The Pelvic Floor

Meeting Place Between Inside And Outside

by Hilde Feldweg

In preparing for this paper, I was disturbed by the manner in which traditional works of anatomy and physiology divide the body into different systems which are then studied and explored separately.

In India I have seen temples which have grown up over the course of centuries. Originally built to protect and contain an innermost sacred place, in the course of time ever new walls, halls, and passages have been added as protective layers. Finally the gigantic temple-district has reached its present borders formed by the outer walls which screen and protect it. As in the temple, where each area that has been added to better protect the holy becomes itself holy, so in the organism every new layer and every new cell that has evolved to protect the liveliness of the existing organism becomes itself a part of that life.

Rolfing deals mainly with the systems that have evolved from the mesoderm - to stay in the analogue: with the layers and walls, which envelope, support, and protect the innermost. These walls make no sense without this innermost life. There are areas in the body where this separation of inside and outside is less distinct than in others. These areas are like sutures which do not definitely belong to one or the other, connecting the inside and the outside. They may be areas with a high potential for change and awareness. The largest such meeting place between inside and outside is the pelvic floor. This is why I have chosen it as subject for my admissions paper.

THE MYOFASCIAL SYSTEMS OF THE PELVIC FLOOR

When during evolution the quadruped began to walk on its hind legs, the functions of the pelvis changed. In the quadruped the bony ring spans the tubelike abdomen and receives weight of the intestines like the suspensions of a hammock. In the biped that bony ring becomes the opening to a basin formed by the musculature of the pelvic floor. It has manifold functions: it has to bear a portions of the weight of the intestines to keep them from sagging; it has to be at once a powerful, elastic closure withstanding the strong pressures of coughing or laughing and at the same time an aperture through which the body wastes and the fetus can leave the abdomen while still keeping back the organs.

The word pelvic "floor" is somewhat misleading, since it creates the image of a solid, horizontal structure. The pelvic diaphragm, however, neither lies as a plain surface nor even as a hammock in the bony ring of the lower pelvic opening. Its internal border lies much deeper than its origin in the arcus tendineus on the inner fascia of the obturator internus. Thus it has the structure of a funnel with its lowest point in the anal area.

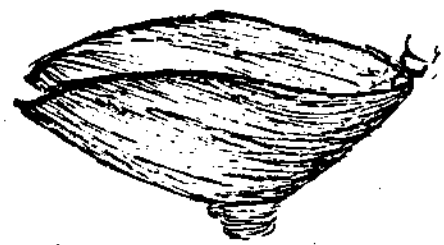

Figure 1

[1] Figures 1-3 were drawn by Hilde Feldweg.

If the pelvic diaphragm is not a floor but a funnel, then it cannot "bear" the weight of the intestines in the sense of exerting an equal counter-pressure. Instead it diverts and distributes that weight as shown in the sketch below: the walls of the funnel distribute the pressure to the obturator forearm, and the myofascial structures of the leg. Only a part of the weight pressure is distributed medially where the pelvic diaphragm is sagitally reinforced by the muscles of the outer anal sphincter, by the perineum, and by the pubococcygeus muscle.

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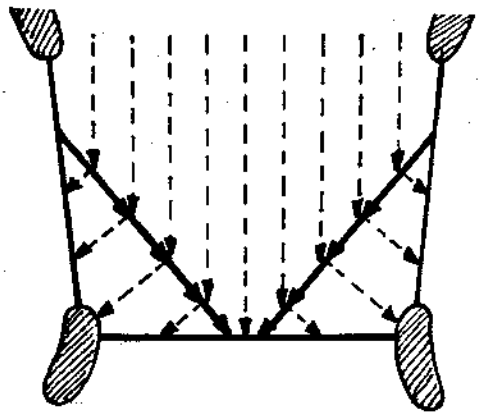

Figure 2

This explains why the pelvic floor can fulfil its many functions, in spite of the fact that in comparison to most other muscular areas e.g. the abdominal wall it seems extremely weak. It is a thin layer of fibers that has to counteract the pressures of weight, breathing, sneezing, coughing, or laughter. It is this funnel-like geometry that makes this possible because thus only the reinforced middle of the funnel truly must bear a perpendicular load.

Seen from below the pelvic "floor" consists of three structures as shown in the following drawings: the fibers of the levator ani muscle (a), the urogential diaphragm (b), and the fibers of the outer sphincter muscles (c). They add up to the net that in Rolfing language is called "pelvic floor".

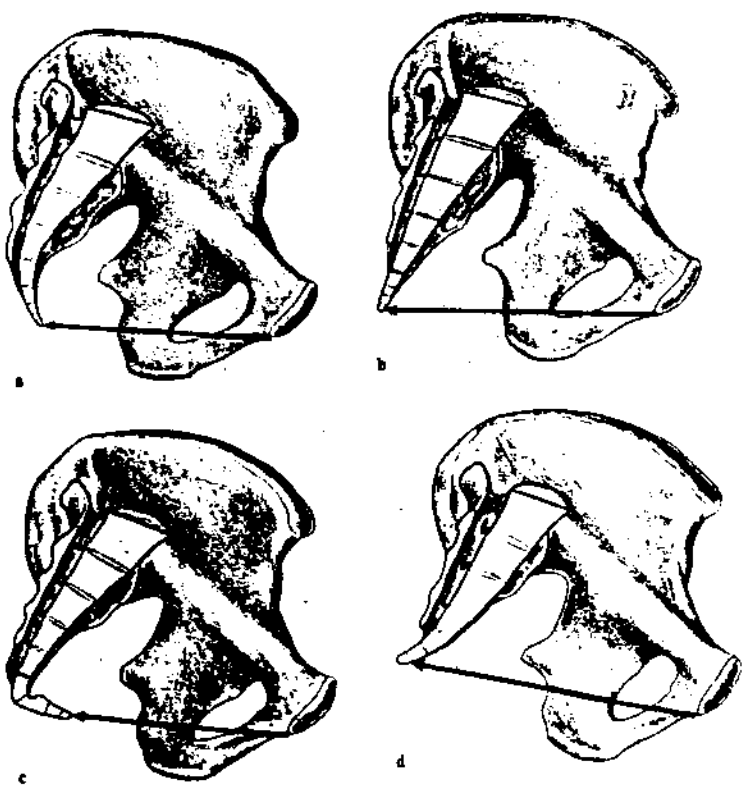

Figure 3

THE BONES

A ring is a stable construction which can receive and distribute pressures and tensions. All centrally directed forces improve the stability of the ring. Irregular tension or pressure deforms the circle but can rarely rupture it.

There are two weak points: the coccyx and the symphysis. Irregular forces will cause change here: in the symphysis the articular surfaces slide on each other; in the coccyx they will deflect it from its normal straight kyphotic curve.

The infantile sacrum is always straight. The infantile pelvic floor is horizontal. The increasing curvature in the sacrum as the person grows older until the 40th year of age may be taken as an example for how the geometry of the skeleton is influenced by the tensional forces of the myofascial network: a nearly straight sacrum (and coccyx!) points to a hypotonicity while a strong bent indicates hypertonicity; if the coccyx is even bent posterior, a short posterior longitudinal ligament must coincide with hypotonicity in the pelvic diaphragm.

THE PELVIC FLOOR AS MEETING PLACE BETWEEN SMOOTH AND STRIATED MUSCLES

At its center, between the sexual organs and the anus, which is the point of highest vertical load, the funnel of the pelvic floor is reinforced by an intricate system of girths as shown in the following graph drawn by Wolf Wagner as a simplified version of a similar graph developed in Lanz/Wachsmuth. In German anatomy books this central area is called the centrum perinei. I shall call it perineal center.

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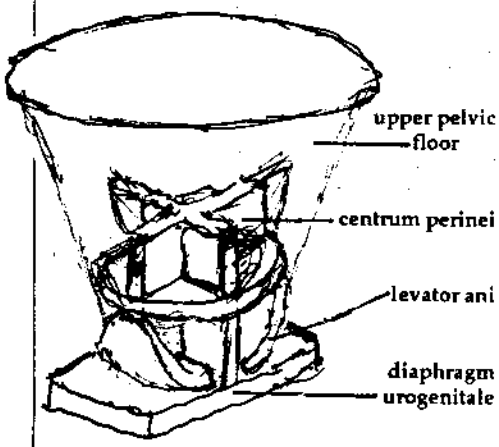

Figure 4
Taken from Lanz/Wachsmuth, Praktische Anatomie.

In the graph the horizontal lowest part represents the urogenital diaphragm. The round parts just above it curving up show the muscle fibers of the pelvic diaphragm. The cross in between these two lowest structures represents the anal and urinary sphincters.

They are composed of both smooth and striated muscles: the sphincter ani internus for example is the continuation of the circular intestinal muscles of the gut. It relaxes involuntarily as the increasing tension in the gut-wall triggers the defecation reflex. It is not subject to voluntary control. The outer ring of the sphincter ani externus muscle consists of striated fibers and has to be relaxed voluntarily.

In defecation the involuntary relaxation of the smooth muscles precedes the reaction of the voluntary system. Then the puborectalis muscle, which is part of the levator ani, relaxes its noose around the flexura perinalis which normally pulls the rectum forward to close it. This allows the anus to slide back and to give way to the pressure of the feces. The whole of the levator ani and sphincter ani axternus are striated muscles. Yet its upper and lower fasciae are interwoven with smooth muscle fibers originating from the perineal center.

The organs in the pelvis are hollows, the walls of which are formed by layers of smooth muscle. They radiate outwards into the connective tissue networks surrounding these organs. Thus the prostate in males, the uterus in females, the rectum, the urethra, and bladder are connected by an intermingling network of smooth muscles fibers and taut collagenous connective tissue into the fasciae of the levator ani, the transversus perinei profundus, the bulbospongius, and the sphincter muscles. This intricate structure is represented in the graph above by the cross resting in a horizontal plate. It shows how from the inside of the body the outer reinforcement at the point of highest vertical load is repeated and functionally enhanced.

Let me demonstrate this intermingling and reciprocal reinforcing of striated and smooth muscles in a specially important and complex example: the uterus. In a balanced pelvic floor the organs are in the middle of the pelvic space. The uterus moves with the bladder on which it rests with in its upper parts. Yet its base stays in the center of the pelvis only by the balanced tonicity of a network of retinacula. They radiate from the cervix area of the uterus outward like the lamellae of a Spanish fan on both sides of the uterus. Since they contain a lot of smooth muscle fibers, sometimes they are called rectouterinus muscle (Platzer) and sometimes rectouterine ligament (Lanz/Wachsmuth). Similar "ligaments" form the crisscrossing and horizontal structures in the graph above as a continuation of the perineal center into the deep pelvic floor: the vesicouterine ligament from the uterus to the pubic bone keeps both the urinary bladder and the uterus from sagging. Transversally, the ligamentum cardinale uteri holds the uterus at its base and determines its inclination by its suspensions from the ligamentum latum.

This intermingling of smooth and striated muscles leads to an equal intermingling of autonomous and central nerve supplies to the area which is too complicated to be reproduced here.

PSYCHOLOGICAL ASPECTS

Thinking of Freud, one could associate smooth muscles with the "ID", or the "subconscious" since they are controlled by hormones and by the autonomic nervous system which are both out of reach of conscious control. The striated muscles would then be the bodily representations of the "EGO", or the "conscious" since they are controlled by the central nervous system and are subject to conscious control as well as unconscious reflex action. The conscious and unconscious could be looked upon as the outside and inside of the psyche. Thus the pelvic floor would represent a fitting muscular parallel to the inside and outside of the body. Nowhere else in the body are smooth muscles as close to the surface as here and at the same time as intricately interwoven with striated muscles. The pelvic floor thus is not only a suture or meeting point between "inside" and "outside", but also -fittingly enough - one of the "conscious" and the "unconscious".

In looking more closely at the relationship of striated and smooth muscles in this area it is striking how weak the striated muscles are if compared to other areas of the abdominal wall. Considering the strong and sometimes demanding emotions and sensations from the vegetatively controlled organs and muscles, one can conclude: while in other areas of the body-wall the striated, conscious side is much stronger in accord with the tendency of our society to be determined by the voluntary, conscious side, here everything is different. Here the vegetative side is stronger and conscious control can only modify but not nullify the effects of the unconscious, vegetative system.

It is evident that in many persons the conflict between vegetative involuntary drives and the voluntary side is acted out from the voluntary side by contraction of the levator ani and outer sphincter muscles in order to avoid feeling the drives. Controlling

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these muscles is one of the first learning tasks for a baby. Lasting contraction can shorten the structures of the pelvic floor and can shift organs from their normal position and thereby impede their normal function.

The attempt to master conflicts in this area can, however, also lead to an extreme slackening of the pelvic floor. Instead of actively fighting against the sensations they are avoided by simply muting and desensitizing the whole area. The pelvic floor becomes slack, without tone, and just as unable to move in living pulsation as this is the case in constant contraction.

The long list of widespread psychosomatic symptoms in connection with the pelvic floor whether from the urinary or digestive tracts or from the reproductive system show that often this conflict between subconscious drives and conscious control is not satisfactorily resolved.

FUNCTIONAL ASPECTS

The pelvic floor is part of the myofascial tube containing the abdominal intestines. Muscles, fasciae, and skin form a contractible as well as extendable system. The muscles of the pelvic floor do not cross any joint and are therefore only indirectly involved in the movement apparatus. Their function is mainly that of bearing and distributing weight. That puts them, however, into the breathing system. The movement of the thoracic diaphragm increases and decreases the intra-abdominal pressure and therefore varies the forces that have to be absorbed and counteracted in the pelvic floor. Ideally, therefore, a wavelike rising and sinking of the pelvic floor should signal how these muscles take part in breathing as synergists and antagonists to the abdominals and the thoracic diaphragm.

All abdominal muscles, the diaphragm, and the pelvic floor must work together as synergists to produce an increase in intra-abdominal pressure for such actions as coughing, vomiting, defecation, the reflexes in birth labors, or for lifting heavy loads when increased pressure creates a cushion to support the spine at its most vulnerable spot: the lower lumbars.

In this pressure increase, the walls of the abdominal cavity tighten and thicken all around; and its volume is decreased. This "armoring" as Wilhelm Reich called this action does not only happen voluntarily as in coughing, vomiting etc. It also happens involuntarily under vegetative and reflex control as part of the startle reflex.

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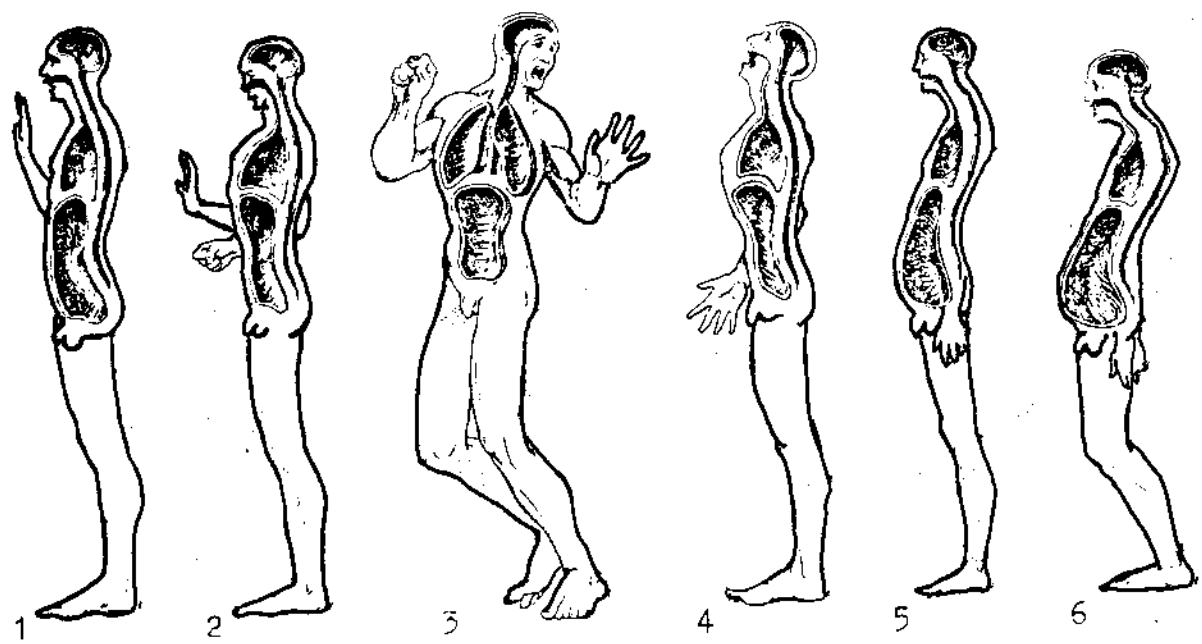

Figure 5

The drawing above is compiled from different pages of *Kelemann, Emotional Anatomy*. It shows the behavior of body cavities in the different phases of the "startle-reflex": (1) Investigation, caution; (2) Bracing, dislike, pride; (3) Rigidity, aversion, fear; (4) Bracing, spasticity; (5) Withdrawal, submission; (6) Collapse, defeat, resignation. Reprinted with permission.

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If you look at the figure on the previous page compiled from Kelemann's book *Emotional Anatomy*, you can clearly see how the abdominal cavity and with it the pelvic floor change in the different phases of the "startle-reflex". In the first four phases, sympathetic nervous reaction slows the activity of smooth muscles in the pelvis. This decreases blood-supply to the area and reduces organic sensations. Awareness is shifted totally away from the inside to the outside. As smooth muscles relax, the intestines sag on their mesodermic and ligamentous attachments and must be supported by increased activity of the striated muscles of the outer protective layers. During the first four phases, in situations of fright and stress which are so predominant in our societies, the striated pelvic floor muscles contract and make deep abdominal breathing impossible. This armoring of the intestines against attack at the same time brings the blood from the intestines to the head, thorax, and extremities, where it is needed for the fight-or-flight-reaction.

The drawings for the last two phases of the startle-reflex show what happens when the threatening situation cannot be dealt with either by flight or fight. The bodily cavities collapse into passive submission, the abdominal cavity increases and the pelvic floor cannot support or resist the weight of the intestines.

The different phases of the "startle-reflex" coincide with the character structures as presented in the theory of bioenergetics. The idea behind this is that persons do not always go through the whole cycle, but have a preferred pattern. Thus they apply one phase of the startle-reflex cycle to many other situations than those where it would be appropriate. This preferred pattern then expresses itself in the body as its structure which then gives a clue to how the person tries to control himself and/or the world around him.

If one of the first four phases is habitually retained so it becomes personal structure, the change in breathing has significant consequences. The attempt to control and reduce vegetative inner sensations under fright or stress is accompanied by a reduction in breathing, especially in the pelvic area. Even if breathing is not removed altogether from the abdomen to the thorax, the constriction in the pelvic floor leads to an overload in the abdominal muscles. They tend to lose tone. The belly gives way and hangs down over the symphysis. The intestines seem not to find enough space in the pelvis. The rhythmic changes of breathing hardly reach down into the true pelvis any more. That leads to a reduction in the exchange of body-fluids with possible pathological consequences in the area.

Because of its special situation as a meeting place between inside and outside in the physical as well as psychological sense, the pelvic floor seems to be the easiest place in the body to directly influence the inside by working on the easily accessible outside. And because of the intricate interaction of smooth and striated muscles, the pelvic floor therefore must be a place from which it seems also possible to voluntarily influence the involuntary functions, e.g. a change in tone of the striated muscles of the pelvic floor as attained in the famous Kegel-exercises can lead to improved function of the smooth muscles and organs as well as to an increase in vital function and ability to generally relax.

STRUCTURAL ASPECTS

When it is impossible for a person to relax the voluntary muscles in the pelvic floor, the chronic contraction of these muscles—especially the levator ani—exerts continual tension on the bony ring of the pelvis in three places: the symphysis, the spine of the ischium, and the coccyx. The pulling on the spine of the ischial bone will be transmitted to the sacroiliac joint via the sacrospinal ligament and thereby influence the positioning of the sacrum itself. In an ossified sacro/coccygeal junction this transmission is augmented.

If the coccyx is pulled out of line, that unilateral tension will travel to the pubic bones and create shearing at the symphysis. This in turn will influence all structures connected to this. Their normal symmetrical arrangement along the medial-sagital plane will be lost. These changes create new tensions in the surrounding bony, myofascial, and organic systems.

The pelvic floor can be compared to the foundation of a house. When it is short on one side, it is as if the foundation were higher on that side. All structures above are then tilted out of their normal relationship to the midline. Gravity will then move them to a new and probably more strained system of order.

Yet a shift in the bony ring of the pelvis caused by tensions in the pelvic floor will not only transmit up but also down into the hips and legs. The structure as a whole cannot be in balance, if the central horizontal connection is unbalanced. □

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