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## Structural Analysis - a Diagnostic Six-step Schema

*A clear conceptual differentiation between structural and functional aspects of the body allows us to make clearer statements about its structural state. With the block model as our reference, we can analyze the relative position of the major body segments, i.e. show in which direction these segments deviate from normal. Tilt and shift of the pelvic segment in the sagittal plane determine distinctive patterns in the front-to-back dimension; side-tilt and side-shift do the same for the left/right dimension. Rotation around the vertical axis reveals the so-called "standard rotation," while examining deviations upward and downward along this axis leads to the point of view of structural dynamics.*

*The results of such an analysis provide a rational background for bringing the body more toward normal. This system provides a framework for dealing with local concerns while keeping the whole in mind.*

There is one belief that is shared by most practitioners of Structural Integration: the idea that everyone's body possesses its own individual structure, different from the structure of every other person. Although this proposition is generally not challenged but, on the contrary, taken for granted, there seems to be great reluctance, resistance even, to consciously deal with what very obviously follows from it: the eminently important question of how exactly the structure of person A differs from the structure of person B, and C, and so on. To deal with this question, we need a system that allows us to describe a person's individual structure in precise terms. Such a system must be verifiable by observation, and it should be discriminating enough to provide an exact description for everybody's individual structure. Ideally, it would permit a practitioner to select out of a large group of people that one person whose structure is being described, or to assign to each person the description that fits that person's structure.

Such a descriptive system must also be "structural" in nature. Obviously, the color of the eyes and hair would not be allowed in such a description because these criteria are definitely not structural. There is a number of ways of describing a body that come closer to the notion of structure. Examples would be terms like "tall" or "short," "stocky," "slim," "heavy-set," "long-legged." However, these and similar notions are not structural in a strict sense either.

From the various definitions dictionaries offer for "structure," we prefer "the arrangement of all the parts of a whole". It names the relationship of all the parts among each other as the main feature but also alludes to the possibility that the whole may be more than just this. Ida Rolf thought of structure in a similar way, for example as the "relationship of units of any size in space"[1], but she made it more specific. She explicitly added a geometrical factor – the spatial arrangement. In addition to this, she also explicitly introduced the notion of weight. Both additions present problems.

Structure as "the spatial arrangement of all the parts of a whole" usually denotes something rigid and solid: a building, a bridge, or a salt crystal. The spatial relationship of the parts is stable and constant. However, even in these cases there are slight changes in the relationship of the parts, which are not structural but functional. A bridge may sway slightly in the wind or undergo minimal changes of form through the impact of heavy traffic. The atoms of a salt crystal oscillate around a median grid place. In a body, the functional changes of the spatial arrangement of the parts are of a much greater magnitude. If we observe someone walking, the left leg will be in front, the right leg in back at a given moment, while a moment later this relationship is reversed. But even in standing, the relationship of the parts is not constant. People stand differently at different times, and even if standing still for some time, the relationship of the parts will be changing ever so slightly. These changes are functional in nature, not structural. In order to say something about the structural relationship of the parts, we must first look at the functional state.

Somewhat paradoxically, Ida Rolf‘s second addition – the notion of weight – shows the way to a solution. Weight is the expression of the physical force of gravity exerted by the earth on the body. However, to understand how gravity determines the spatial arrangement of the parts of the whole we need to consider additional physical factors. Under ordinary circumstances, with the body placed on the ground, “normal force”, the force that is exerted by the earth on the body (also called ground reaction force) is always present as an essential counterpart to the force of gravity. A second set of forces that are always present in the body are the passive elastic forces. Passive elastic forces can be further divided into tensional elastic forces that are exerted largely by stretched fascia, and compressional elastic forces  exerted by the contents of the fascial bags. The third type of physical force in the body is provided by active tension and compression exerted by the musculature. This third type of force can be summed up into the concept of the “(muscular) tonus pattern” reigning in the body at a given moment[2].

It is impossible to know exactly how the sum and interaction of all these forces determine the spatial relationship of the parts of the body. However, certain considerations and the appropriate functional tests give us enough information about the functional side to be able to make statements about the structural aspect of that "relationship of parts." For the following considerations, we assume the "functional problem" to be solved.

The key concept of structure is the "relationship of parts." If taken literally, this means that the shape of the parts themselves is not a structural consideration at all; only the way they relate – primarily spatially – is "structural." A person‘s body may sensibly be described as possessing a long, narrow trunk and short, thick legs, for example. However, this description would not be structural because it describes the shape of the parts, not their relationship.

A further peculiarity of the structural point of view results from the emphasis placed on the "whole" by the definition. Structural integrity can only be assessed with regard to the whole body in the gravity field[3]. When the relationship of the parts is examined, these parts should be large enough to fit easily into the view of the whole. In contrast to anatomy, Structural Integration starts with the whole and then goes to the parts, not vice versa. This necessarily makes the parts – and the whole – something much more abstract than the fairly concrete "anatomical parts." It also necessitates the use of various abstract models of the body depending on the question under consideration. This can be confusing, especially if one is used to the straightforward way in which anatomy describes small parts and then puts them together to "construct" the whole.

The basic model used for structural analysis is the block model invented by Ida Rolf. The diagnostic system is easier to understand if we keep in mind that this model is really a "blocks-in-an-elastic-sack" model[4]. The block model serves to describe the spatial relationship of the parts in appropriate geometrical terms. The framework, the system of coordinates, is provided by the Line – the vertical line through the center of gravity of the body – and the transverse and sagittal axes of the body. This allows us to make qualitative statements about the position of blocks with regard to neutral in the three directions of space. In addition, we can qualitatively determine rotation of blocks around the three axes, i.e. their orientation in space.

Keeping in mind that the progression for describing structure goes from the whole to the parts, it would be preferable to begin with the body as the whole, the "structural body." In fact, a first attempt at such a systematic approach was made by Jan Sultan[5]. He starts with a dichotomy of the whole body by distinguishing an "internal" from an "external" basic organization. He then goes to the parts by deciding whether they are “congruent” or “conflicted” and extends this procedure to still smaller parts. Sultan's system is derived from the craniosacral rhythm. It implicitly refers to a neutral state, which can be thought to represent normal structure, and then decides toward which one of the two opposing sides a part is rotated structurally.

Sultan’s novel and radical approach is still the foundation and the starting point for anyone who wants to understand the specifics of an individual’s structure. It is highly predictive in the most important front-to-back dimension. To this, we intend to add considerations of the left/right dimension (the longer and the shorter leg) as well as the points of view of structural dynamics (up-down) and standard rotation around the long axis of the body.

The system presented here analyzes the body in its dimensions one at a time. This is not possible yet for the body as a whole. However, the block model permits to determine the structural state of the blocks while keeping the whole in mind. Factually, the system is centered on the pelvic segment as the "keystone."

## 1. General Considerations

### 1a. Subjective Impressions

The term is a little misleading. What is meant here is that the practitioner should be aware of his or her feelings when meeting a client and while working on him/her. This may not seem very important because Structural Integration is a fairly technical affair. Its concepts are rooted in the physical reality of the body. Specifically, it is a highly formal affair, for it deals with the shape or the form of the body in the gravity field, while disregarding other highly important aspects such as history or meaning. Form is a difficult to understand, fleeting, abstract aspect of the human body and it is easily and all too readily given up in the face of the much more powerful questions of content, of emotions, self-image, human relationships, etc. It is also quickly lost when one focuses on pressing and obvious needs such as disease, pain, and ailments.

It is well established that the practitioner‘s emotional state and disposition are important for ethical reasons. Here, their importance from a purely technical point of view should be stressed. If the practitioner is not aware of his or her emotions and the power differential of the practitioner/client relationship, not only are ethical complications to be expected but also the goal of integrating structure is endangered. This issue is common to all fields dealing with humans from various perspectives and it is adequately subsumed under the concept of "transference."

1b. Objective Impressions

Two different kinds of observations belong in this category. The first one is an overall impression of the larger tendency of a given structure. A body may, for example, appear strongly collapsed or constricted. Or the structure may be "typically" internal or external. This first kind of impression is described in detail in the specific points of view nos. 2 through 5.

A second kind of impression comprises observations that are not addressed in the schema below and that have not been well defined.

One aspect we try to evaluate in Structural Integration is the degree of order a given structure exhibits. Good order is not so much indicated by good alignment in standing but rather by seeing a body move harmoniously and easily with good support. Bodies with lower degrees of order can be divided into “centripetal” and “centrifugal” structures. The first are bodies which are either strongly collapsed or constricted and move accordingly. "Centrifugal structures" move freely but with little coordination and support. These distinctions call for different approaches as to how a body needs to be integrated. "Centripetal structures" usually respond well to unspecific softening and lengthening, to "release," at least for a while. Geometrical concerns become important later in the process, once a certain degree of freedom and flexibility has been established. With "centrifugal structures," specific structural considerations are essential right from the beginning if collapse is to be avoided and support is to be improved.

A second aspect is loosely related to the first one. We look at whether or not a moving body exhibits "style," or a certain kind of order. Such an order, as for example the order typically seen in ballet dancers, is very different from "Rolf order." These bodies exhibit an intentional connectedness in movement. Working with a body that possesses a style or some kind of order of this type is very different from working with a body that moves more or less unconsciously and randomly, with a structure that has formed accordingly.

A third aspect to be considered is the consistency of the fascia. It can be rigid or soft. If fascia is rigid, it can either be of the more common variety of tough and hard fascial membranes, which are often glued together. Or it can take on the more specialized and selective form of a body tied together as if by tight and tough strings. We also try to differentiate between bodies that are either homogenously rigid or soft, and bodies that are soft on the outside and rigid on the inside or vice versa.

The fourth aspect we consider is the habitual state of the muscular tonus pattern. Traditionally this is called "hypertone" or "hypotone" musculature. Hypertonicity and rigid fascia, hypotonicity and soft fascia don’t go together necessarily. We use “tonus” exclusively for active tension contributed to overall tension by contractile tissue in order to differentiate it from “tone” which results from several factors (like tonus, degree of rigidity, turgor).

**2. Internal/External - The Front-to-Back Dimension**

If the block model is taken literally, each block possesses only three degrees of freedom: it can be shifted forward or back, left or right, and rotated left or right around the vertical axis. In reality, each block possesses three additional degrees of freedom: it can also be tilted around a transverse axis, side-tilted, and “shifted” along the vertical axis (too much up or down).

Given the emphasis Ida Rolf placed on the pelvis as the “keystone” of structure and her insistence that the pelvis must be horizontalized, it seems justified to take the “pelvic block”, and specifically the pelvic tilt, as the starting point. The pelvis can be tilted forward or backward. In the first case, with the anterior tilt, the legs are rotated internally in most cases. Anterior tilt determines the 'internal' organization corresponding to Sultan’s internal type. In the second case, with the posterior tilt, the legs are in most cases rotated externally, defining the external type.

To keep the different dimensions clearly apart, pelvic tilt must be thought to take place around a transverse axis through the center of gravity of the pelvic block. The pelvis then stays aligned perfectly along the vertical axis of the body. This conceptual tilt (for the purpose of analysis) can be called "segmental tilt," in order to distinguish it from the "anatomical tilt” where the axis of rotation is formed by a transverse axis through the hip joints. If the blocks are in perfect vertical alignment, an anterior segmental tilt brings the hip axis posterior to the Line. With a posterior segmental tilt, the hip axis is forward of the Line.

Anterior and posterior pelvic tilt determine two different tensional patterns in the fascial net in that they go together with qualitatively different patterns of primary and secondary shortness in front and in back[6]. The pelvic tilt therefore provides important information about the state of the fascial net.

With the block model in mind, it is apparent that a sagittal shift of a segment is highly relevant for gravitational concerns. With an anterior pelvic shift, the pelvis (or, more precisely, the gravity center of the pelvis) is forward of the Line. With a posterior pelvic shift, the pelvis is posterior to the Line. In the first case the pelvis is pushed forward by gravity and normal force; it is pushed back out in the second case. Similar to pelvic tilt, anterior and posterior pelvic shift also determine two qualitatively different patterns of primary and secondary shortness in the fascial net. The sagittal pelvic shift is more important than the shift of other segments for two reasons. First, in erect posture the pelvic segment contains or is close to the gravity center of the whole body. Secondly, it contains the most mobile – and least stable – area in the front-to-back dimension: the hip-axis

Pelvic shift can be visualized in the block model – with the blocks enclosed by an elastic sack – in the following way. In the case of a structurally anterior pelvic shift, and if the pelvic block is functionally held in normal alignment, there will be more passive tension on the backside of the elastic sack. When left to itself, this passive tension will tend to push the pelvis forward, where upon gravity and normal force increase this shift until some sort of equilibrium of forces is reached. The opposite happens if the structural pelvic shift is posterior.

Looking at the hydrostatic balloon model in easy erect posture true to the structural type, an anterior pelvic shift shows as an anterior convexity of the midline. A posterior pelvic shift will show a posterior convex midline. In still simpler words, the body is bent forward in its middle portion (from about the LDH to the knees) in the first case. It is bent backward with a posterior pelvic shift.

Diagnosing the direction of structural pelvic shift is often difficult because there is a large functional range for the pelvis to shift (and be held) forward and/or back. The basic test is with the client standing erect and tall as close to the normal arrangement as possible. Then the pelvis is made to shift softly forward and back across neutral. It will go farther, faster, and smoother in the direction of the structural shift. However, several factors regularly disturb the test and obscure or even invalidate the findings. First, almost everybody stands too far back on his or her heels. The weight of the body should be more on the forefoot. Secondly, the abdominal muscles are usually contracted to some degree. All the muscles crossing the pelvis in front, in back, and on the sides should be as relaxed as possible during the test. Thirdly, the movement backward is often not led far enough. Then the pelvis does not pass the neutral point but stays in front the whole time. This leads to the fourth and major obstacle. When the pelvis goes forward, the upper body has to tilt back in order to keep the gravitational center of the body in place. This is usually not much of a problem. But when the pelvis moves back, the upper body should tilt forward. This is rarely done spontaneously, and even with instructions some clients don‘t manage to go forward with their chest sufficiently. Or, if they succeed, they bend their back.

Pelvic shift cannot be diagnosed in a person just standing "naturally" because, almost without exception, people stand with a functional anterior shift. Generally, the alignment of the segments along the vertical is different in free standing from what it is in walking. Habitual walking seems to represent structure better than standing. Therefore, we use walking to observe the alignment along the vertical. It is truer to the structural type although not absolutely reliable either, of course. We ask people to walk in a way that seems natural to them, to slow down, shorten their steps, and come to a standstill. Invariably when they come to that point they shift the pelvis forward and tilt the upper body back to some degree. Clearly, the "natural" alignment along the vertical is different in walking and in standing. We then ask them to do the same but not to shift any part of the body when they come to the standstill. If they succeed, standing will often feel highly unnatural to them, but the vertical alignment of the blocks will be closer to the structural type.

Determining the direction of sagittal pelvic shift permits a beginning understanding of the patterns in the structural body. A perfectly normal body should be imagined in perfect alignment. When the pelvis is brought forward a little, it will be pushed forward more by gravity. Passive tension in the elastic sack increases in front tending to push back the pelvis into its original place. Tension decreases in the fascia in back of the pelvis. This makes the pelvis wide in front while narrowing it in back; the ischial tuberosities can be imagined to come closer together. A little farther down, the front halves of the upper thighs will be rotated laterally and therefore move apart, the back halves will come closer together. The legs rotate externally. The opposite happens (i.e. pelvis narrowing in front and widening in back, ischial tuberosities going wide, legs rotating internally) when the pelvis is moved in a posterior direction from its starting position in the imagined perfect alignment.

An anterior pelvic tilt usually goes together with internally rotated legs. With a posterior pelvic tilt the legs are in most cases rotated externally. The reasons for this are not well understood. But if we start with the thought experiment above, we can see that the lower half of the pelvis moves back when it tilts in an anterior direction. This would make the back of the legs wide and let the front aspects come together more. The opposite would be the case with a posterior tilt.

Pelvic tilt and sagittal pelvic shift don't seem to be connected in a causal way. Internals and externals each present the two directions of shift in a fairly even distribution. When the tendencies for leg rotation are mixed instead of congruent from tilt and shift, tilt regularly seems to take precedence over shift

From the direction of pelvic tilt and shift we derive four structural types. The regular internal (RI) has an anterior tilt and a posterior shift, the regular external (RE) a posterior tilt and an anterior shift. The locked-knee internal (LI) has an anterior tilt and an anterior shift while the symmetrical external (SE) has a posterior tilt and a posterior shift. These four types exhibit qualitatively different patterns of tension in the fascial net and can therefore be distinguished clearly. Within each type there exist large differences, of course, which must be explained by other points of view. The internal/external typology should be used fairly restrictively to understand the front-to-back dimension of the structural body, although the types predispose toward certain tendencies in other dimensions.

A quick and global test is often useful to determine the type. We put the client into the four typical arrangements successively and observe which one fits his structure best. 'Best fit' means that passive tension in the fascial net is fairly low and distributed evenly in front and in back along the whole of the body. Again, the specific conditions of the function of standing easily interfere with the findings. We sometimes go directly to observing how the client walks in each of the four arrangements.

## 3. The Longer and the Shorter Leg - the Left/Right Dimension

With reference to the Line a block can be shifted to the right or to the left. The gravitational center of the block is then either to the right or to the left of the Line. This is illustrated by the "blocks-in-an-elastic-sack" model for the pelvic segment in the following way. All the blocks are held in perfect normal alignment with no shifts or tilts present. Now the musculature around the hips is relaxed, and tension on the lateral sides of the pelvis decreases. A tensional imbalance results between the right and the left side, which is due to the side-difference in the rigidity of the fascia stretching from the lumbar segment to the thighs across the hips. The pelvis will be pushed out laterally by the higher tension in the fascia on the tighter side in the direction of the softer side until tension is equal.

The block model is based on the assumption that the bordering planes between the blocks are horizontal. It can therefore not explain side-tilt. We use the pelvis-on-legs model instead. This consists of a bowl or a "bony basin"[7] supported by two sticks representing the legs. The pelvis is imagined to be free and mobile. The sticks never have the exact same length; therefore the pelvis cannot sit exactly horizontally on top of them. It is tilted down on the side of the shorter leg. The hip-axis will be slanted sideways in the same direction.

If the pelvic bowl is replaced by a rectangular block, this model shows that the pelvis will also slide down sideways in the direction of the shorter leg. Here the shift is produced by gravity and not so much by a tensional imbalance of the fascial net between the left and the right side, as in the block model used above. The pelvis-on-legs model explains why pelvic side-shift and side-tilt are usually in the same direction. Elastic forces exerted by fascia and gravity combine to produce this pattern.

This description of pelvic side-shift and side-tilt is strongly simplified. Several premises are implied which need to be examined in detail. Among them are the assumptions that the orientation of the legs in space remains unchanged and that the pelvis is able to slide freely on the legs. Concerning side-shift, the pelvis is assumed to shift sideways and down to the side of the shorter leg from the initial neutral arrangement. This means that also its center of gravity will shift and more weight is placed on the shorter leg. Furthermore, the pelvis will take the top of the legs along, resulting in the legs being somewhat slanted in the direction of the shorter leg, if they stood straight initially.

If side-tilt is considered in isolation, the sagittal axis of rotation runs through the pelvic center of gravity, which therefore stays in place. The upper part of the pelvis will turn in the direction of the shorter leg, the lower half in the direction of the longer leg. This lower part will take the top of the legs along in the direction of the longer leg. So, the upper end of the legs, the hips, go to one or the other, depending on whether we examine side-shift or side-tilt! This contradiction seems to be related to the two functional patterns of 'static stance' and "dynamic stance”[8].

Structurally, "static stance" seems to be more relevant. The effect of side-shift supersedes that of side-tilt, resulting in the pelvis coming more over the shorter leg and the legs slightly slanted to that side, too. The upper body will then lean over to the other side, more on top of the longer leg, in order to maintain balance. This counter-curve of the upper body is usually not perfectly smooth but starts with a visible angle. The counter-curve may start low, just above the pelvis in the lumbar segment. It may be found higher up in the mid-trunk in the area of the costal arch. Or, it may be still farther up in the thoracic segment, visible sometimes between the scapulae.

Looking at the whole body in "static stance," it is curved from the feet to the upper body in the direction of the shorter leg. With a right shorter leg, it will be right convex, with a left shorter leg, it will be left convex. We can assume that the fascial net has adapted to this arrangement and fits it, and instead of a shorter leg and a longer leg side we could talk about a right convex and left convex structural type.

Finally, we find yet another side-curve in the area of neck and head, which serves to place the head horizontally. It is reasonable to assume that the various individual ways in which the counter-curve is expressed are determined by the structural characteristics of the individual bodies. Unfortunately, we don‘t know much about exactly which characteristics are responsible for which kind of counter-curve.

It must be kept in mind that this description is simplified. The issue is much more complex in reality because the picture is superseded by other factors, one of which is standard rotation.

There also seems to exist a fairly constant asymmetry in the trunk. The right side usually appears as shorter, wider, and flatter. The left side is longer, narrower, and deeper.

The pelvis-on-legs model implies that the upper end of the legs is at the top of the femoral heads. It also promotes the seemingly natural idea that the weight of the upper body rests on the legs and is transmitted down via the femoral heads. This generally unchallenged assumption is so compelling because of the bone/muscle model provided by anatomy that it is nearly impossible to even imagine alternative possibilities. In contrast, the radically structural model of the hydrostatic balloon does not need bones at all. The legs form extensions of the large balloon of the trunk. The border between trunk and legs would be indicated more abstractly by the hip-axis instead of the femoral heads, the hip-axis being a little lower as it goes through the centers of the femoral heads.

The hip-axis as the bordering line between trunk and legs is certainly relevant for functional considerations. In Normal Function it should be posterior to the Line. This is also valid for normal standing. This is extremely rare, however, because people nearly always stand with a functional anterior pelvic shift and therefore with the hip axis anterior. Such variations in the front-to-back dimension lead to variations in the way the body is supported, which in turn are relevant for left/right considerations, too.

Usual stance is qualitatively different from normal standing because it forms something like a "compressional régime" as opposed to the "tensional régime" of normal standing. In this usual stance, pelvis and thighs, but also often lower leg and foot, are a solid unit giving the impression of bone standing firmly on bone. The area of maximal mobility is then not at the hips but between pelvic and lumbar segment. For this arrangement it makes sense to consider the iliac crests as the upper end of the legs and to determine the relative length of the legs at that level.

If standing is functionally normal, the area of greatest mobility is at the level of the hip axis, where it should be. Relative leg length determined at this level can differ from the findings in usual stance. From the point of view of Normal Function it is more important which way the hip-axis is slanted, rather than which way the line given by the iliac crests is slanted. Some tests to determine relative leg length have been described in Notes on SI[9]. About 70% of clients show a left longer leg, 30% show a right longer leg. A quick diagnosis can be made by observing a client walking. As should be expected, the trunk can be seen to sink a little lower when its weight comes down on the shorter leg; it sinks less or even goes up when it comes down on the longer leg. The hip of the shorter leg moves laterally when the weight of the body comes over it. This convex side of the whole body can be visualized as a column, which bends out laterally in its entire length, with the maximum excursion at the hip level. The picture usually looks different on the concave side with the longer leg. The thigh also goes laterally when the weight of the upper body bears down on it, with the maximum excursion at about the level of the greater trochanter. But the trunk seems to stay more in line. The impression is then that the trunk, with the pelvis as the lowest part, passes by the thigh medially, pushing the leg out a little. If again that side is imagined to be a column the picture is that of a break or dissociation within the column at the hip level. Furthermore, especially with a marked difference in leg length, it seems that the trunk is carried permanently more over the shorter leg. The longer leg seems to be slanted a little so that support from the foot comes slightly from a lateral direction.

Considerations of leg length can be further refined by looking at the length of the components of the leg. The contribution made by the feet can be estimated by comparing the relative height of the ankle axes. The height of the foot is largely "structural" in that the relationship of the bones of the foot, considered to be the parts that make up the whole of the foot, is more important than the size of the bones. We have the impression that generally the arch of the foot on the side of the longer leg is lower.

In the lower leg and thigh, the "ossary factor" is more prominent. The length of the lower leg segment is largely determined by the length of the tibia. It is modified "structurally" in three ways. First, any deviation of the tibia away from vertical results in a loss of length along this vertical. This needs to be considered frequently because the slant of the lower legs away from the direction given by the midline of the thighs is often markedly different between the two sides. This is true for both knock-kneed and bow-legged structures. A second source of modification is differences in rotation around the long axis. Although this should theoretically not influence length along the long axis it seems to be relevant because it influences the third factor: the state of structural dynamics at ankle and knee, where collapse, as well as constriction, can reduce length.

The length of the thigh segment seems to be largely determined by the femora. Besides their absolute length, the angle between neck and shaft is also a factor in leg length. A "structural" modification arises from the degree by which the thigh deviates from the vertical, both sideways and in the front-to-back dimension. A frequently observed pattern consists of the right lower leg being longer than the left one, and of the left thigh being longer than the right one.

In the pelvis, the right half is shorter along the long axis of the body than the left one because of pelvic standard torsion.

Leg length thus appears as the product of many factors. In the foot and pelvis the spatial relationship of the bony components seems to be of primary importance. In the lower leg and the thigh the ossary factor is probably predominant. All this is modified by the spatial orientation of the segments with regard to the vertical, and by issues of structural dynamics (see no. 5. below).

## 4. Standard Rotation

In the block model, the segments of thorax, thighs, and feet are rotated positively, or counter-clockwise, around a vertical axis through these segments. Those of head, pelvis, and lower legs are rotated negatively, or clockwise, around such an axis. Standard rotation appears to be a biological constant[10].

In addition, the pelvis regularly shows an intra-segmental standard torsion. This pelvic standard torsion seems to be linked to the standard rotation of the whole body, but it is not clearly understood how it fits into the overall pattern. Standard torsion causes the right half of the pelvis to be shorter along the long axis of the body. The right half is also wider and flatter than the left half, which in turn is longer, narrower, and deeper.

In the legs, standard rotation is most prominent in the relative rotation of the thigh and lower leg segments of the right leg. The rotation of the thigh relative to the lower leg is stronger on the right and thus the right leg always appears more "conflicted," while the left leg is more "in line." This means that by organizing (i.e. de-rotating) the legs, more length can generally be gained in the right leg. We find the right lower leg regularly in a standard torsion, which tends to rigidify and shorten it in contrast to the left lower leg. This may explain in part why right longer leg structures always seem to present more problems than left longer leg structures.

**5. Structural Dynamics**

Structural dynamics describes the situation along the long axis of the body, in the line of action of gravity and normal force. The block model is limited in its capacity to explain this aspect of structure. The question would be whether a block is too high above or too low down on the block below. The model does show though, that the question cannot be decided along the lines used in the other five dimensions. There, geometrical consideration of the two possible directions in which blocks could deviate from normal allowed us to state qualitative differences. Physically, the direction of deviation from labile (or unstable) equilibrium could sometimes be used. In structural dynamics on the other hand, there exists no absolute reference point.

The problem can be clarified by examining the height of the medial arch of the foot, which is, strictly speaking, an intra-segmental consideration. Starting with an arch of ideal height – which cannot be defined exactly – it should be expected that the arch becomes lower over time. The weight of the body comes down on the foot all the time, and the fascial structures responsible for holding up the arch would tire and give in over time. Everybody should be flat-footed eventually. This is not the case, of course. Many people have arches that are too high.

The foot seems to have a choice with regard to the load acting on it permanently. It can go along with it to some degree, resulting in low or sunken arches. Or it can react by shortening and rigidifying the tissue, which results in high arches. The first could be called "structural collapse," the second "structural overcompensation“ or "constriction." It should be kept in mind that these terms describe a structural state only. They do not say anything about how this state has evolved. Nor should these terms be used to describe functional aspects.
Structural dynamics manifests on a number of levels. The foot, primarily its medial arch, is on the lowest level. The next level up is at the ankles. If the ankle is collapsed, the malleoli are too far apart, if it is constricted, they are too close together. The constricted knee is also narrow, with tendons clearly showing, the patellae often protruding. A collapsed knee is broad, with little definition. Constricted hips are drawn-in and tight, collapsed hips are wide and formless. The hips can be deceptive, however. Sometimes they seem wide and soft although inside they are tight and therefore constricted.

The pelvis can be narrow or wide. We must take into account that the pelvis can have an internal or external configuration. The difference in form between the male and the female pelvis must also be considered. Above the pelvis the situation is less clear. Weight as a factor becomes less important here, too.

Normal Function helps with diagnosing the dynamic state of the structure. The ankles for example widen initially in Folding. Collapsed ankles will do that readily at the beginning although perhaps not very far. Constricted ankles will stay together longer. In extension against the ground, constricted ankles will initially provide lift, while collapsed ankles will tend to stay low and wide.

**6. Planning a Session or a Series of Sessions**

Structural analysis describes the structural form or shape of the body in all the dimensions of space. Its reference point is the normal alignment of a perfectly integrated structure. Its information is qualitative in nature. It indicates in which direction the body deviates from normal. It is essential for a rational practice of integrating structure. For, without knowing in which way a structure is not normal, a claim to integrating structure certainly lacks a rational base.

However, structural analysis doesn‘t provide a simple set of directions for integrating structure. The reason for this is that the structure of the body forms an exquisitely circular system. Any structural change does not change one aspect alone but affects all aspects, i.e. the whole of the structure. If, for example, the anterior pelvic tilt of a given structure is reduced – a positive change in itself – all the other parameters are also affected. A local positive change may well result in a disintegrating effect on the whole.

The practice of integrating structure depends on knowing how an intervention, or a sequence of interventions, affects the whole. Does it result in integration or disintegration? Furthermore, it depends on an understanding of priorities, of what helps the structure most, of what is necessary or helpful to prepare an integrating shift of the whole. Unfortunately, we possess virtually no founded knowledge of the process of integration. It is based on more or less reasonable beliefs, on vague concepts and images, and on idiosyncratic intuition, which usually differ widely between individual practitioners and are often contradictory, if they are defined at all.

Structural analysis provides something like an overall framework for working on this shaky ground. At the outset, it presents a picture of how structure deviates from normal and provides a rather large set of possible changes, which might serve the purpose of integration. It excludes an even larger set of changes that would clearly be counterproductive, i.e. disintegrating. During the work, it provides a frame of reference for individual interventions and their results. At the end of a session or a series, structural analysis permits to critically evaluate the outcome.

**Practical Relevance**

In practical work, the Rolfer‘s mind tends to shift into the familiar anatomical or pathological model of the body. Bones, tendons, muscles, and joint function then determine the mental context, and therefore the work. This switch of context can probably not be avoided at all times, and perhaps it is sometimes appropriate. But there is also a certain danger to it because it is often hard to find back to the more abstract and demanding structural view of the body. We remember a fair number of instances where, after having released a certain area, we had to realize that, while we had achieved a positive result locally (e.g. improved joint function), structural order had deteriorated and change was in the direction of disintegration. Structural analysis is very helpful when one gets really busy on a "stubborn" area of the body that does not want to release. When we finally get things to move locally, it allows us to step back and assess the local events in the context of the whole.

It is easy to succumb to the "anatomical furor“ hinted at above. Its outcome as far as integration of the whole is concerned seems rather doubtful. Working on babies is a valuable experience in this respect because it necessitates a style of work that is clearly in the nature of the Rolfing process. It is perhaps best expressed by the metaphor of shaping and reshaping the body, by what clients sometimes refer to as "sculpting." Structural analysis provides the rational framework for the shape of the body as a whole, to which the "sculptor“ references what he does.

The process of integrating structure has been described by Ida Rolf in deceptively simple terms: "The technique of Structural Integration is basically twofold: by manipulation, the soft tissue is brought toward its normal (anatomically efficient) position; calling for what we consider appropriate movement then allows the structure to realign itself”[11](see box).

The sentence is also known as “put it (the tissue) where it belongs and ask for appropriate movement.” It raises a number of questions. Some of them are listed here:

1. Is the sentence to be understood in the sense of a definition (a), excluding other modalities from the possibility of integrating structure? Or, is it to be read as a statement (b), describing a common and effective practice, but allowing for other modalities to also integrate structure under certain conditions? What modalities? Under what circumstances?

2. Is the sentence true? If yes, in the sense of (a) or of (b)?

3. If the tissue is brought to a place where it does not belong, is structural integration still possible? If yes, under what circumstances?

4. What determines the place where it belongs vs. all the places where it does not belong?

5. If movement is not called for, is structural integration still possible? How and under what circumstances?

6. What is appropriate vs. inappropriate movement and where is the exact border between the two?

This statement forms something like a descriptive definition of the work of integrating structure, and it raises a number of important and relevant questions. In its second part it could suggest that inappropriate movement does not lead structure to align itself but to “disalignment,” i.e. disintegration. It could be interpreted as stipulating movement as mandatory, although experience shows that tissue can be changed plastically without calling for movement.

The first part of the statement could be understood to mean that tissue brought to a place where it does not belong will result in disintegration. We suspect that Ida Rolf probably thought primarily of the normal position of soft tissue with regard to bone. The soft tissue of the thigh for example would be brought to its normal position with respect to the femur. But to be positioned truly normally, the soft tissue would also have to be in its normal position with respect to the hip, the pelvis, the whole trunk, and the lower leg – to the whole of the fascial network. In the context of the block model, this would call for a normal alignment of all the segments first. Once the segments are in proper alignment, the plastic change, i.e. structural change, of the soft tissue can be expected to be in the direction of integration.

This allows for a primary distinction with practical relevance. The body can be brought "toward normal“ – in terms of its soft tissue, its blocks, or in whatever specific model one uses – or it can be brought "away from normal.“ If "toward normal“ produces integration, "away from normal“ will produce disintegration. "Away from normal“ seems to correspond to what in some fields of bodywork is called "indirect technique.“ Apparently this is valuable for the more local concerns of a therapeutic nature in these fields. From the structural point of view, however, these otherwise beneficial effects could well result in disintegration.

Structural analysis provides a framework that helps us to avoid errors in determining the "normal position.“ Although this "normal position“ cannot be defined absolutely in practice, the system is reliable in that it allows a distinction between "toward normal“ and "away from normal.“ If we take leg rotation as an example, it is clear that the structural norm is “no rotation”. When working on externally rotated legs for example, it is safer to take them toward this norm rather than more into external rotation. But this point of view also permits to distinguish a third possibility: "across normal.“ This technique is sometimes effective in bringing the body toward normal. However, because it goes strongly against the state of the fascial network, it tends to create disorder in the overall arrangement of the body. We use it almost exclusively if "across normal“ is in the direction of the functional norm. Since the functional norm for the legs is minimal internal rotation, it is often safe to take externally rotated legs into internal rotation functionally while working. It is tricky however to take internally rotated legs across normal into functional external rotation.

Structural analysis is also valuable, perhaps even essential, with regard to the arrangement of the body of a client lying on the table. The segments are never aligned normally, and in addition they are aligned very differently from standing[12]. The soft tissue is neither in the "normal position,“ nor is it in the position it occupies with the client erect on his feet. Moreover, because gravity and normal force don‘t act along the long axis of the body, the pattern of passive tension in the fascial net is altered.

It should be valuable to understand how the arrangement of the body segments deviates from normal, depending on how the client is lying on the table. Sagittal pelvic shift, for example, is almost always anterior functionally with the client lying supine, regardless of whether it is anterior or posterior structurally. It is mostly posterior with the client lying prone. Depending on the structure of the client, these and other functional characteristics of the body lying horizontally on a flat surface can either go in the direction of the deviation (generally "away from normal,“), “toward normal”, or "across normal.“ Being conscious of direction helps to bring the body toward normal structurally.

Footnotes:

1 Rolf Ida: “Rolfing. The Integration of Human Structures,” Harper & Row, New York, s.a., p. 31
2 Notes on S.I. 91, p. 8
3 Notes on S.I. 89, p. 40
4 Rolf Ida, op. cit., p. 33
5 Sultan Jan: “Towards a Structural Logic,” Notes on S.I. 86
6 Notes on S.I. 90, p. 2
7 Rolf Ida, op. cit., p. 123
8 Notes on S.I. 90, p. 2
9 Ibid.
10 Notes on S.I. 91, p. 2
11 Confin. Psychiat. 16: 69-79 (1973)
12 Wagner Wolf: “The Influence of Gravity, Normal Force, and Anatomy on the Shape of the Body Lying on a Surface,” Notes on S.I. 92/93