Rolfing and the Neuro-Myofascial Net

Robert Schleip

The following is a condensation of some of the concepts and charts I have presented in my lecture "Self-Regulating System Dynamics and Linear Repair" at the 1992 Annual Rolfing Conference and which I have been requested to make available again in writing.

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Leaning with your elbow on a piece of dead chicken wing does not feel like Rolfing. It seems to lack the kind of organic tissue response that seduces Rolfers to mumble things like "YEAH" while leaning with the elbow for a while into a tissue spot. In my experiment of trying to rolf an anesthesized leg I could not elicit this kind of tissue response. Rolfer Robert Hall, who did a similar experiment with an anesthesized person in the early seventies couldn't get the typical Rolfing tissue response either.

Our old "Gel to Sol Theory" as an explanation for the supposed short-term plasticity of collagen tissue is clearly challenged by those experiments. They demand from us to include the role of the nervous system in our models to explain the observed short-term plasticity of the body during Rolfing strokes.

Rolfer Peter Levine told us at the August 1991 faculty meeting that, based on his Ph.D. background in physiology, he did some mathematical calculations on how much pressure would be necessary in order to use the thixotropy of connective tissue (ability to change from gel to sol in response to mechanical pressure) to result in short-term plasticity within a few seconds. It would be several tons of pressure!

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DEEP TISSUE WORK AND THE NEURO-MYOFASCIAL LOOP

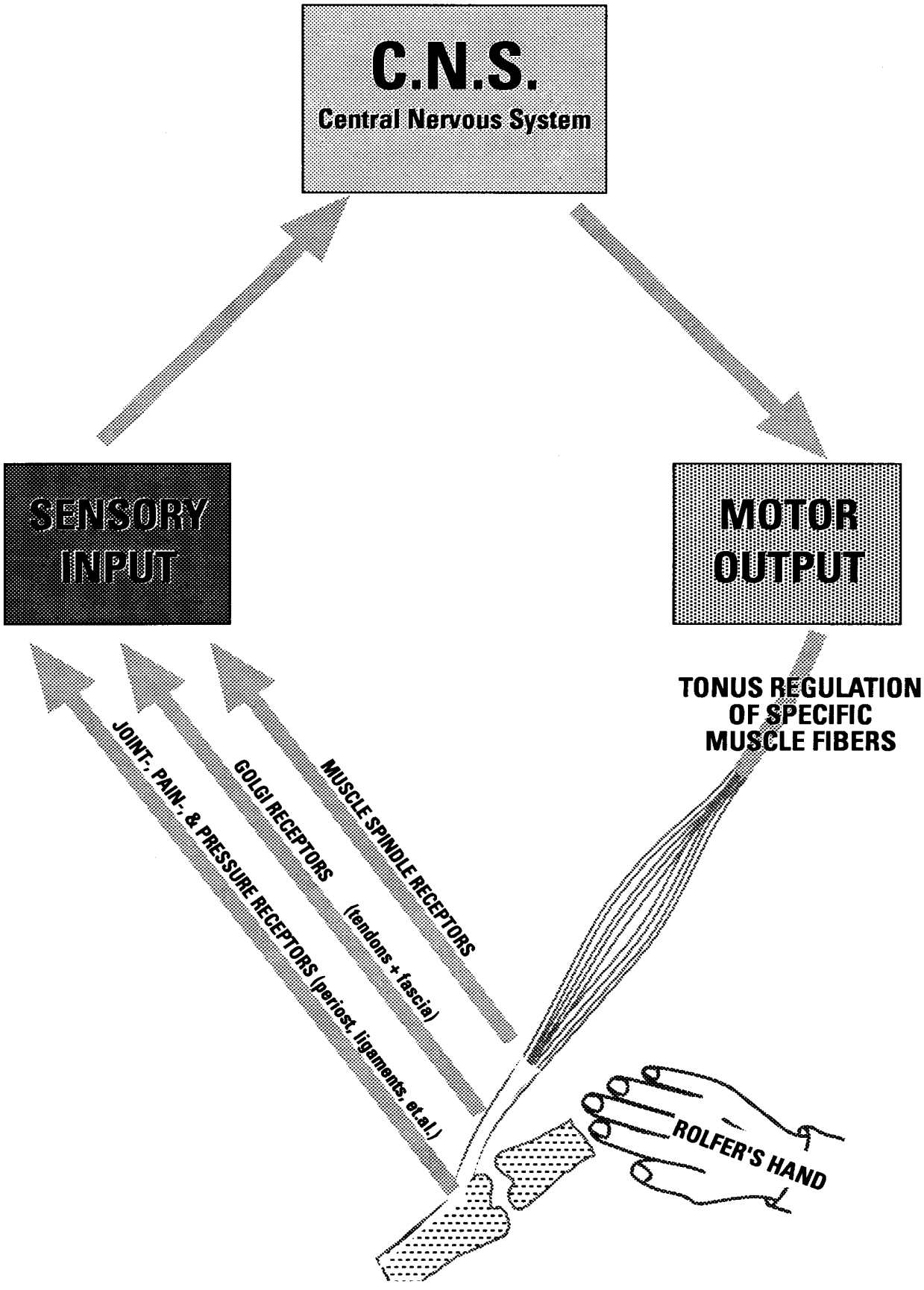

Chart 1 shows my current concept of how Rolfing (probably) works. It is based on John Cottingham´s explanation of deep tissue work in his book "Healing through Touch" (Rolf Institute 1985).

To give an example: If I lean with my elbow on the iliotibial tract, this will cause some Golgi tendon organs to fire (fascia is densely innervated by Golgi receptors) which will then lead to a tonus decrease of some of the muscle fibers connected with it (e.g. from the tensor fasciae latae) which will then lead to a softening of the fascia under my elbow. Which is the same mechanism how passive Yoga stretches have been explained to work. (There are some parallels between Yoga stretches and Rolfing with respect to the slow timing of the stretch, but with Rolfing we can be much more specific). Please note that we have about 10,000 motor-neurons (!) which can be modified individually. Together with the related muscle fibers and fascia we speak of 'motor-units´. So there are 10,000 motor-units in your clients body that are available for individual responses to a skilled and sensitive hand.

One advantage of this Neuro-Myofascial Model is that we can now explain much more elegantly some of the observations which were not so easy to explain in our old Gel-to-Sol Model:

- ❑ How it is possible to work perpendicularly across tissue fibers and achieve a lengthening—instead of broadening—effect of those fibers? (E.g. in classical third hour work.)

- ❑ How come that our typical slow motion Rolfing strokes seem to work especially well around attachment areas of a muscle as opposed to the middle of the muscle? (That is were the fascia is most densely innervated by Golgi receptors).

Apart from the Golgi receptors we also use stimulation of the muscle spindles as invitation to the client´s (subconscious) motor-cortex patterns to "reevaluate your organization of this joint, please".

As anybody who has ever run his shinbone into a low table can verify, the fascia around bones (periosteum) is exceptionally well innervated with nerve receptors. As Rolfers we work with those deep fascial nerve endings more than massage therapists or most other bodyworkers. The scientist Bruno D´Udine presented at a European Annual Rolfing Conference his speculation that stimulation of those deep fascial nerve endings triggers a very powerful biological mechanism which leads to a "high behavioral plasticity" (see my article in *ROLF LINES* April/May 1991 page 20).

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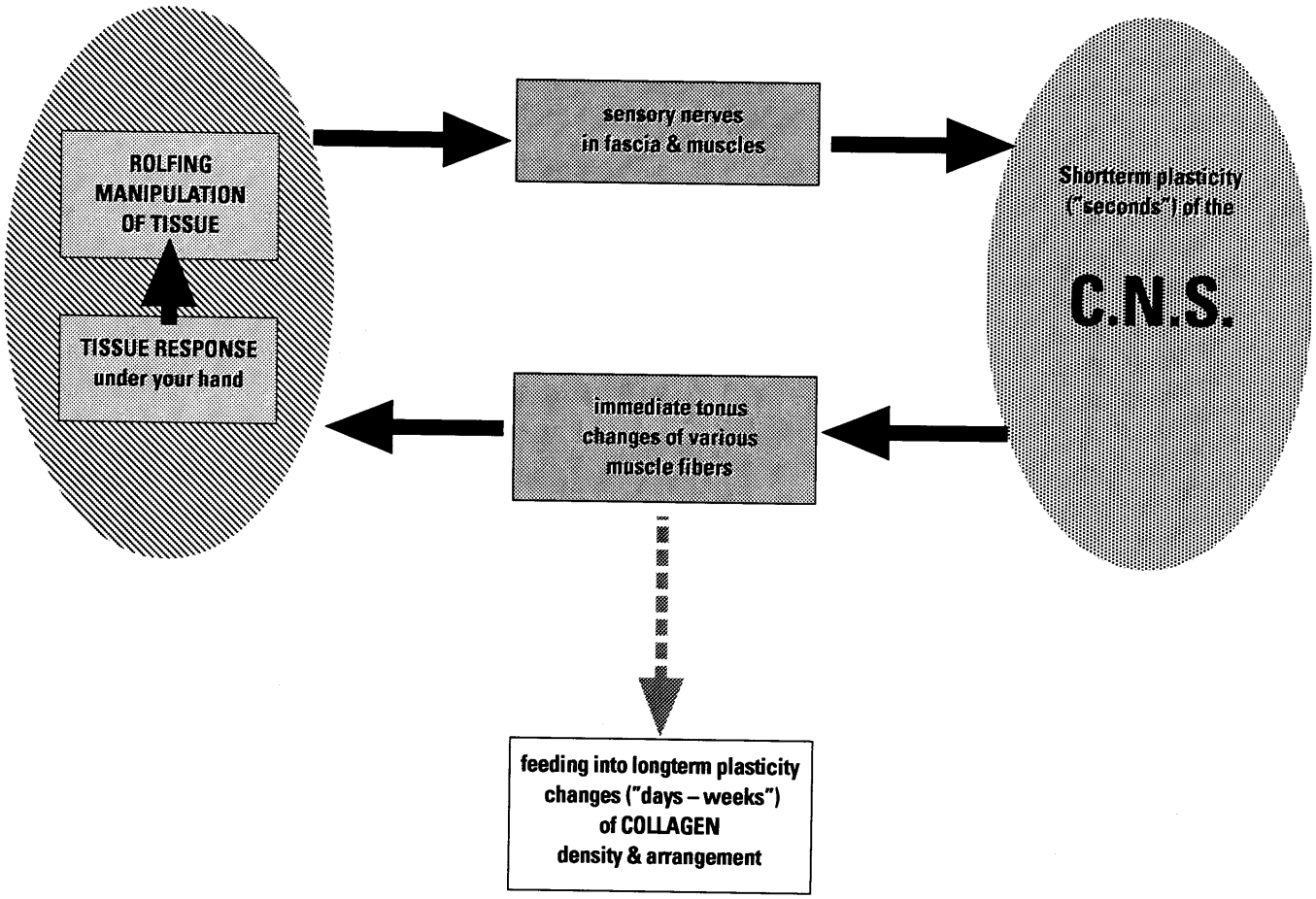
Chart 2 shows how I see my interaction with the client. I don´t treat my client´s body as a piece of clay or a stack of mechanical dead blocks, but as an alive organism or—to say it in more modern or cybernetic terms—as a self-regulatory system. My own actions and perceptions (left ellipse in Chart 2) are in constant interaction with minute responses of my client´s nervous system. Any tonus changes that my hands detect (even if it is only from a few motor-units) will influence my hands how they continue with subtle changes in their pressure and direction. So short-term plasticity of the body to Rolfing manual pressure is mainly a neuromuscular tonus change. But this short-term neuromuscular change will be feeding—especially under the conditions of Bruno D´Udine´s "high behavioral plasticity" of habit formation—into long-term plasticity changes (which take several days to weeks or months) of collagen density and arrangement in the body.

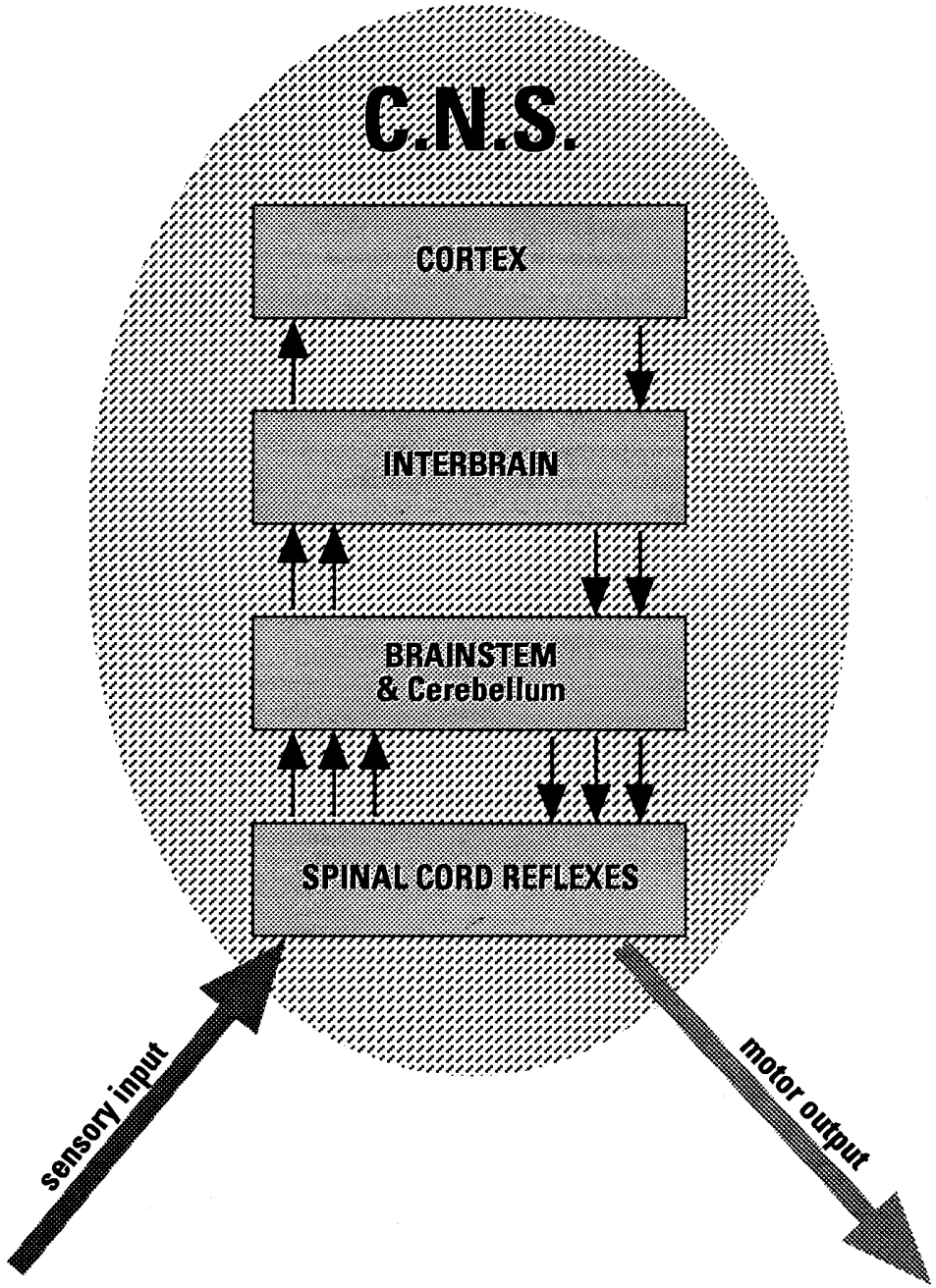
"THE BODY IS A PLASTIC MEDIUM"



R. Schleip 1992

INSIDE THE BLACK BOX

(very much simplified)



SPINAL CORD: antagonist's extension;
spindle stretch reflex;
Golgi stretch reflex

BRAINSTEM
& Cerebellum: individual movement style ("handwriting");
input from spindles and Golgi receptors;
tonus regulation via Gamma motoneurons

INTERBRAIN: emotional coloring;
setting of ANS-states (plus endocrine regul.);
overall body muscle tonus

CORTEX:

- motorcortex (homunculus = somatic selfimage) modified by learning;
  thinks in terms of skeletal directions (& prefers the distal elements)
- suppl. motorcortex, not involved in passive movement,
  but in active or imagined movement.
- Associations based on underl. emot. coloring
- Learning

Chart 3 gives a rough understanding of what happens inside the black box regarding neuromuscular organization. Of course, this is awfully simplified but it can serve as a starting point for some useful reflections about our work (e.g. how to influence the most repetitive movement and posture habits of a person with respect to gravity [which I call structure]? How essential is their emotional coloring through the interbrain in those patterns? etc.)

Looking back at Chart 2 it is easily possible to see how the drawing emphasizes the "being in dialogue-quality of our work. I consider it important to see oneself as **interacting with the dynamics of a self-regulatory system** rather than working in a linear repair mode of fixing this or that in a mechanical system. Of course non-linear system dynamics are currently fashionable in almost any field of science, ecology or art. One famous example for its necessity was the big Exxon Valdez oil spill disaster. They employed the best specialists to give them advice in how to repair the ecological damage. According to their advice they cleaned the spilled beaches with hot water steam in order to remove the oil. Years later they discovered to their surprise that the beaches they didn't clean were much better off than the ones which they had cleaned. Apparently, this ecological system had a self-regulatory ability via some microbes which was unknown before and which the well-meaning helpers damaged with their intervention.

It is quite possible that there are many self-regulatory dynamics of the human organism of which we are currently not aware yet. Could it be that some of our clients end up with much more problems years later—after our well meant repair work—than if we had not worked with them so well? I believe that this is easily possible. But how to avoid it? I suggest that the best answer is to operate in a mental mode of interacting with a highly complex self-regulatory system which demands more non-linear systems thinking instead of the logically and hierarchically oriented 'linear cause and effect thinking' in which most of us have still been trained in school and university. That is why I have become much more careful now than in the past with the application of "structural logic" or any other linear concepts in our work.

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To give an example for **non-linear systems thinking** in our field **Chart 4** demonstrates an application to a specific case. This client of mine came in with a chronic headache as presenting symptom. It was clear that the headache was influenced by the high degree of neck tension, which again was influenced in the gravity field by the amount of thorax flexion (bent forward posture). The thorax flexion was interdependent with her shallow breathing, and the more headache she had the more her shallow breathing pattern would increase. She also complained of indigestion which seemed to be influenced by her shallow breathing as well as by her thorax flexion. Some traditional linear cause-and-effect thinkers would probably want to stop now in the analysis because already it becomes rather complex. But if we want to avoid doing shortsighted repair damage like the helpers of the Exxon Valdez accident we have to become comfortable at managing much more complex pictures.

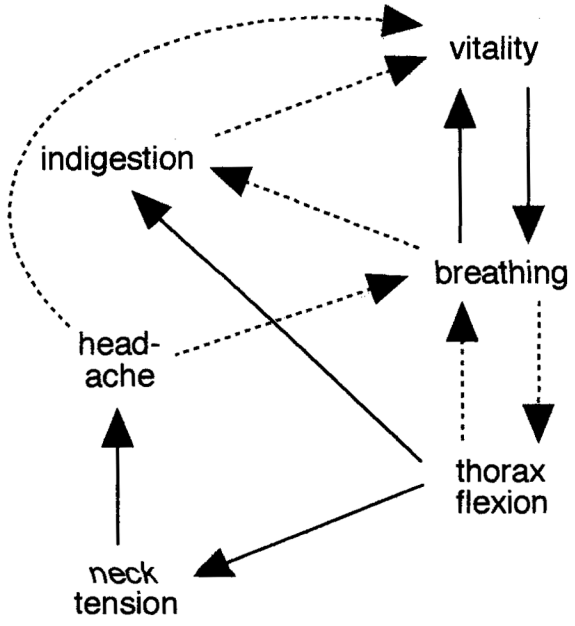
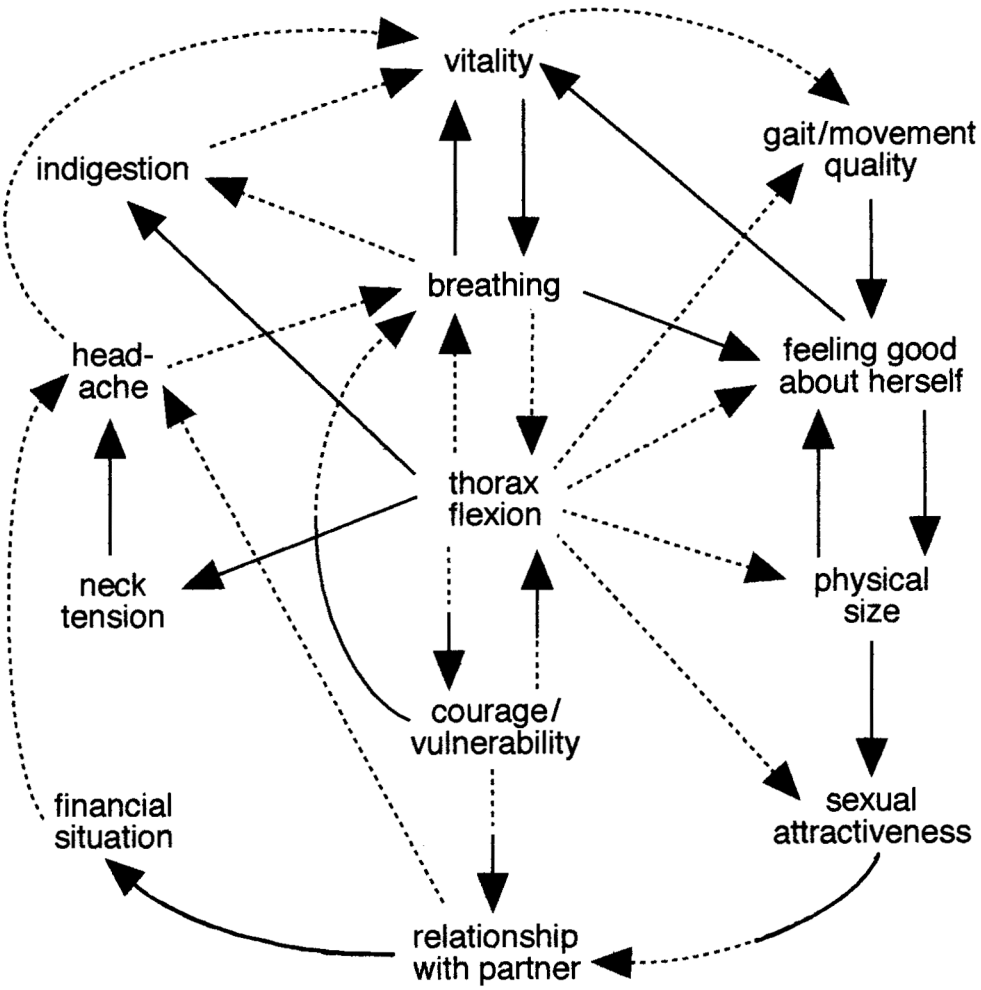


Chart 5 shows an expanded version of the complex interdependencies. Of course, even this picture is much too simple, and one could easily argue that many more factors need to be included. But in my understanding of her situation and after working with her for a while, those seemed to be the most relevant factors. The uninterrupted arrows indicate amplifying influence (the more neck tension the more headache) and the dotted arrows oppositional influence (the more thorax flexion the less good her breathing will be). Sometimes the style of influence can change at certain threshold values (when she started looking too attractive the relationship with her partner disintegrated again). The question now is "Where are the **high leverage points**?". From where can I best influence the whole system? Or in Buckminster Fuller's terms: Where is the "trimtap" at which one can most easily adjust the course of the whole big ship? A systems analyst like Peter Senge at M.I.T. could work with this model on a computer and give all the different arrows different mathematical correlations (sometimes with so-called non-linear equations) until the model behaves very similar like reality. In working with thousands of such non-linear systems dynamics he found that the highest leverage point tends to be quite far away in space and time from the presenting symptom. Meaning that if you get an immediate improvement with your intervention it is quite likely that you haven't hit the main leverage point. If one hits the trimtap in such complicated systems it usually involves some "lag". (This reminds me of my "learning experiences" about lag or of the value of small adjustments together with patience that I had with some Italian showers and their temperature regulation...—after I had jumped between freezing and burning myself several times before.)



So in my model I found the main leverage point in her thorax flexion. Helping her to open up in the front of the thorax took some time, and it didn't solve her headache, her financial and marriage problems immediately. But in the long run it seemed to have been a main key factor for changing the whole system towards the better. (Of course additional work with other elements like with her visceral organs, her psychology and neck tension were also helpful.) The main point is that thinking in non-linear system models can be learned and improved, and we need to train our **intuition** to operate with those complexities.

PRACTICAL APPLICATIONS of the Neuro-Myofascial Model

1) BRING ATTENTION TO THE **PRIMARY (PARASITICALLY) CONTRACTED MUSCLE FIBERS**
(e.g. to rhomboids in retracted scapula pattern)

2) INCLUDE BRINGING ATTENTION TO THE **ANTAGONISTIC MUSCLES** OF THE RELATED JOINT
(e.g. to hamstrings in anterior pelvic tilt)

3) FOCUS AROUND **ATTACHEMENTS**
(working in a direction that stretches the tendon fibers)

4) FOCUS ON **DEEPER FASCIAL STRUCTURES**
(e.g. on periosteum, interosseus membranes, ligaments, muscular septi)

5) CREATE **UNUSUAL** KINESTHETIC SENSATIONS that are most likely to be interpreted as **"significant"** by the filtering action of the reticular formation of the C.N.S.; i.e.
- unusually **strong** stretch of those fibers
- unusually **subtle** stimulation ("whispering effect")
- unusually **specific** stimulation
- sensations that are **always slightly changing/moving** in a not precisely predictable manner

6) PAY GREAT ATTENTION TO THE **STATE OF THE A.N.S.**
If the body is generally hypertoned because of a high ergotropic (symathetic) tuning, then focus on those areas and manipulation styles that address the A.N.S. most effectively - instead of trying to induce specific position changes in the body.

7) INCLUDE A LOT OF **A.M.P.s (active movement participations)** of the client during the manipulations
(usually the slower, subtle and unhabitual the AMPs are, the more effective your interaction will be).

8) INCLUDE PRECISE AND **IMMEDIATE TACTILE FEEDBACK** ABOUT THE TONUS CHANGES
As soon as you sense the beginning of a tonus change, mirror this back in your touch to the tissue. The more precise, immediate and subtle your feedback inclusion is, the more effective your interaction will be ("animistic thinking" useful for this).

Chart 6 finally gives some practical applications of the Neuro-Myofascial Model for our hands-on work in terms of where, when and how. Some explanations to the following items of this list:

1) & 2): Both together will invite the motor-cortex to reevaluate the tonus patterns of this joint from different angles. Active movement participation of the client (item 7) will engage additionally the 'supplementary motorcortex´ and increase the nervous systems attention to this joint.

5): Although your socks or your shirt is touching your body right now with possibly the perfect minimal 'craniosacral pressure,´ it is not causing a significant short-term change at this moment. Nor—if you are sitting on a chair while reading this—is the chair pushing with several pounds of pressure against your buttocks causing any structural shift. In order for our hands to be more effective than the chair´s pressure right now, they need to work in a way that is interpreted as "significant" by the filtering action of the reticular formation of our C.N.S.

8): This is my favorite. A master bodyworkers hands (like Dr.Rolf´s) are able to detect the slightest tonus changes of just a few motor-units and mirror this change back to the clients C.N.S. constantly without even thinking about it. Which working concepts and images can help us to achieve the same? Sometimes the Neuro-Myofascial Model has been misunderstood that one needs to think now in terms of electrical circuits, etc. But this would be very inappropriate and miss the fine delicate responsiveness of our interactions and especially the self-regulatory dynamics of this organism. A much better image would be one of something animated, something alive. While touching it is best if you picture an animal nature or an alive spirit to which you have a positive motherly emotional bonding (then the "sensory acuity" in mammals tends to be highest). I have found to achieve best results by teaching practitioners not to think of electrical circuits or of dead people's anatomical pictures (please don´t!) while touching, but of imagining little gnomish spirits (like goblins or little gremlins) to inhabit this tissue. Your hands will then be eager to contact those little spirits and to get the frightened and rigid ones among them to loosen up in response to your loving and very sensitive—even if firm -touch. (While those little gnomish entities of course don´t exist in a way where one could photograph them, they do exist as `auto-poietic structures´ of several motor-units - sometimes spread over the topography of several muscles—and their neural interconnections which have formed as parasitic subsystems within the background of the bodies overall neuromuscular coordination. They can be recognized to behave dysfunctional or disconnected in functional movements or in the tissues response to our touch).

I don´t think that the inclusion of the self-regulatory dynamics of the nervous system in our view of human structure is far away from Dr. Rolf´s intention. Nor is our current shift of focus from pure mechanical thinking towards modern non-linear systems thinking in any contradiction to her spirit. Making a clear emphasis, she started the very first chapter of her book with a quote of the man who is often referred to as the father of cybernetics:

"We are not stuff that abides,
but patterns that perpetuate themselves"
Norbert Wiener