transmitting the impulse from the feet as they relate to the substratum upwards toward the spine. Many knee problems develop because the knee joint never articulates fully, as a result of which the meniscus is not massaged and nourished adequately. We also want the leg to come forward by the activation of the psoas stretch reflex – not by the quadriceps, whose action inhibits the psoas and can deflect the direction of the knee off the sagittal. This is important because the position of the knee determines where the foot will land.

The next step should be initiated by the dorsum of the foot (instead of the calcaneus) with the ankle joint loose, the foot working more like a paw than a hoof. The calcaneus of the swinging leg should be able to reach the substratum while the standing foot remains totally on the ground. Otherwise, the walk will lack support. Absent support from the calcaneus of the standing leg, the body cannot take full advantage of its design for efficient walking.

Photo of a Chinese woman's wrapped feet: Any resemblance to the shape of a foot in modern pointy-toed shoes?

Functionally, the second hour presents an excellent opportunity to activate intrinsic muscles throughout the body. Finding the intrinsic muscles of the feet in walking (opening the feet to the floor) helps release tight hamstrings (which affect the pelvis, the spine, and ultimately the breathing). Because the bones of the feet – via the ligaments – have an intimate relationship with the thorax and the cranium, work with the feet activates the intrinsic muscles of the thoracic and cranial spaces.

Evoking spiral movements in the trunk will help activate the intrinsics and thus improve coordination. While working on restrictions in the foot, ankle or leg, invite the client to reach across the chest. If you are working with the right foot, ask the client to reach with the right arm. The motivation of the action influences the sequence in which the muscles fire: if the client *reaches* across the chest, the internal obliques fire first; but if the client *pushes*, the external obliques fire first. Asking the client to *reach* will evoke the firing of the intrinsics first. This allows freedom of movement in the thorax during walking.

The *functional goals* of Session 2 are:

- Open the *down* orientation to the substratum.

- Improve the capacity of the feet to *land* and *take off* so that they function as both shock absorbers and catapults.
- Improve the quality of support through the legs.

The main *questions of perception* (space-time relationship) are:

- Does the client have the capacity to exhale? Although we address the breath in Session 1, full support through the legs reinforces the exhale.
- Does the client orient to the substratum?
- Do the feet have the capacity to *reach* to the substratum?
- Does the client have the capacity to feel or perceive the substratum because *there is* a substratum below?
- Does the client have the capacity to orient and open towards the caudad direction during the manipulation?

The main *questions of coordination* (centers of gravity and biomechanics) are:

- Do the ankles give support for G, the general center of gravity?
- Are the toes active, such that the client can push off the substratum and leave it behind?
- In walking, is there mobility in the sagittal plane at the tibio-talar joint?
- In walking, is there mobility in the frontal plane at the subtalar (talocalcaneal) joint?
- Are the three arches coordinated? (The landing happening in the lateral arch; the transmission of weight going from the lateral arch to the medial arch through the transverse arch; and the take-off happening through the medial arch, with active hallux and second and third toes?)
- Is there freedom of movement in the interosseus membrane (balance between the short and long flexors and extensors?) If so, when the calcaneus is reaching for the ground the toes remain relaxed (not grabbing); and when the body weight flows into the foot, the toes seem to lengthen away – like tooth paste flowing out through the tip of the toes.
- Is there balance at the knees between the lateral and medial hamstrings?
- Are the suboccipitals free during the exhale? (Having the client reach with the hands or the chin can help release the suboccipitals)
- Are all five lordoses working in harmony? (When the lordoses are working in harmony, they all flex and extend with fairly equal amplitude; when one or more of them are out of sync, all lose their synchronized movement, and one or more will flex or extend to a different degree than the others).

SESSION 3

In the first hour, we improved the relationship and coordination between the thorax, on the one hand, and the pelvis and shoulder girdle, on the other hand (orientation to space). In the second, we sought to improve the relationship and coordination of the lower limbs (especially the feet and lower legs) among themselves, on the one hand, and to the spine and the substratum, on the other hand (orientation to the ground). Now we will address the relationship between the anterior and the posterior aspects of the body – especially in the torso. While Sessions 1 and 2 focused on the sagittal plane, Session 3 focuses on the frontal plane (abduction and adduction). Put another way, we will treat the themes of the first and second hours from the side. This takes to the next level the client's balance, orientation to space and substratum, and expression of G′ in breathing and G in spinal flexion and extension.

We have defined *posture* as potential for action. But we can also see posture as an accumulation of attitudes. Attitudes concern our relationships with others and things. When the lateral line is disorganized, it is disorganized *in relation to* other persons and the environment. Godard teaches that social anxiety (emotional discomfort) manifests through disorganization of the lateral line of the torso, such that one will be unable to be in a particular space or in oneself. With this disorganization, the person's *volume* gets lost.

Traditionally, we achieve the lateral line by organizing in the frontal plane the pelvis in relation to the hip axis and the shoulder girdle in relation to the thorax. We also free the 12th ribs to allow organization of the pelvis in relation to thorax.

When doing the upper-body portion of Session 3, we habitually underestimate the role of serratus anterior in the organization of the lateral line, shoulder girdle and upper limb. According to Godard, serratus anterior is the "king of the shoulder girdle." If the serratus anterior is not working properly as a local stabilizer, the global trapezius will undertake the task of upper girdle stabilization – instead of being free to perform movements and more global stabilization. Instead of being supple and elastic, these global muscles become hard and inelastic. Activating and bringing into the body image the client's weak serratus during the third hour begins the task of balancing the action of the local and global muscles of the shoulder girdle.

Having already addressed the three lower lordoses (the root of the toes, the plantar surface of the foot and the back of the knee) we will now address the lumbars and cervicals. As the legs become more differentiated from the pelvis, we expect the lumbars to be freer of the pelvis, as well. For example the lumbars should have control of the glutei – not *vice versa*. Likewise, having differentiated the arms from the shoulder girdle and the shoulder girdle from the thorax, neck and head, we expect that the arms can move without impinging upon the cervical lordosis. The cervicals should have control of the deltoids – not *vice versa*.

In the lower body, good differentiation of the leg from the pelvis (as well as its prerequisite – coordination of the lower limb joints) increases potential forward flexion of the torso at the hip joints, which allows the thorax to be free of interference from the legs through the pelvis – such as short hamstrings restricting the position of the thorax by distorting the position of the pelvis. Ultimately, it is the legs having independence from the pelvis that frees the thorax. The possibility of forward flexion from the hips (instead of from the waist) frees the pelvic floor, and thus allows awareness of visceral space. Perhaps this explains the importance of releasing lesions in the trochanters in the early hours.

In walking, whatever the lower limbs fail to do will have to be accomplished by the pelvis or the thorax. In general, men tend to hold the pelvis in the frontal plane and compensate with more movement in the thorax or shoulder girdle; while women tend to swing the pelvis more in the frontal plane and compensate with reduced movement in the thorax and shoulder girdle. In both cases, the relative motion of the girdles is out of balance; and the lumbars are re-

stricted by either the pelvis or the thorax. When we work to free the 12th ribs, we are in essence liberating the lumbars from the girdles – which is a step in the direction of balancing the girdles relative to each other.

As in the second hour, the third hour presents opportunities to activate the client's intrinsic muscles. When the intrinsics are active, the extrinsics cease to work to stabilize the body, and can remain elastic and fluid. One of the many reasons to activate the intrinsic muscles of the foot (especially the short flexors of the toes) is this: connecting to the substratum via the intrinsics of the feet helps activate the intrinsic short flexors of the hands. This, in turn, helps to balance the shoulder girdle with the thorax and the front with the back. In the third hour, we remind the client to find the intrinsic muscles of the feet, and from there teach the analogous movement of reaching with the hand, rather than the shoulder.

However, the client's intrinsics respond best when stimulated by activity in the practitioner's intrinsics. A good start is to find the intrinsics of your own feet and allow yourself to receive the client. Then, tracking the client from your own sternum (G'), you can evoke movement in the client by offering information to the client's body directly from your own.[15]

The embodiment of the lateral line introduces the issue of abduction v. adduction, and foreshadows the fourth hour question of the medial line of the legs. Contralateral movement requires transition of movement from the sagittal plane (extension and flexion in the first two hours) to the frontal plane (abduction and adduction). Encouraging the client to reach – to project a vector into space, or to invent the space into which to move – to the opposite side with either the feet or hands will help the client embody the lateral line of the third hour – as well as the medial line of the fourth hour.

The *functional goals* of Session 3 are:

- Balance orientation towards the substratum (ground/down) and the surroundings (space/up). Look for equal responsiveness at the pelvis/legs and shoulder girdle/chest.
- Balance the expression of G' in breathing, such that G' can go forward and up in inhalation, and back and down in exhalation.
- Balance the expression of G so that it moves backward in flexion and forward in extension.
- Free the lumbars from interference by the pelvis and thorax.

The main *questions of perception* (space-time relationship) are:

- Is there balance between interoception (sense of the inside) and exteroception (sense of the outside) – allowing the person to inhabit more of the inside and outside space?
- Does the pelvis have the possibility to reach towards the substratum?
- Do the shoulder and hand have the possibility to reach for space (others and things)?
- Is there a glimmer of perception of the visceral and thoracic spaces?

The main *questions of coordination* (centers of gravity and biomechanics) are:

- Are the tonic and phasic muscles of the trunk balanced?
- Is there clear flexion from the hip hinges (the beginning of the visceral space perception)?
- Do the arms have the capacity both to reach and push across the trunk?
- Is there balance in the lateral line from the neck to the heels? Are the scalenes and suboccipitals free from the sternocleidomastoids or are they being overpowered by the SCMs? Is the serratus anterior stabilizing the scapula – or is the scapula being governed by the trapezius, levators and pectoralis minor? Are the lumbars governing the glutei — or are the glutei impinging on the lumbars? (Too much glutei in relation to iliacus will disturb the psoas function.) Is an overactive tibialis anterior causing the soleus to grab, thus inhibiting the action of the intrinsics of the feet?
- What is the next level of contralateral coordination between the legs and the arms? Ideally, we would like to see equal movement for the legs and arms.
- What is the next level of integration between the shoulder and pelvic girdles in terms of transmission of motion from the sagittal to the frontal plane? Have we begun to evoke contralateral movement as the client perceives a more "round" field?

SESSION 4

We have already seen that differentiating the legs from the pelvis and organizing the pelvis around the hip axis allows greater forward flexion of the trunk, which brings awareness of the pelvic floor and visceral space. However, imbalances in the frontal plane of the legs (relationship between abductors and adductors) will restrict forward flexion of the hip joint. Try this yourself: standing with your legs in "neutral," flex the trunk forward at the hip joints. Then try flexing with your legs in lateral or medial rotation, and feel the diminution of flexion. In Session 4, we continue the Session 3 work in the frontal plane to improve the relationship between the legs and the pelvis and begin to improve the capacities of the pelvis in locomotion.

Whenever there is a problem in the coordination of the five lordoses, the pelvis will have to compensate with either anterior or posterior tilt over the femurs. When Ida Rolf talked about a "horizontal pelvis," perhaps she meant a functionally neutral pelvis, neither posterior-tilted nor *excessively* anterior-tilted. In fact, we need a bit of anterior pelvic tilt for optimal spinal action and pelvic floor integrity – *i.e.*, for proper walking and breathing.

When the pelvis is not functionally balanced, its movement in walking will not be balanced in the frontal plane: someone with too much movement of the pelvis in the frontal plane (which tends to go with orientation towards the substratum) will tend to walk from – rather than through – the pelvis. But a person who has limited pelvic movement in the frontal plane (which tends to go with orientation to space) will tend to walk from – rather than through – the thorax.

First, as to walking, if the pelvis is really *horizontal* – without any anterior tilt at all – the person will lose the lumbar lordosis, and the functional mechanics of the contralaterality in the spine will be subverted. Excessive anterior tilt of the pelvis tends to cause medial rotation of the femurs, while the posterior tilt of the pelvis tends to cause their lateral rotation. If the pelvis has too much lateral travel in the frontal plane during walking, the sacroiliac joint will never close adequately when the foot is reaching the substratum (the *exhale* phase of the step). Without good SI closure, the sacrum and lumbars are dragged by the action of the legs. Conversely, if the pelvis

has too little lateral travel during walking, the sacroiliac joint will never open adequately when the homolateral leg is in the swing phase. Eventually, impaired opening or closing of the SI joint produces poor transmission of motion to the spine, interference with contralateral spinal motion, and SI pain; the dynamics of both breathing and walking are adversely affected.

In walking, the femur of the extended leg rotates slightly medial. The lateral rotators and gluteii react to close the sacroiliac joint. This closure stretches the psoas, which both stabilizes the head of the femur in the acetabulum and prepares the psoas to contract in the next phase to propel the leg forward. For this to work, while the psoas of the standing leg is stabilizing the head of the femur, the force must be transmitted from the lateral to the medial arch of the standing foot – which, in turn, requires the medial line of the leg to lengthen (this will also prepare the opposite leg for the next step). To preserve the spring action of the medial arch, the navicular must reach – not collapse – towards the floor as the tibia medially rotates.

Often, restrictions in one leg cause lesions or inhibitions in the opposite hip, and *vice versa*. For example, either the right adductors or the left femoral rotators can limit left lateral movement of the left hip, thus compromising the normal closing and opening of the sacroiliac joint. So, when we watch someone walk, we also want to see how the lesions and inhibitions relate to each other.

Second, as to breathing, the pelvic floor forms the base of support for the action of the respiratory diaphragm. It is not flat, as the word *floor* suggests; instead, it is shaped like a funnel with its lowest point at the anus. The walls of this funnel – the bony pelvis and a thin layer of muscle – were designed to distribute the weight of the superior structures to the obturator area and myofascial structures of the legs. Only part of the pressure is distributed medially – to an area where the pelvic floor is reinforced by the external muscles of the anal sphincter, the perineum, and the pubococcygeus. In a truly horizontal pelvis, the weight of the superior structures would not be diverted adequately to the obturator area and legs, but would fall instead directly over the center of the pelvic floor, which was not designed to directly support the weight of the viscera above.

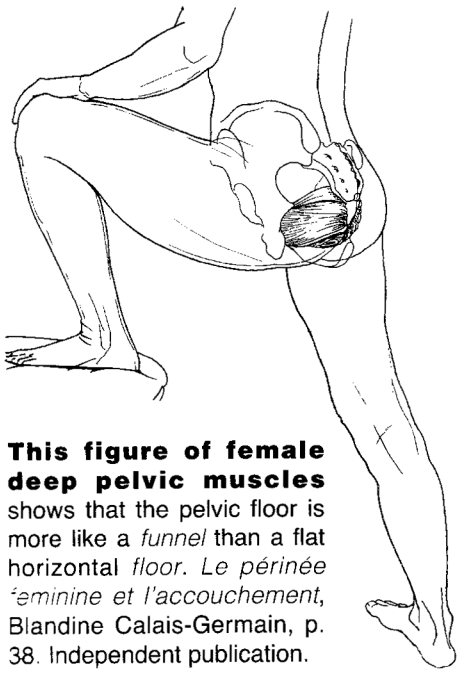
Either hypotonus or hypertonus of the pelvic floor muscles (especially levator ani) can affect the bony pelvis at four points: the sacroiliac joint, the pubic symphysis, the ischial spine, or the coccyx. The two most vulnerable areas in the pelvis are the pubic symphysis and the coccyx. Unbalanced forces can shear the articular surfaces of the symphysis (which is very painful) and deflect the normal kyphosis of the coccyx. A straight sacrum and coccyx indicate pelvic floor hypotonicity, while extreme flexion of the coccyx indicates the opposite. Pelvic floor strain will be transmitted either inferior, through the hip and legs, or superior through the lumbars.

The pelvic floor has both non-striated muscles (*e.g.*, the internal anal sphincter) and striated muscles (*e.g.*, the external anal sphincter and the levator ani).[16] In sympathetic arousal, the striated muscles contract to prepare for fight or flight. Deep abdominal breathing is hindered, but a base of support for thoracic breathing is provided. In contrast, during parasympathetic arousal, the relaxed muscles encourage abdominal breathing. Thus, chronic pelvic floor contraction or laxity indicates not only a structural pattern, but also the habitual orientation of the autonomic nervous system.[17]

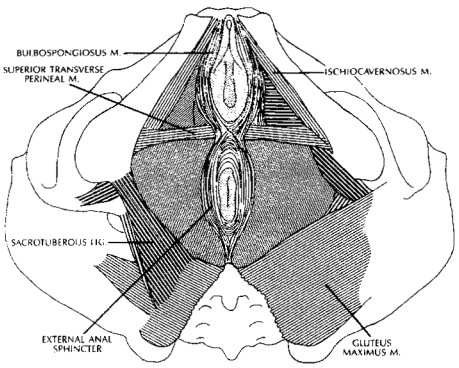
As changes in breathing affect the pelvic floor and changes in the pelvic floor affect breathing, in the first hour we were already working with the pelvic floor, and in the fourth hour we are again working with breathing. Even though, as structural integrators, our focus is not psychology, we influence the psyche and the client's awareness of it through our work on breathing – especially in the pelvic floor.

The *functional goals* of Session 4 are:

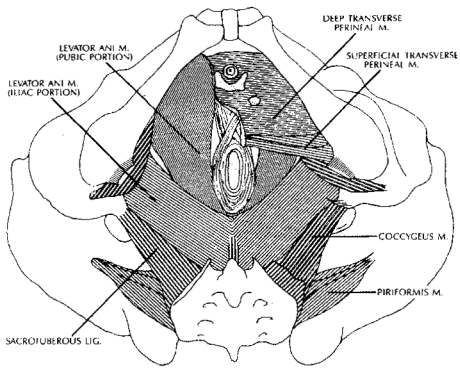
- Independence with stability between the legs and the pelvis.
- Coordinated action of the two halves of the pelvis through the sacroiliac joints.
- Function of the distal portion of the psoas in walking.
- Balance between adductors and abductors.
- Improved coordination among the toe, ankle, knee and hip joints.



This figure of female deep pelvic muscles shows that the pelvic floor is more like a *funnel* than a flat horizontal *floor*. *Le périnée féminine et l'accouchement*, Blandine Calais-Germain, p. 38. Independent publication.



Inferior View of the Female Pelvic Floor — Superficial Muscles



Inferior View of the Female Pelvic Floor — Deep Muscles

***Visceral Manipulation*, Jean-Pierre Barral, figures 9-2** (The Superficial muscles of the Pelvic Floor) and 9-1 (The Deep Muscles of the Pelvic Floor), Eastland Press (March 1, 1988), ISBN: 0939616068.

- Clear functional differentiation of the adductors from the hamstrings and quadriceps.
- Competence and coordination of the lower "diaphragms" (plantar, knee and pelvic) so that they all work together and none of them lock.

The main *questions of perception* (space-time relationship) are:

- Does the client perceive the pelvic floor?
- Does the client perceive the intra-abdominal (visceral) space?
- Does the client have the connection of the pelvic and respiratory diaphragms; *i.e.*, that torsions in the legs yield imbalances in the pelvic floor, for which the respiratory diaphragm must compensate?

The main *questions of coordination* (centers of gravity and biomechanics) are:

- Does the client differentiate and balance the function of the adductors (orientation to space) and psoas (orientation to substratum)?
- Does the client differentiate the two potential fixed points of the psoas: proximal, at the lumbodorsal hinge v. distal, at the lesser trochanter?
- Are the four leg hinges (toe, ankle, knee and hip) coordinated?
- Are the plantar and pelvic "diaphragms" coordinated? Does the client have the possibility of the next level of contralaterality: a sense of the need for adequate – but not excessive – tonus in the pelvic floor for transmission of the contralateral impulse through the *functional lumbodorsal hinge*?

SESSION 5

In Session 4, having taken the relationship and coordination of the legs with the pelvis to the next possible level of integration, and thus having begun to enhance pelvic floor function, we indirectly affected the functional lumbodorsal hinge. But this hinge is also influenced by the muscles in and around the pelvis and torso. In the fifth hour, we want to connect the legs directly to the lumbars through the psoas without impediments from the torso and the pelvis itself. If we accomplish this, we will also improve the relationship between the pelvic and respiratory diaphragms.

Classically, the focus of Session 5 is on the psoas. One key function of the psoas is to stabilize the head of the femur, which is a prerequisite for contralateral motion. Thus, Session 5 is also about enhancing contralaterality.

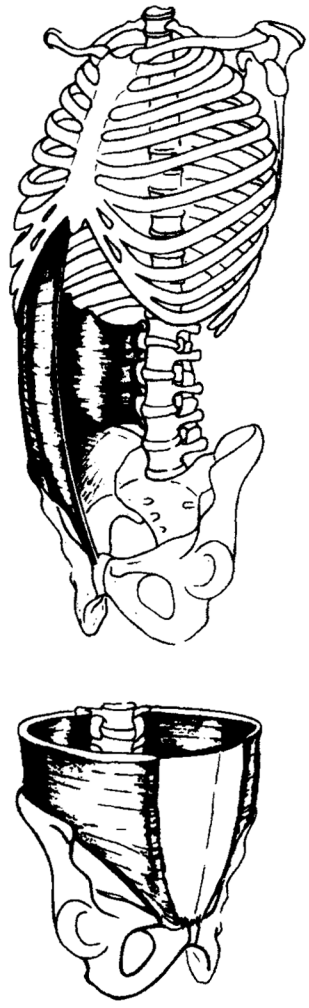
Some of the many factors that foster contralaterality include:

- Independence between the two legs;
- Freedom of the sacrum from the ilia;
- Coordination between transversus abdominis and multifidus;
- Coordination among serratus anterior and the internal and external obliques;
- Coordination between psoas and hamstrings;
- Coordination between psoas and latissimus dorsi;
- Cervical freedom relative to the thorax and abdomen; and
- Full breath capacity.

Independence between the two legs. In walking, one leg must remain stable and firm, while the other moves freely. However, the femur of the standing leg must be free to rotate medially during the unipodal phase of the gait, while the ilium makes a slight anterior tilt. In this phase, the external rotators of the femur and the psoas are front-to-back stabilizers of the pelvis. If the medial rotation of the femur is lost, the psoas is not counter-balancing the obturator internus.

Freedom of the sacrum from the ilia. A free yet functionally stable sacrum is impossible without lumbar lordosis. Lumbar lordosis helps open and close the sacroiliac joints. When we lose the lumbar lordosis, the effect is the same as when, in forward bending, we cease to be in neutral position and the sacrum is in counter-nutation. This prevents Type 1 normal motion of the sacrum (side-bending to one side, with rotation to the opposite side) in walking. The proper function of the sacroiliac joints transmits movement upward and at the same time maintains the resiliency of the pelvic floor. Without functional SI joints, we lose pelvic floor function, thus compromising the balance between the pelvic and respiratory diaphragms and reducing breathing balance and efficiency. The shape of the lumbar vertebrae favors lordosis; however, in today's western culture, we tend to lose it.

Coordination between transversus abdominis and multifidus. A functional sacrum needs transversus abdominis and multifidus both to be engaged and working together.[18] The subumbilical transversus and internal oblique allow the lumbars to move freely without interference from the pelvis, while multifidus counters their action to maintain the lumbar curve. This combined action leaves the sacrum relatively free of the iliac bones. Lumbar pain is a sign of poor coordination between the transversus and multifidus. What we usually find is shortened multifidi, with little resiliency and diminished mass, along with disengaged transversus.



A clear picture of how the transversus abdominis relates to the front of the lumbar spine, thus affecting the support for the origin of the crura of the diaphragm and the psoas. *Anatomie Pour Le Mouvement*, Blandine Calais-Germain, Portuguese language version, p. 94, Editora Manole, ISBN 852041138X, 200

Western aesthetic norms emphasize the rectus abdominis. However, exercising the rectus without first engaging the transversus weakens the transversus and thus diminishes the stability and resiliency of the spine. This, in turn, hinders the breathing mechanics. Using rectus abdominis to stabilize the pelvis may be sufficient for static balance, but does not give optimal dynamic balance. Stabilizing the pelvis via the multifidus/transversus system, however, affords dynamic balance.

As we saw in the first hour, because multifidus and transversus are engaged in tonic function, their actions are triggered through proprioception and orientation. Back then, we worked with the multifidus as we taught the client to let the back go towards the table or "to do something" with the back allowing the deepest muscles to contact the table – or, if the person was sitting or standing, to make contact with the wall behind them. This work indirectly affects transversus, as well.

Coordination among serratus anterior and the internal and external obliques. In walking, the subumbilical transversus abdominis should work to stabilize the lumbars and the pelvis in conjunction with the inferior internal oblique (its horizontal part), the contralateral external oblique and the adjacent serratus anterior. For example, the left subumbilical transversus, left internal oblique, right external oblique and right serratus anterior stabilize the left psoas (by containing the whole front of the trunk), thus preparing the next step.

In breathing, ideally, the combined action of the lower transversus abdominis and internal obliques creates a light lift of the pelvic floor, which gives the necessary support for the respiratory diaphragm to function without having to compensate by locking either the crura or the costal arch. Try this in standing: ask a colleague to touch you in your lower belly with the heel of one hand, close to the pubic bone, as if to lift your bladder up. Now, slowly and trusting the support your colleague is giving you, lean forward from your ankles as much as possible and breathe. You will notice that breathing becomes very easy, and that it expands in all directions – with neither the origin of the crura in the lumbars nor the attachment of the diaphragm in the costal arch locked.

However, when the external obliques and rectus abdominis work too much, which usually coincides with posterior pelvic tilt, the respiratory diaphragm pushes the pelvic floor down too much. This weakens the pelvic floor, with obvious consequences for the support and function of the viscera – especially in women who have given birth. It is also common to see people try to diminish their bellies by contracting the rectus and external obliques before activating the transversus abdominis and internal obliques. This causes the typical lower abdominal belly pouch.

By contrast, in hyperlordosis, which usually coincides with excessive anterior pelvic tilt, we most likely have a short psoas, diaphragm crura that cannot release, or deep erectors that are working too hard.

Coordination between psoas and hamstrings. Stretching the psoas by extension of the leg prepares the psoas for contraction if and when the opposite side hamstrings release. But the hamstrings function only when the adductors, abductors, pelvic floor and rotators are balanced. Do not forget that rotation of the femurs causes imbalances in the pelvic floor, for which the respiratory diaphragm must compensate. Medial rotation of the femur tightens the pelvic floor in front, which correlates with a short iliacus. Lateral rotation of the femur tightens the pelvic floor in the back, which correlates with a short psoas. In either case, the lumbars are affected – and as the diaphragm and the crura get support from the lumbars, their function will be affected, as well.

Coordination between psoas and latissimus dorsi. The myofascial connection of the psoas and latissimus dorsi via the lumbar fascia integrates the legs to the arms. In walking, the anterior swing of the arm puts latissimus dorsi in tension, which at its distal portion stabilizes the lumbars against the anticipated contraction of the contralateral psoas long fibers. This action of countertorsion also puts a light stretch on the psoas before contraction, enhancing its contractile capacity. To walk energetically for any length of time, we must walk from our arms[19], as activation of the spiral chain consisting of serratus anterior, homolateral external oblique, and contralateral internal oblique, assisted by latissimus, gives power to the walking. According to studies made by Hubert Godard, 85% of the women who make breast reconstruction using the latissimus ended up developing hip problems, which very clearly shows the importance of the latissimus for the contralateral movement of the spine and pelvic stabilization.

Cervical freedom relative to the thorax and abdomen. Another good reason for the rectus abdominis not to overpower the other muscles of the abdominal wall is the necessity of the head to orient freely. (Remember that cervical freedom also depends on the neck being independent of the shoulder girdle and arms, among other things.) If the rectus works too much, it pulls the sternum caudad[20], which then pulls the cervicals anterior and inferior, over-involving them with the thorax.

Full breath capacity. This depends on many factors, but here we focus on tonus of the abdominal wall. Although proper organization of the viscera is essential for posture and balance, visceral work is easier if the client already has good balance between the transverses abdominis, multifidus and psoas. Lack of tonus in the abdomen, usually caused by an excessive abdominal breathing, can even cause visceral problems. When the myofascial structure is balanced, the viscera are constantly massaged by the breathing. For this reason, systematic visceral work should perhaps be preceded by a basic Rolfing series, as one should not underestimate the impact of abdominal wall tonus, breathing pattern, and myofascial organization on visceral function.

If the abdominal wall is flaccid, the breathing tends to be abdominal. Paradoxically, if the abdominal wall is hypertonic with the thorax projected forward (military posture), the breathing tends also to be abdominal, although shallow. Military posture often compensates for a tendency to collapse. Of course, abdominal breathing is not bad in and of itself. But because abdominal breathing comes with a tendency to collapse or flex the spine, the habitual abdominal breather loses the capacity to extend the spine.

Many Rolfers try to assist exhalation in an inspiration-fixed client by pressing the client's sternum down, instead of by evoking more function in the transversus, internal obliques and multifidus. If we want more parasympathetic activation (evoked with abdominal breathing), we need more sympathetic capacity (evoked with thoracic breathing) and ability to maintain a good sympathetic level when necessary. This requires functional transversus, internal obliques and multifidus. Our original nature

as hunters and gatherers required us to reach, jump, run and fight. All of these activities demand thoracic breathing – and imply a G' in front of G, as we tried to evoke in the first hour.

It is not that we want either thoracic or abdominal breathing: we want full capacity for each. Most of us would benefit from greater amplitude in both directions.[21] We need the possibility to be in either state, and to oscillate between them without getting caught in either one. Remember that the diaphragm and the crura are two different muscles, and that the mechanics of the breathing changes completely according to whether the fixed point is the costal arch or the central tendon. If the fixed point is the costal arch (as it is in abdominal breathing), the cephalad portion of the crura can descend up to one inch, expanding the abdomen and possibly pulling the lumbars forward. But if the fixed point is the central tendon, stabilized by the transversus abdominis and internal obliques (as it is in thoracic breathing), the dome of the diaphragm follows the chest cephalad.

The *main functional goals* of Session 5 are:

- Improve contralateral movement (instead of focusing so much on psoas function).
- Connect the legs directly to the lumbars.
- Take the coordination of the pelvic floor with the respiratory diaphragm to the next possible level through improved relationship between the legs and the pelvic floor and balance between psoas and iliacus.
- Balance the action of the latissimus dorsi, serratus anterior and rhomboids.
- Evoke function in the *proximal* portion of the psoas in walking. For this, we need the action of the psoas to be stabilized and counterbalanced by a well-coordinated chain consisting of latissimus, serratus anterior and rhomboids.

The main *questions of perception* (space-time relationship) are:

- Does the client have the capacity to distinguish between the abdominal and thoracic cavities?
- Does the client have the capacity to distinguish between the deep and superficial abdominal muscles and the deep and superficial erectors? In other words, can the client maintain a sense of weight and presence in the back as well as the front?
- Has the client achieved the best currently possible balance between *proprioception* (perception of what is inside the body) and *exteroception* (perception of what is outside the body)? To what degree can the client exercise both faculties at the same time?
- Has the client achieved the next possible level of support for both inhalation and exhalation through improved front-to-back and inside-outside balance, as well as awareness of transversus/internal oblique activation?

The main *questions of coordination* (centers of gravity and biomechanics) are:

- Are transversus abdominis and internal obliques balanced with multifidus?
- Are serratus anterior and external obliques balanced with opposite side internal obliques?
- Do the diaphragm, crura and central tendon all work in breathing? If they do, the inhalation will produce a nice expansion of the whole rib cage, without pulls to the inside or conspicuous bulging on the outside.
- Is the psoas contralaterally coordinated with latissimus dorsi?

SESSION 6

Classically, we view Session 6 as the hour in which we address the spine. However, we have been affecting the spine ever since the first hour. There, as we worked to free the thorax from the shoulder girdle and the pelvic girdle from the legs to improve breathing, we were affecting the tonic function of the deep spinal erectors. In Session 2, we continued to improve erector plasticity as we enhanced support for the exhale. In Session 3, we addressed the same themes from the side by evoking front-to-back balance and a sense of dimension in the torso.

In Sessions 4 and 5, we brought the legs into better relationship with the axial complex – first by balancing the legs and the pelvic floor through the midline, and then by connecting the legs directly to the front of the spine. Here, we focused on the lumbodorsal hinge – where the proximal insertion of the psoas meets the central tendon of the diaphragm and the crura – and where walking meets breathing at the front of the spine. The lumbars were stabilized by the transversus abdominis, multifidus and internal obliques, which gave support to the functional lumbodorsal hinge (T-8/T-9) and the rest of the axial system.

Now, in Session 6, we address again the relationship and coordination of the legs with the pelvis – and from there with the spine, going up to the thoraco-cervical junction. We also address the relationship of the legs (through the pelvis) to the visceral space. From a functional perspective, we seek not so much the *alignment* of the blocks (head, thorax, pelvis, legs), but rather:

- Coordination of the pelvic and shoulder girdles, with each working equally in contralateral movement.
- All vertebrae capable of total extension. If even one vertebra does not extend fully, we tend to pull the shoulders back or push the pelvis forward to compensate for the absence of capacity for extension in the spine.

Although Ida Rolf focused on spinal motion in the sagittal plane through the action of the *prevertebral* psoas, we must now acknowledge the torsions and counter torsions that arise from the spine itself. Until very recently, the contralateral motion of the spine was thought to be induced by mechanical push from the bony structures of the legs; but as Serge Gracovetsky has elucidated in *The Spinal Engine*[22], the *posterior* myofascial structures of the legs provide the energy for movement that occurs within the myofascial system intrinsic to the thoracolumbar region itself.

In walking, the alternating action of the erector spinae upon the lumbar curve originates spinal contralateral motion according to Lovett's law, which states (as quoted by Gracovetsky), that side-bending a lordotic curve induces an axial torque. Lovett's law thus describes the interplay among the spinal curves, and with it, the emergence of the contralateral motion in the spine.

Functionally, the ideal transition point between the lumbar lordosis and the thoracic kyphosis is around T-8/T-9, which is different from the conventional anatomical transition (L-1/T-12). In terms of functional mechanics, we could say that T-11 and T-12 are really "lumbars." If the functional transition occurs either above or below this point, we lose contralaterality. A transition above T-8/T-9 produces a long or exaggerated lordosis, which dissipates at the level of the abdomen the impulse coming from the legs. This manifests as excessive contralateral motion in the pelvic girdle and

legs relative to that of the shoulder girdle and arms. In contrast, a transition below T-8/T-9 produces relatively flat lumbars and a long or exaggerated kyphosis. This configuration – with its diminished lumbar curve – cannot efficiently transform the impulse from the legs into contralateral movement at the axial level. The shoulder girdle and arms will compensate, with excessive contralateral motion relative to that of the pelvic girdle and legs.

EVOKING THE OPTIMAL POINT OF TRANSITION

For optimal contralateral motion in the spine, the legs must support the manifestation of the T-8/T-9 transition point. In other words, they must be organized in such a way that the impulse to the thoracolumbar myofascial system is both generated and transmitted adequately.

As a precondition, the soleus – the tonic muscle that stabilizes the legs in preparation for any activity – must slide smoothly, without interference from the phasic gastrocnemius. Then, in walking, each calcaneus must have the capacity to *reach* the substratum and *stay there* until the other arrives. Otherwise, the toes can never push off and the *toe lordosis* will not function. This impedes the ability of the other four lordoses to transmit motion up through the spine to the cranium. What's more, without push-off from the toes, the hip extensor system, of which biceps femoris is key, will not be activated.

Biceps femoris is part of a deep myofascial chain, often called the *inner unit*, which includes also the sacrotuberous ligament, transversus abdominis and multifidus. This layer stabilizes the spine and acts on it as follows: as the toes push off, biceps femoris contracts to extend the hip, and in so doing, tenses the sacrotuberous ligament[23], which tugs the sacrum inferior. The resulting stretch upon the deep lumbar fascia activates transversus abdominis to stabilize the lumbars, which allows multifidus to rotate them. This sends an impulse up the entire spine, which responds with contralateral motion according to Lovett's law.

Proper function of this inner unit is essential for core stabilization and contralaterality at the deepest level of the spine. Unless biceps femoris is independent from the medial hamstrings (which attach only to the ischial tuberosity and not to the sacrotuberous ligament), it cannot put adequate tension on the sacrotuberous ligament. First, we isolate the biceps femoris in the client's perception before strengthening it. Then, we improve its coordination in pushing; and finally, we employ it in a full-body movement, such as reaching into space in a manner that takes advantage of support from the ground.

Proper activation of the biceps femoris should trigger the transversus abdominis. Should this not occur, make sure the ischiococcygeus muscles are not habitually contracted. Contraction of ischiococcygeus triggers contraction of rectus abdominis – which, in turn, inhibits transversus abdominis. The ischiococcygeus causes iliac outflare, while transversus causes inflare. Imbalance between the action of these two muscles on the ilia thus destabilizes the core.

Superficial to the inner unit is a second chain, which extends the spine. Like the inner unit, this chain includes biceps femoris and the sacrotuberous ligament. Here, however, transmission is through the intermuscular lamina of the lumbodorsal fascia to iliocostalis and longissimus. Absent competence in this chain – which, again, depends initially on the proper function of biceps femoris – the erectors will not have the impulse to lift the torso in walking. Notably, a person with a long kyphosis (insufficient impulse to extend the spine) tends to have a posteriorly tilted pelvis, which hinders the action of the biceps femoris in extension.

And superficial to the second chain is a third, comprising the iliotibial tract, gluteus maximus, and the contralateral latissimus dorsi, which promotes contralaterality between the girdles. For this chain to function properly, the iliotibial tract must be independent from vastus lateralis so that it can trigger gluteus maximus to *close* the sacroiliac joint when the leg extends. This action of gluteus maximus transmits tension through the homolateral thoracolumbar fascia to the opposite latissimus dorsi. This manifests as contralateral motion of the shoulder girdle in relation to the pelvic girdle.

Even if the posterior myofascial chains arising from the legs are functioning properly, inhibition in the shoulder girdle relative to the spine can impede spinal motion. As Dr. Rolf observed, the starting point of vertebral fixations is in flexion. Many clients have flexion fixations, for which they tend to compensate with a forced extension of the thoracic spine. Then, they exacerbate the compensation by forcing their shoulders behind them. The result is flat upper thoracics. In addition to work in the spine itself, these clients must be taught first to rest their shoulders off the spine and towards the substratum. Once the spine is thus freed of the shoulder girdle, the client can learn to allow the spine to go up from the floor without engaging the shoulders. We must distinguish between inability to *go up* and inability to *let go*.

The *functional goals* of Session 6 are:

- Balancing the posterior tonic muscles.
- Coordinating the five lordoses, not so much in terms of alignment as in terms of mutual responsiveness.
- Evoking the next possible level of coordination in the sagittal plane, from the substratum up, *with the focus on extension*. We want to see that the movement through the hinges at the ankle, knee and hip transmits through to the sacrotuberous, sacrococcygeal, sacroiliac and sacrolumbar ligaments. This distributes the motion to the sacrum, lumbars, functional lumbodorsal hinge and thoraco-cervical hinges, and cervicals.
- Promoting adequate function of the inner unit.
- Evoking the manifestation of the functional lumbodorsal hinge at T-8/T-9.

The main *questions of perception* (space-time relationship) are:

- Is the tonic activity of the back muscles responsive to the client's interoception, exteroception and proprioception?
- Is there balance between the orientation towards the substratum and towards space (but especially the connection with the substratum)?
- Is there perception of lift from below to above in walking – the calcaneus giving support with the toes giving momentum?
- Is the client conscious of the front of the spine (possibility for extension)?
- Is the client conscious of the ischial tuberosities and coccyx?

The main *questions of coordination* (centers of gravity and biomechanics) are:

- Can the spine extend in walking?

- In walking, does the calcaneus of the leg that stays behind have the ability to be totally in contact with the substratum as the calcaneus of the leg that is going forward is touching the ground?
- Is the inner unit working, such that we have contralaterality not only in the limbs and girdles, but also in the spine at the deep level of multifidus and spinal ligaments?

SESSION 7

Having focused thus far on support that comes from below (orientation to the substratum), we shall now focus on the support that comes from above (orientation to space) via the organs of the upper pole and the information they gather. In the seventh hour, as we further improve the structural position of the head and neck and the freedom of the axial complex, we have the opportunity to enhance function in the realms of balance, perception and coordination. This follows from the fact that several key components of our orienting system – the suboccipital muscles, the vestibular system, and the eyes and ears – are located in the seventh-hour territory. Functionally, we also seek to coordinate the activity of these components with the key component at the opposite pole – the baroceptors of the feet.

We said earlier that *posture* is the potential for action – which is initially a function of perception. Before I can move, I must first orient to my surroundings – first to gravity, then to space, and finally to particular objects in space. Orientation begins with perception –especially through the inner-ear vestibular system, the eyes and ears and the baroceptors in the soles of the feet. The orientation in gravity of the head and its organs of perception gives us a sense of the horizontal plane in which action and relationship happen. If the head itself is not well oriented, the person will seek a sense of the horizontal plane through excessive muscular activity of the neck (particularly the suboccipitals) and shoulder girdle – or through intense ocular activity.

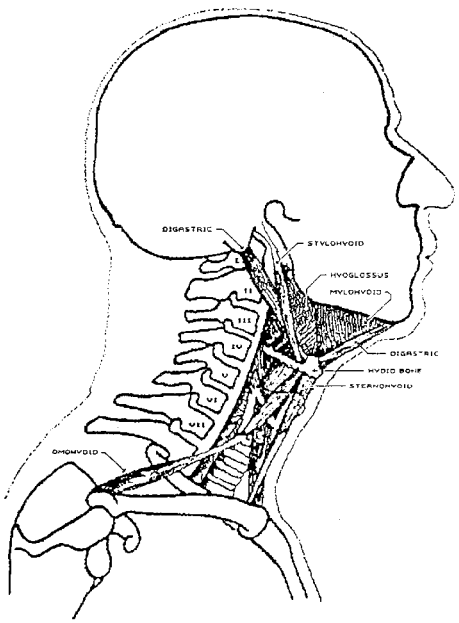
Orientation begins with the vestibular system, which organizes the neck and head in gravity. Then, the suboccipitals inform the vestibular system about the relationship of the head with the rest of the body. Imagine a dropped cat finding its feet: first, the head rights itself in gravity. This is the vestibular system working. Only then does the rest of the body follow, placing itself in proper relationship to the head. This is the suboccipitals working. Therefore, properly functioning suboccipitals are essential for good balance.

Note also that because the dura mater is attached at one point to the rectus capitis posterior minor[24], when we do neck work we affect the entire axial system at the level of the dura.

IMPROVING THE FUNCTION OF THE SUBOCCIPITALS

Although the suboccipitals have many times more stretch receptors than any other muscles, their receptors do not activate a stretch reflex in the suboccipitals themselves. Instead, they *inform the tonic function of the rest of the body.*[25] Therefore, to recalibrate the tonic function anywhere in the body, the suboccipitals must first be free to work. Various conditions arising from inhibitions correlate with diminished suboccipital function. Some are set forth below. As we alter these conditions – often through work with the client's patterns of perception and coordination – suboccipital function generally improves, and overall tonic function improves with it.

Loss of cervical lordosis. If the cervical lordosis is straightened, the suboccipitals are stretched long and cannot function well. Also, in a person who has lost cervical curve, sternocleidomastoid and rectus abdominis tend to overwork, making it harder for the person to open to the sub-



The cervicals and associated prevertebral muscles, and their relation to the head and clavicles: *Plastische Anatomie*, S. Mollier, Munich 1938. Dr. Ida P. Rolf said about this drawing, "I think I have never seen a clearer picture of why we must go to the floor of the mouth in order to let the cervical vertebrae back where they belong."

Aesthetic norm for Thai women. Over time, the neck loses sufficient strength to support itself without the aid of necklaces, and the c

stratum. This, in turn, diminishes the sense of one's own weight – and it is the perception of weight that gives us the first sense of self.

Impairment of the inner ears. In the presence of inner ear difficulties, be they from physiological processes, restrictions of the temporal bones or other causes, C-1 is often found to be restricted.

Hyper-vigilant eyes. A person whose eyes are constantly alert and seemingly over-focused (they seem to *grab* the image instead of receiving it) often has a restricted C-2 that will release if the person puts more visual attention to the periphery.

Paradoxical breathing through the nose. Balanced breathing through the nose could be considered a sign of balance between the sense of smell (which is turned to the *outside*) and of taste (which is turned to the *inside*). In paradoxical breathing through the nose, the person seems to grab the air, rather than receiving it: the nostrils close on the inhale. Paradoxical breathers tend to activate rectus abdominis and external oblique in attempting thoracic breathing, which pulls the thorax down. At that point, the sternocleidomastoids are recruited to assist the scalenes on inhalation. This breathing style tends to straighten the cervicals, which diminishes the function of the suboccipitals.

Hyper-toned sternocleidomastoids. Hypertonus in the superficial sternocleido-mastoids interferes with the fine motor activity of the deeper scalenes to turn the head and neck, which is key to free orientation of the head. This is a vicious circle: without proper orientation to space, the head ceases to function as a fixed point from which the scalenes can work. When the scalenes do not work, the SCMs will take over turning the neck via the head – a function for which they were not designed. When the head is oriented directly from the clavicle by the SCMs – instead of through the mediation of the cervicals by the scalenes – the range of motion is reduced and the visual field possibly contracted. This correlates with poor suboccipital function. A client can be taught to release prominent, hypertoned SCM's by evoking the deeper scalene function: the client need only allow the motion to be led by attention to the peripheral visual field, or by auditory stimulus from behind.

Hypertoned hyoid system. Frequently, excess tension in the hyoid system arises, via the linea alba, from excess tension in the pyramidal muscles at the pubic bone. This entire restriction pattern hinders the inhale by shortening the whole front line. This restricts the potential position of G' and thus inhibits full orientation to space, which, once again, correlates with poor suboccipital function. If the client is taught to release the front line – which is often as simple as asking the supine client to let the throat fall backward into your hand – suboccipital function will generally improve.

Tension around the mandible. The mandible can be considered part of the axial system, given its attachments to the cranium by the temporalis, the masseter and the pterygoids. But if the mandible is over-involved with the cranium through its muscular attachments, it will restrict the axial system. For a number of mechanical and neurological reasons beyond the scope of this paper, tight jaws occur together with over-focused eyes and tight posterior necks. Training the client to engage peripheral vision or hearing – or to drop the jaw away from the cranium – will often improve suboccipital function.

COMPETENCE OF LONGUS COLLI

To understand how the scalenes work in thoracic breathing, we must observe how their proximal attachment is stabilized so that they can act efficiently on the first two ribs. Unless the scalenes are stabilized, instead of acting on the ribs, they will compress the cervicals and pull the neck into hyperlordosis. Just as good psoas function requires pre-stabilization of the lumbars by the transversus, good scalene function requires pre-stabilization of the cervicals by the longus colli. The longus colli, with its attachments on the anterior aspect of the cervical vertebrae and first three thoracic vertebrae, counteracts the tendency of the scalenes to lordose the cervicals so that the force of the scalenes acts on the ribs. This longus colli action works together with transversus stabilization of the central tendon of the diaphragm for thoracic breathing. What's more, the synergy between longus colli and transversus stabilizes both the cervical and lumbar lordoses in support of many movements. In strong movements, which demand action of the global stabilizers (such as rectus abdominis and SCM), it is of primary importance that the core stabilizers act before the global stabilizers to avoid vertebral compression.

Competent longus colli function also changes the action of the SCM on the head. When the SCM acts bilaterally in the absence of good longus colli function, it flexes the head. However, when working synergistically with longus colli, the SCM will extend the head.

As a consequence of the reciprocal relationship between the lumbar and cervical curves, positional distortion of the cervical curve inhibits transmission of motion cephalad from anywhere else in the body. Therefore, when working with the client in the supine position, it is important to position the head and neck to allow ***continuity*** in the transmission from the feet to the occiput. Usually this means relaxing the cervical lordosis by supporting the back of the head; but for clients who have lost their cervical lordosis, it means providing support under C-3.

THE SENSES AS MEDIATORS OF TONIC FUNCTION

What is the importance of how we use the senses for tonic function in posture and movements – which, through repetition, become physical "structure"? Our actual perceptive and coordinative structures form what we call the *body schema*. The body schema is physiological; it concerns the "where" issues. The structures of perception and coordination gather proprioceptive and other sensory information, and act more or less automatically, often below our consciousness. They affect the coordination of local and global stabilizing muscles, as well as their firing sequence. Thus, perception affects coordination and vice-versa. By contrast, structures of attributed meanings (our psychology) form what we call the *body image*, which concerns the "what" issues.[2] Body image operates cortically, as we filter sensory input based on our personal history, taboos, idealistic views, beliefs and attitudes. Although lesions (such as an impaired ligament) reside in the body schema, inhibitions (such as a belief that one must force the shoulders back) reside in the body image. Concentration on body image prevents us from learning new movements because our awareness is more in the "what" than in the "where." Shaun Gallagher even says that the more we focus, the less we're able to perform. (*Ibid.*) As we've seen, the way we organize our visual perception totally affects our body schema (a "where" question). Thus, when

teaching movement, it is better to focus on spatial orientation, and then make the new possibility of movement as adaptable as possible to the changes in context.

In several scenarios above, we suggested improving the function of the suboccipitals and related structures through the intermediary of perception, on which both body image and body schema depend. Using vision as an example, we see, however, that body image and body schema each depend on a different aspect of vision. *Focal vision* registers in the brain at the cortical level. It allows us to name what we see, and thus informs the body image. *Peripheral vision* registers at the subcortical level. It allows us to perceive spatial relationships, and thus informs the body schema. Curiously, a person with damage to the focal vision area of the cortex can approach an object without the ability to recognize or name it. However, the same person will not collide with the object as long as the function of peripheral vision remains intact.

Loss of good peripheral vision causes overuse of focal vision – as if the person is trying to *grasp* with the eyes. This tends to inhibit the vestibular function of the inner ear. Diminished vestibular function, in turn, tends to cause over-activation and hypertonus in the global stabilizers. The effect is similar to what we see when the local stabilizers of the spine (such as transversus and multifidus) are insufficiently engaged: the global stabilizers (such as rectus abdominis, SCM and erector spinae) are over-recruited. The head is pulled forward and down, which prevents the scalenes from acting properly from a good proximal fixed point. Consequently, the fine movements of the head are lost, and the tremendously important proprioceptive function of the suboccipital muscles is inhibited. With this inhibition of the suboccipitals – which function as a "vestibular" system of the neck[27] – the hypertonus of the global stabilizers is reinforced.

Here is an experiment to demonstrate the relationship between perception and tonic function:

Sit on a chair and imagine someone behind you to your right calling to you. Maintain your vision at a close focal length – what you would use to read a book or view your computer screen – and see how far you head turns to the right in response to the call. Return your head to neutral, and this time allow your vision to take in distant objects and peripheral space. Now observe the range of motion. Try the experiment again – this time observing how your breathing changes as you shift focus. Try the experiment yet again – this time to discover whether attention to what you hear behind you with the "eyes in the back of your head" has the same affect as engaging your peripheral vision.

How is our function enhanced if we now also engage our lordoses and our baroceptors? In this experiment, let yourself slouch (to diminish the lumbar lordosis) and your feet to disengage from the ground. See how far your head will turn in response to the imaginary stimulus. Now restore the lumbar curve by finding your sitting bones. Notice the enhanced range of motion at the head. Take it a step further by putting your feet firmly on the ground; engaging the baroceptors should increase the range through which your head can rotate. Finally, engage the contralateral system by pressing the left foot (first the lateral edge, and then the medial edge) into the ground as you turn your head to the right.

Engaging the combination of peripheral vision, sitting bones and feet should take the angle of our visual field in rotation from about 60 degrees to about 225 degrees. All of this with no "fascia mashing" whatsoever!

The *functional goals* of Session 7 are:

- To improve the function of the vestibular system.
- To allow the head to lead the body – through the dynamics of the senses – to organize posture and movements, including breathing and walking.
- To allow the spine to relate to itself without the interferences from either girdle or the diaphragms, thus addressing any unfinished work related to arms/shoulder girdle/neck and legs/pelvic girdle/lumbars relationships, as discussed in connection with the previous sessions.

The main *questions of perception* are:

- Can all the senses turn to both the outside and the inside (intrasensoriality)?
- Can the senses balance and complement each other (intersensoriality: one sense "helping" and "being helped" by the others)?
- Is there balance between peripheral and focal vision?
- Is the cranium differentiated from the mandible?
- Is there a sense of the sagittal line through the head?

The main *questions of coordination* are:

- Is the longus colli acting to support the cervical lordosis?
- Is the head free to move in all directions, and yet serve as a stable fixed point in space?
- Is nasal breathing balanced between the senses of smell and taste?

SESSIONS 8 AND 9

"It is not possible to solve a problem with the same questions that created it." Albert Einstein

"Principles without intuitions are empty. Intuitions without principles are blind." Immanuel Kant

Ida Rolf's pedagogical focus seems to have been integration of the human body in *standing*, and perhaps she developed the recipe accordingly. Of course, this is not to say that her thinking was limited in the same manner; she is reported to have claimed, "Anybody can take a body apart... but only a few can put it together!" "Putting together" is what Sessions 8, 9 and 10 should be about. When Jeff Maitland, Jan Sultan and Michael Salveson developed and articulated the Principles of Rolfing intervention (adaptability, support, palintonicity, closure, – and the meta-principle, holism) they substantially advanced our understanding of the recipe – particularly of the last three sessions. However, even with the benefit of the Principles, the teaching and execution of these sessions is often muddled. I believe the difficulty in grasping the last three sessions is in the *initial condition* of where, as structuralists, we've been focusing our thinking. This is especially true in respect to what we envision that we are trying to accomplish.

WHAT ARE WE TRYING TO ACCOMPLISH?

Why do we want to treat people with Dr. Rolf's method? Is it just for them to be better *aligned* in gravity, or is it for them *to relate better to gravity* so that they can, in turn, interact with others and the environment

in more positive and constructive ways – in short, so that they can lead better lives? I suspect that most of us, at heart, prefer the latter. Surely, living better means enjoying to its fullest our human condition, including the body and its movement potential, as well as our intelligence – both emotional and rational. Freed from dysfunctional restrictions we can, both literally and metaphorically, walk through life with more ease and grace.

But this takes more than the release of tissue fixations. It also requires release of fixations in the structures of perception, coordination, meaning (psychological), cosmology and spirit. To the degree we intervene in perception and coordination, we can indeed touch restrictions in structures beyond the physical and thereby enhance the client's potential to *be* more fully a human being.

In the structuralist mindset, we often misperceive problems of perception or coordination in terms of biomechanics, and therefore pay insufficient attention to the client's subjective experience of movement. I propose that we look at Sessions 8, 9 and 10 in terms of the dynamic, rather than the static, with respect to the interaction and exchange with others and the environment (including gravity).

THE IMPORTANCE OF THE HORIZONTAL PLANE

Classically, Dr. Rolf's model is an orthogonal one, emphasizing the sagittal plane. Perhaps the model – and therefore, the recipe – pays insufficient attention the horizontal plane. If so, this would be a serious gap in functional terms. First, spinal torsions and counter-torsions at the deep ligamentous level occur in the horizontal plane. What may be more important, the horizontal plane is the one in which human action and relationships happen. For example, we can best offer or receive from another person if the eyes and hands of both persons are on the same horizontal level. And, as discussed above, the orientation of the head in space depends on the dynamics of G', which influences the person's relationships with others and things in the world.

WHAT IS DYNAMIC SUPPORT?

Dr. Rolf's book, *Rolfing: The Integration of The Human Structure*, shows at Illustration 2-5 two dummies made of blocks – one of them disorganized and collapsed and the other one well-aligned, with support from the sky hook. According to the caption, somehow the body seems to have an imaginary sky hook lifting it heavenward. Is the flesh-and-blood reality of the sky hook only the co-operating balances of myofascial spans (static) – or has it something to do with orientation in and movement into space (dynamic)? As structuralists, we have focused on static support and neglected dynamic support. *Dynamic* or *active* support comes not only from the substratum, but also from the head and hands as they orient us in space.

It helps to borrow the concepts of *feedback* and *feedforward* as used in the theory of *action systems*.[28] In *feedback*, movement is regulated based on the perceived *effects* that it exerts on the body; and the movement has to be slow enough for its effects to be perceived in time for the perception to regulate the movement. In *feedforward*, the movement is too quick to be regulated by perceived effect, as it may be finished before it comes into conscious awareness.

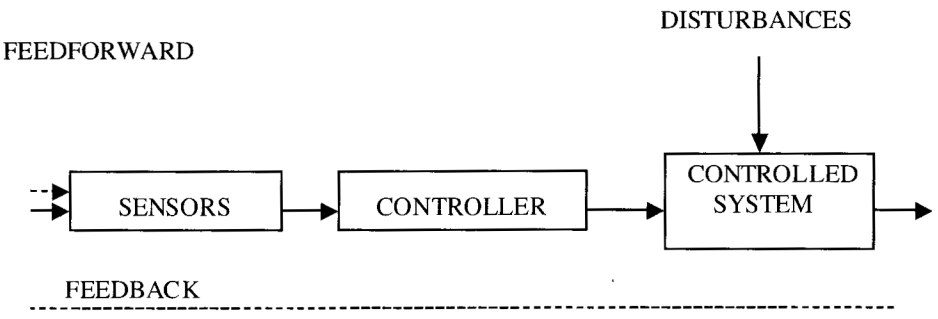
When I am on your table and you ask for a movement, my system perceives, consciously or unconsciously, the effects of your exquisite and evocative touch as it educates my perception and coordination. I can use this information to fine-tune my own movement because I have time to perceive its effect and correct it accordingly. But then I return to my work on the flying trapeze at *Cirque de Soleil*. As I reach for the trapeze handle coming my way, I throw my arm in a spastic movement and realize too late that I misjudged! Unfortunately, the feedback came too late for me to correct before the handle is gone...

Just because I can perform a movement in slow motion does not mean that I can perform it quickly. While in the first seven sessions we worked with the feedback function, now at the last three sessions we can work with the feed forward function through perception, coordination and meaning to better integrate the sky hook *in the dynamic to allow acceleration forward into space.*

DYNAMIC SUPPORT FROM THE HEAD AND HANDS

We have observed that the orientation of the head towards something or someone is related to the function of the upper limbs (especially the hands), the center of gravity for which is G'. To act in our environment, we need direction; that is to say, an action takes place along a particular vector. The vector is determined when our eyes or ears or sense of touch identifies the object of desire or necessity. But to actually apprehend the object, as opposed to merely observing it, we must *accelerate* along the vector; and this requires the impetus of G'. If we act only from G, we cannot go toward the object. What's more, without good G' function, our arms cannot reach and our hands cannot grasp.

Acceleration is different from *velocity*. In one sense, *acceleration* can be seen as the equivalent to space orientation – or perception. If I say, "Movement is the capacity to accelerate through space and time," I mean that the *direction* of the movement is a vector. It has a particular course, or orientation in space. And to speak about orientation in space is to speak about perception. Thus, if we lose the hands, we lose acceleration. In other words, if I lose my hands, then I also



Feedforward and feedback control schema. *Emergent Forms*, Eugene C. Goldfield, p. 10, Figure 1.2. In feedforward control (open loop), the regulation is based on sensed disturbances. In feedback control (closed loop), the regulation is based on the sensed effects that the disturbances have on the regulated variables. Oxford University Press, 1995. ISBN: 0195065891

lose (or do not have) the capacity to accelerate through space and time. It follows that if I do not have my hands, my relationships to others and things are hindered.

Often the client who lacks presence in the hands has difficulties around relationships. In choosing an intervention, we must first identify the source of the difficulty. Is it that the perceptive apparatus fails to notice objective reality sufficiently well to identify clear vectors? Is it that the impetus of G' is thwarted by excessive connection to the substrate? Or is it that the person suffers from ambivalence such that the back will not release to allow motion toward the goal, paralyzing the person in a *push-me-pull-you* dilemma? Whatever the case, the organization of the thorax mirrors the quality of the person's relationships.

G' is not *more* important than G, but it is *as* important. Under conventional theory, bipedal locomotion liberated the hands for development. However, Phillip Tobias suggests that in fact we became bipeds because our upper limbs had already become more functional.[29] This makes more sense: the development of the hands during the quadrupedal phase – allowing us to grasp with the forelimbs instead of the jaw – gave not only the impetus but also the balance (through G') for animals to go bipedal. Just imagine a cat standing on its hind legs and using its forepaws to capture a bird.

Or, imagine our arboreal ancestors brachiating through the treetops. This form of quadrupedal locomotion required a strong and sophisticated upper girdle from the paw through the scapula. But it also required keen hand-to-eye coordination. The arm that the chimps brought down from the trees had already secured a major presence in the brain. Both structurally and neurologically, the brachiating arm had the potential to evolve into an organ capable of helping only two legs balance the body.[30]

Although the classical Rolfing approach centers on the pelvis, the organization and function of G' are indispensable for the verticality of the spine. In developmental terms, an infant begins to organize vertically by finding dynamic support through the senses, first in relation to the mother and then in relation to the environment. Thus, it is the organization of G' that initially determines the position of G; and the organization of the pelvis in gravity is influenced by the person's earliest developmental issues.

SEEING WITH NEW EYES

Right movement cannot be achieved analytically: to perform a movement correctly is never about doing the right thing, but about getting the right information. Right information yields the full spectrum of sensation, organization and timing, which allows the emergence of right movement. "In efficient movement there is no 'body,' but only the imaginary process of the anticipated vectorization of space and my body within it." (Hubert Godard)

At this point – looking at the person with new eyes while respecting the person's way of relating to the world – observe which areas of the body behave differently than the rest. Often, there is a division between the behavior (quality of movement) of the superior and inferior parts of the body. It is like a *mechanical* schizophrenia. But a mechanical schizophrenia means especially a *perceptive* schizophrenia. All the accidents, physical and emotional, arise from the same issue: a flaw or break in the perception creates a vector that is not efficient for the support of the mechanical forces in movement.

When our clients complain that our instructions are "too much to think about" – or when they are doing movement as opposed to being movement – we, as practitioners, should ask ourselves what information (sensation, organization or timing) the client is missing. This question harkens back to Session 1, when we asked whether the client needed to open perception towards either space or support, and whether the client had the potential to receive.

But how can we see the client with new eyes if we ourselves are not open to receive him? At this stage, the main issue is not in the client, but in the practitioner. We have already seen that focal vision goes to the cortex (where it is associated with words), while peripheral vision goes to the sub-cortex and spatial perception. Although there are bridges between the cortical and subcortical analyzers, they can disconnect. The same is true for the other senses. For example, in what psychoanalysts call fluctuating listening, the therapist allows the words to come in, but refrains from judging or interpreting – instead allowing the subcortical analyzers to work. As Rolfers, we should similarly refrain from judging while observing or touching the client and let the subcortical (spatial) analyzers to work. Eventually, we "see" something in the client as we ourselves make a new association.

To allow the new associations, look at the person with two eyes: one that has words, and the other that does not. If you look only with the eye that has words, you will see only what you already know. Listen to the person with two ears: the one that has words and the one that does not. And most of all, touch the person in three dimensions: as Godard says, the Rolfing quality of touch is so important because it gives the client permission to create or invent a state or a place further in the unfolding of the client's potential. The big question is how to be in a receptive state and at the same time think cortically. How to balance both? This is the *central question* in meditation and martial arts – and for the psychoanalyst and the Rolfer as well.

Often, when either the practitioner or the client tries to do something, it does not work because we are in a state in which the free symbolic association cannot work. We need to be capable of making new associations, and then of concretizing them in language. When the client is experimenting with a movement that "does not work," the practitioner should, as Godard says, "give benediction" to the movement as it is and then *return to the initial condition* of the anticipatory postural activity (APA). It is *there* that the person can change the potential for the movement by changing perception. Again and again!

THE PRINCIPLES IN FUNCTIONAL TERMS

It is often said that the eighth hour is structural, and the ninth functional. But it is also said that Dr. Rolf herself worked more functionally in all of the last three sessions; and that when she choose to work more structurally, she went to the joints at the ligamentous level in the feet and ankles, the fascia lata, the hips, the viscera and the atlantooccipital joint. As I was told, practitioners were originally taught to strategize the eighth hour as a "lower" or an "upper," and do "the other one" in the ninth. This approach allowed the opportunity to work those elements that still needed to integrate with the others. However, to this day, some structural integrators believe that the eighth session is the last opportunity to work on lesions, while the ninth session should be more dynamic and work the movements *through the joints* to encourage mobility.

The Principles have made possible more intelligent strategizing of Sessions 8, 9 and 10:

Adaptability: What in the structure is still not adapted for the system to maintain the changes that have been introduced? Which joints or tissues still need some work? (As Jeff Maitland has warned, the danger in this approach is to do *more of the same* – focusing on the details while missing the whole.)

Support: Where has the support principle not been adequately addressed? We should consider not only the support from the substratum, but also the dynamic support that comes from the orientation to space. Traditionally, work to improve support could address a detail (like a joint) or a whole system (like the feet, legs, and pelvic girdle up to the lumbodorsal hinge; or the hands, arms, and shoulder girdle down to the lumbodorsal hinge). When looking with ***functional eyes,*** we can see the same things we have always seen, but should consider in addition the perception and coordination and aim for the *functional* lumbodorsal hinge. The classic tracking techniques become even more powerful when applied in this context.

Palintonicity: This concerns the dynamics of the lines and geometric planes in the physical structure – *the line* being the clearest referent. Palintonicity can be understood in terms of congruence: we want the best possible relationship of each part with the line; or the best possible relationship between each of the five structural elements (pelvic girdle, shoulder girdle, axial, core and sleeve), on the one hand, and the line, on the other hand. Here again, the danger is to focus in the parts and miss the whole.[31]

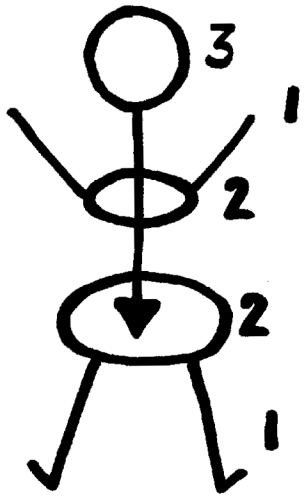
Closure: At this point, closure comes to the fore.[32] From now on, the need for closure should inform the work so that the client can own the interventions as much as possible and take them into daily life. Thus, we should not open new questions that cannot be integrated with the previous work. The Closure Principle also concerns the nature of the therapeutic relationship: we should not nourish dependence, but rather empower our clients to take care of themselves in healthy and constructive ways while respecting their unique ways of being in the world.[33]

The *functional goals* of Sessions 8 and 9 are:

- To work toward full capacity of the spine in flexion and extension in relation to movements of the arms and legs. Psychological issues, such as residual startle reflex, can contribute to difficulties in the full movement of the spine.
- To improve coordination from the leg to the arm and from the arm to the leg.
- To have the best possible support from the legs for the work of the arms (such as reaching or pushing); and the best possible balance from the arms to orient the work of the legs (such as walking or running).
- To see the axial skeleton providing the best possible support and stability to the girdles and limbs, so that the flow of movement from the bottom to the top and the top to the bottom appears to be uninterrupted. Maybe this is what we can call the *dynamic of the line*, or *grace*.
- Total capacity of breathing – now as a link between us and the environment in the feed-forward mode.
- Optimal contralaterality at all three levels (limbs, girdles and spine).[34]
- Limbs that show capacity for total expression of reaching, pushing and pulling.

The main *questions of perception* (space-time relationship) are:

- Does the person exhibit total capacity of breathing (which depends on the anticipatory postural activity)?
- Does the person exhibit the capacity for both abdominal and thoracic breathing (and thus for balance in the autonomic nervous system)?



The "three levels" model, showing the three different and growing levels of contralaterality.

- Does the person exhibit consciousness (not just *awareness*) of the anticipatory postural activity through the resolution of the inhibitions in perception?
- Does the person exhibit the capacity to notice the need to change the context (the chair, the table, the job, the home situation, relationships with others, etc.)?

The main *goals for integration* are:

- New meanings and associations for gestures – including breathing and walking.
- Integration in gravity, body use and social context.
- Expression in the social context.
- Development of a customized sequence for self-education, pertinent to the person's daily life.

SESSION 10

"Wholeness is not so much about perfection as it is about conclusion."

Carl Gustav Jung

"We will not cease to explore, and the end of all our exploring will be to arrive where we started and know the place for the first time."

T.S. Eliot

At this point, even before the body/movement reading, the practitioner should ask what needs to happen at the emotional or energetic level for the best possible closure. How can the client own the process and further its gains and transformations? How can the client sense a differentiation from the practitioner, so that both can say goodbye with clarity and elegance – knowing that at some future time they can work together again, not to repeat what was done before, but to evolve it further as ripening over time makes possible other levels of integration?

Some questions for reflection are:

- What does the client need for closure?
- What does the client/practitioner relationship need for closure?
- What are the limitations of the client that the practitioner must perceive and accept?
- What are the practitioner's own limitations, both professionally and personally, that the practitioner must perceive and accept?
- What are the limitations of the client's process that the client must perceive and

accept?

Only after having reflected on these questions should the practitioner undertake the body/movement reading.

The *functional goals* for Session 10 are:

- To optimize the dynamic *line*.
- To optimize breathing.
- To optimize contralateral motion.

The main *questions of perception* (space-time relationship) are:

- Does the person have full capacity for both abdominal and thoracic breathing, showing balance in the autonomic nervous system and appropriate anticipatory postural activity?
- Is the person *conscious* (not just *aware*) of the anticipatory postural activity through the resolution of the inhibitions in perception?
- Does the person have the ability to recognize the need to change the context – be it a chair, a table, the job, the home life, relationships with others, etc.?

The main *goals of integration* are:

- New meanings and associations for gestures – including breathing and walking.
- Integration in gravity, body use and social context.
- Expression in the social context.
- Development of a customized sequence for self-education, pertinent to the person's daily life.

CLOSING WORDS

"Hang together at this point in your thinking; don't try improvements just now. Otherwise you go off on tangents. There are improvements possible, I'm sure, but wait a little."

Ida P. Rolf[35]

Historically, we have been a structuralist community. Our language of function is neither sufficiently well-developed nor widely adopted. The limitations imposed by our current technical language and state of knowledge tend us toward biomechanical thinking, causing us to lose the opportunity to educate clients about how to live in terms of movement instead of anatomy.

I believe we have waited long enough – and, hopefully, have matured enough – that *now* is the time to look at the recipe with new eyes, to refresh and invigorate it. We should treat people not only for them to look better or feel better, but also to take fuller advantage of the human condition and express themselves better through the body and its inherent movement potential. To quote Til Luchau, "Each of us chose a professional path because of a vision compelling enough to get us to do all it took to get here. Take a moment to remember this original vision. What attracted you to this work? What experiences along the way have kindled your excitement and moved you? What do you most enjoy about it? These are touchstones – things to stay connected to and take even further."

For me, working to actualize the potential of life is the dream and the vision. To bring more vitality to life, we must integrate structure and function. This is integration. It empowers both the practitioner and the client. ❑

END NOTES

1. Berdiaev, N., *Slavery and Freedom*, French-New York, 1944. Nicolas Berdiaev (1874-1948) was a Russian philosopher.

2. Joseph Campbell, American mythologist, professor and writer, said, "The perfection of the human being is his very imperfection." According to Lael Keen, American-Brazilian Rolfer, "Perfection is boring."

3. Lucia Merlino, Brazilian Rolfer and editor for *Rolfing Brasil* says "Rolf Movement basically teaches you to breath and walk."

4. Tonic muscles govern our posture. Rich in spindles, they maintain tonus even as we sleep. They consume oxygen. Phasic muscles execute our movements. With fewer spindles, they rest when we rest. They consume glucose. In a way, tonic muscles run the show because they manifest the psychology of the person (or the memory of the body in gravity). Working on phasic muscles does not release tonic muscles. The only way to communicate with tonic muscles is through perception, either working with the sensation of weight or giving them a direction (towards the table or the wall, for example) with the gamma touch.

Because there are no "pure" tonic or phasic muscles, we should treat each muscle as a couple: besides releasing lesions, we should help someone who tends to collapse to find "directions," and someone who tends to rigidity to find support and let go into it.

Very interesting are the studies of Judith S. Kestenberg, M.D. and Arnhilt Buelte on infant development as expressed through bodily movement; holding patterns; and the mutual holding between mother and infant, and how these interactions shape both the body and the psychology.

5. Local muscles are usually smaller, deeper and closer to the joints – often attaching directly to the joint capsules – whose primary role is to stabilize the joints. Global muscles are usually larger and more superficial; their primary role is to execute large motions, with the local muscles acting as stabilizers. Bergmark, A., "Stability of the Lumbar Spine: A Study in Mechanical Engineering." *Acta Orthopaedica Scandinavica*, 230 (suppl.): pp. 20-24.

6. The author would add the social aspect to the Circle of Being, as the human is *par excellence* a social being. Most Rolfers notice changes in the way people relate to each other after receiving Rolfing. Furthermore, the author prefers to refer to the Circle of Being as the Hologram of Being – as each of its aspects is implicit all the others.

7. Many of us have seen the most beautiful movie "The Muse Within," in which Jon Roar Bjorkwold (professor of musicology at Göteborg University) and John Collins (Music philosopher in Ghana) are interviewed. While the movie successfully evokes nostalgia for the condition (with its beautiful movement qualities) of the human beings shown there, it also says, "It is like this that 'it' should be." In my opinion, this could be another kind of violence to the person.

8. Thiago de Mello, Brazilian poet and translator of humanistic vocation, was born in 1926. His most polemic work is *The Statutes of the Man*, published in many languages. Thiago de Mello translated into Portuguese works of T.S. Eliot and Pablo Neruda, among others.

9. Vivian Jaye, American Rolfer, who wrote a big and important chapter in the history of Rolf Movement, says: "The way you walk across the room is the way you walk through life."

10. As a doula, the author has attended more than 1,200 births, always in awe of the babies' first inhalation and all that it represents.

11. Newton A., "Breathing in the Gravity Field," *Rolf Lines*, Fall 1997, pp. 27-33; "New Conceptions of Breathing Anatomy and Biomechanics," *Rolf Lines*, Winter 1998, pp. 29-34; and "Posture and Gravity," *Rolf Lines*, April 1998, pp. 35-38.

12. While Fryette's laws talk about individual vertebrae, Lovett's (1903) law talks about the functioning of the whole spine: when you bend a lordotic curvature to either side you induce an axial torque. Translating this to the spine: the rod is the spine, the lumbar lordosis and the thoracic kyphosis are where the rod is bent, and the movement that comes through the erectors is the "trying to side-bend the rod." Read more about this in the *Fourth Interdisciplinary World Congress* on "Low Back and Pelvic Pain Annals: Analysis and Interpretation of Gait in Relation to Lumbo-Pelvic Function," by S.A. Gracovestsky, Ph.D., Concordia University, Montreal, Canada. See also: J.P. van Wingerden, A. Vleeming, G.J. Kleinrensink, R. Stoeckart, "The Role of the Hamstrings in Pelvic and Spinal Function," in *Movement, Stability & Low Back Pain*, edited by Andry Vleeming, Vert Mooney, Thomas Dorman, Chris Snijders, Rob Stoeckart. Churchill Livingstone, New York, 1997.

13. According to Godard, the nerve of the vestibular system is the first to myelinate.

14. This is a reference to Godard's concept of the "five lordoses": the root of the toes, the plantar curvature, the back of the knees, the lumbar and the cervical lordoses. Restrictions in any of them will cause compensations in all the others. For example, a non-functional toe lordosis is frequently accompanied by non-functional psoas (usually the person walks from the quadriceps).

15. G' is the most exact and efficient part of the body to track something or someone in movement. Remember that the heart is there, and that the magnetic field of the heart is five thousand times stronger than that of the brain. The retina has the second strongest magnetic field in the body.

16. The connection between the fascia of the non-striated and striated muscles mirrors the connection between the central and autonomic branches of the nervous system. Associating Freud's ideas of the id (the unconscious) with the non-striated muscles and autonomic nervous system, and the striated muscles with the ego (the conscious) and the central nervous system, we see that these muscles are subject to control from both the conscious and the unconscious. Rolfer Hilde Feldweg (1950-1989) wrote a very interesting paper on the subject, published in *Rolf Lines*, March/April 1990.

17. Keleman, S., *Emotional Anatomy – The Structure of Experience.*

18. For more details, consult Diane Lee, "The Pelvic Girdle – An Approach to the Examination and Treatment of the Lumbo-Pelvic-Hip Region."

19. Adjo Zorn, Ph.D., and Monica Caspari, "Why Do We Hold Up The Arms While Running?" *Structural Integration*, Fall/December 2003, Vol. 31, No. 4, pp. 4-10.

20. In this regard, note that the transversus thoracis is like a slip of the rectus abdominis going deep to the ribs.

21. For a very interesting article read "Stress-Bewältigung und Rolfing" (The Management of Stress and Rolfing), by Adjo Zorn, Certified Advanced Rolfer, at http://www.rolfingb.de/stress.htm; also published in *Rolfing Brasil*, the Brazilian Rolfing Magazine, March and July 2001, under the title "Vencendo o Estresse–Rolfing" (SNA, Estresse, Equilíbrio e Rolfing).

22. Gracovetsky, S., *The Spinal Engine*, Springer-Verlag, New York, 1998.

23. In fact, recent dissection research has shown that in many instances, slips of biceps femoris attach directly to the sacrotuberous ligament, as well as to the ischial tuberosity. See, J.P. van Wingerden, A. Vleeming, G.J. Kleinrensink, R. Stoeckart, "The Role of the Hamstrings in Pelvic and Spinal Function," in *Movement, Stability & Low Back Pain*, edited by Andry Vleeming, Vert Mooney, Thomas Dorman, Chris Snijders, Rob Stoeckart. Churchill Livingstone, New York, 1997.

24. In a series of dissections, James A. Lipton, D.O., F.A.A.O. (U.S. Navy), found a fibrous band in the suboccipital space connecting the rectus capitus posterior minor and the posterior aspect of the dura mater. Information courtesy of Harold I. Magoun Jr., D.O., F.A.A.O., F.C.A., D.O. Ed. (Hon.), Denver, CO.

25. Abrahams, V. C., "Neck Muscle Proprioception and Motor Control," *Proprioception, Posture and Emotion*, Garlick, D., ed., University of New South Wales, 1981.

26. Welton, D. ed., *Body Image and Body Schema in Body and Flesh: A Philosophical Reader*. Blackwell Publishers, Ltd., 1998, chapter 7.

27. Gallagher, S. and Cole, J., *Body and Flesh: A Philosophical Reader*. Blackwell Publishers, 1998.

28. The theory of Action Systems was first introduced by Edward S. Reed (1982) in "An Outline of a Theory of Action Systems," *Journal of Motor Behavior*, 1982, Vol. 14, No. 2, pp. 98-134. In *Emergent Forms: Origins and Early Development of Human Action and Perception*, Eugene C. Goldfield presents and modifies the taxonomy of action systems first introduced by Reed.

29. Tobias, P., *Man, the Tottering Biped: The Evolution of His Posture, Poise and Skill*, University of New South Wales, Kensington, 1982. See also, Aline Newton's review of this book in *Structural Integration*, February 2003.

30. Wilson, R., *The Hand: How its Use Shapes the Brain, Language and Human Culture*, Vintage Books, New York 1999.

31. At a Rolf Movement certification training in Florianopolis, Brazil, Koh Brodie, Tsuguo Hirata and I came up with a new saying: "Kill the ants if you like, but don't forget the elephant!"

32. Adjo Zorn and Monica Caspari, "Beyond the Recipe – Process-Oriented Rolfing®," *Structural Integration*, Summer 2001, Vol. 29, No. 3, pp. 9-13.

33. Interestingly, different cultures place the vanishing point – the perspective point in the depth of the picture towards which all the lines that originated in the first plane seem to converge – at different locations in their art: while the Occident usually places the vanishing point in front of the viewer, in an accelerated perspective, the Orient generally puts it behind, in a slowed-down perspective. The African culture works with a flat perspective. These differences in perspective reflect different ways of being in the world.

34. Hubert Godard's Three Elements model for looking at the person in movement is very valuable here. This model speaks to the three progressively more refined levels of contralaterality: 1) at the limbs; 2) at the girdles; and 3) in the axial complex. It consists of looking at the person while having this model in mind and asking which of the three elements is out of sync with the rest.

35. *Ida Rolf Talks about Rolfing and Physical Reality*, ed. Feitis, R., The Rolf Institute, 1978, p. 170.