PERSPECTIVE

What Is A Diaphragm?

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Rolfing® is an evolving art. As Rolfers, we not only continue a long tradition of manual medicine, but we also are, or should be, bringing new distinctions, new concepts, to the field of work with the human body. That our work has contributed to the field, that we have been effective in alleviating suffering and enhancing movement where other practitioners or approaches have had limited success, should encourage us to explore a unique interpretation of the body that is allied to, but not defined by, traditional concepts of the human body.

In any developing field, there is a need to continually define terms, to ask ourselves, "What are we talking about?" This has been brought home to me in reading of students' responses to essay questions, submitted between Unit II and Unit III of the Rolfing training. There are certain questions that are recurrent stumbling blocks. One is the question which reads: "Define the term diaphragm in terms of form and function. Using this definition, discuss the validity of calling the pelvic floor, respiratory diaphragm, and thoracic inlet diaphragms." Most students rely on a textbook definiton of diaphragm, such as "a horizontal myofascial structure, separating two cavities." This obviously fits the respiratory diaphragm, but students often have difficulty in seeing the pelvic diaphragm and thoracic inlet as diaphragms consistent with this definition. Where is the second cavity in the pelvic floor? Where is the horizontal myofascial structure of the thoracic inlet? Despite the hard work of faculty in delineating the principles of Rolfing, there is imprecision in our concepts. But there is room for interpretation in a science and art that draws from empirical knowledge as well as previously-established concepts. The task of this essay is to suggest some further distinctions drawn from empirical understanding that will address the problem, of defining a "diaphragm" in Rolfing terms.

The dilemma a student faces with this question is compounded if they had a Unit II instructor who mentioned that other structures have previously been referred to as "diaphragms" in Rolfing education: the arches of the feet, the knees, the floor of the mouth, the roof of the mouth, the tentorium. While the inclusion of these structures can be dismissed as being metaphorical, there is a relationship between these structures that Dr. Rolf indicated that can be verified experentially. Somehow they can be seen to act as if they were diaphragms. What are the commonalities that hold with all these structures, that might justify calling them all diaphragms within the Rolfing ontology?

It's important first of all to remind ourselves that, even though it's convenient to talk of bodies in anatomical terms, our work is not always defined by textbook anatomy. Rolfing holds a unique vision of structure and function – we speak and think of the body in terms of its relation with the larger energy field of gravity, and our anatomy is, our should be, primarily fascial, not muscular. That is, our anatomy is an anatomy of relations, not only dissection. This anatomy of relations includes function, as observed in the moment and as imagined potentially. When Rolfers speak of diaphragms, we refer not just to myofascial structures, but to movement. Consider the respiratory diaphragm, obviously the most apparent and clearly defined structure in the diaphragmatic canon. When we observe a person and describe the state of the diaphragm, especially in terms of constriction, we are really considering what we see in movement – the way the body changes shape with breath, with reference to the landmarks of rib movement and abdominal shape. It's from these that we infer the position and restriction in movement of the diaphragm. I would assert that we don't normally even think of the diaphragm anatomically when we describe it. Most of us seem to describe it as existing at rest at roughly the level of the lower sternum, when in fact its superior excursion is more superior, and its lumbar attachments more inferior. However, the diaphragm just doesn't exist in a fixed position; it is never at

rest. As long as we're breathing, the respiratory diaphragm exists as a moving entity, not as an anatomical landmark. This epitomizes the problem of the anatomical definition of "diaphragm" – its clearest example is a moving, not an anatomical, structure.

The inclusion of the thoracic inlet in the list of diaphragms often presents a problem in logic for students, particularly when they attempt to use the definition of a diaphragm as a horizontal structure. I suggest that this is largely a confusion of terms.

Many people consider the terms thoracic inlet and thoracic outlet to be equivalent, , and indeed many students get around the logical problems of the question by addressing the thoracic outlet rather than thoracic inlet. Philip Greenman, in *Principles of Manual Medicine*, defines the thoracic inlet as "bounded by the body of T1, the medial margins of the right and left first rib, the posterior aspect of the manubrium of the sternum, and the medial end of the right and left clavicle." A student is hard-put to find horizontal structures within this space, Sibson's fascia notwithstanding, and the confinements of the traditional anatomical viewpoint are no help.

I suggest that as Rolfers what we are more properly concerned with is the thoracic outlet, the space in the upper thorax bounded by the scapula, the upper ribs , and the clavicle. This is obviously an area of great potential constriction, and the position and function of the defining structures are essential to balance and freedom in the upper thorax, shoulder girdle, and neck. I believe that the thoracic inlet, rather than thoracic outlet, is included in the essay questions because of the definition of core space as visceral space. To extend the definition of diaphragms into the thoracic outlet would be to remove a diaphragm from the core space into the sleeve space. However, in taking our considerations from an anatomical model to a functional model, we can allow the interplay of core and sleeve space – which is indeed how we experience it in the reality of our work.

The dilemma of defining "diaphragm" within the context of Rolfing is evident. The structure most easily identified by traditional anatomy – the respiratory diaphragm – is in function a most elusive entity. A "structure" which Rolfers empirically experience as a diaphragm may or may not exist, as shown in the example of the thoracic inlet. However, in considering both these problematic structures, we are provided with a first criterion for a new definition of diaphragm: movement in the vertical axis occurs there. A listing of "diaphragms" that have been included in the Rolf view of the body shows that all these structures have some movement vertically:

Feet: movement of the medial and lateral arches

Knees: although the movement of the bones is primarily in the sagittal plane, considering the leg as a whole, the movement is vertical

Pelvic floor: the movement of levator ani

Respiratory diaphragm: obvious

Thoracic outlet/inlet:: The elevation of the lungs, the movement of the first two ribs, sternocleidomastoid and scalenes all confirm potential vertical movement, which can be applied to either the thoracic inlet or outlet

Floor (or roof) of mouth: The movements of the tongue and soft palate

Tentorium: the movement in response to cranial rhythm

Given the practices and purposes of Rolfing, movement around the vertical axis is insufficient to define "diaphragm." As Anatomy Instructor Tom Myers remarked when looking over an earlier draft of this essay, "Why not call the whole damn thing a diaphragm?" Obviously we are looking for specific structures that we observe as functioning in specific ways. A second defining feature of diaphragms may be inferred from Hubert Godard's concept of three lordoses in the body. As articulated in Aline Newton's "Basic Concepts in the Theory of Hubert Godard," these lordoses are essential to movement. They are defined as C3, L3, and the knee. These lordoses are congruent with some of the diaphragms given above: C3 is the level of the hyoid bone, defining the lower level of the floor of the mouth; L3 is the inferior extent of the crura; and the knee is the knee. Godard characterizes these three lordoses as having myofascial components arranged in a rectus and oblique pattern – that is a central structure with attached components at angles to its axis of movement. All the diaphragms listed above can be seen to have this pattern, though in some the pattern occurs in the coronal plane, and in some in the transverse:

Sole of the foot: (transverse plane): rectus is the plantar fascia, oblique arrangement is the tendons of peroneals and flexors.

Knee (coronal plane): Rectus is the quadriceps tendon, obliques are the hamstrings and gastrocs.

Pelvic diaphragm (transverse plane): The rectus in this instance is the levator ani and urogenital diaphragm, the obliques are the obturator internus, which forms the walls of the pelvic outlet, and

fibers of levator ani.

Respiratory diaphragm (all planes of movement): This depends somewhat on whether we are looking at the diaphragm itself, or at the trunk muscles whose movement we usually use to surmise the movement/position of the diaphragm. If the latter, then the myofascial structures are the rectus abdominis and the obliques and transversalis muscles. Within the diaphragm itself, it could be said the the whole muscle functions horizontally as a rectus and obliquely in its flexion and extension around the central tendon and crura.

Thoracic outlet (transverse and coronal planes): The rectus components are the horizontal myofascial structures of the shoulder girdle and neck, the anterior border of the trapezius, omohyoid, perhaps subclavius; the oblique structures are the scalenes and omohyoid

Floor of the mouth (transverse plane): rectus is the diagastric, omohyoid, oblique is stylohyoid and mylohyoid

Palate: rectus is the palantine bone and soft palate itself, oblique is constituted by levator veli palatini and tensor veli palatini

Tentorium: the curved fibers of the tentorium as it continues to the structures of the falx cerebri can be seen as obliques, while the main body itself is horizontal.

Using Godard's distinctions of the lordoses, and comparing it to the list of Rolfing diaphragms, supports the notion that diaphragms in Rolfing practice are sites of movement, perhaps more than distinct anatomical entities. To distinguish them as such justifies the inclusion, specifically, of the thoracic outlet as a diaphragm, and also makes clear how those other apparently obscure structures may be called diaphragms.

The question for the written essay goes on to ask about how the diaphragms interrelate. Implied in this question is that they do interrelate, and I believe this is confirmed by empirical experience, not mere anatomical distinction. This further explains how the thoracic inlet/outlet is seen as a diaphragm. In our vision as Rolfers, the area of the upper thorax is clearly related to the functions of breathing and to tone and lift in the pelvic floor. By seeing the relationship, we have tried to draw the anatomical analogy, but have somewhat restricted ourselves by the limitations of other definitions we've imposed – core/sleeve – and by the definitions of anatomical convention.

In seeing the functional relationship between not only the three diaphragms of the torso, but all the potential diaphragms, we are led to the third component of an inclusive definition of "diaphragm," as it applies to the Rolfing process. It's apparent, in Rolfing vision, that if there is fixation in breath, either in inspiration or expiration, there will be a corresponding set of the upper thorax, and that these fixations will have an effect on the pelvic floor. These effects are in part due to the configuration of the abdominal cavity's response to the movements of the diaphragm in breathing, to the movements of the myofascial structures of the ribcage, and to the restricted ribs' and viscera's influence on spinal contour. What is important to our definition is that this fixation can be either up or down (inferior or superior). In scanning the list of potential diaphragms, we can see that in our typology, almost all of them follow the same dichotomous pattern – arches, for instance, are seen as either high and fixed, or low and collapsed at their extremes. (In the case of the knee, restriction may come from either hamstrings or gastrocs, and, due to the particular mechanics of the knee, the extremes become extremes of rotation.)

Godard speaks of the lordoses as being essential for the movement of the spine lengthening. Typically the diaphragms are seen as essential landmarks for both horizontal balance AND lift in the body. From this, we can also define a "diaphragm" as a place in the body where vertical movement is most likely to become fixed in one direction or the other.

Combining these ideas, I offer this definition of "diaphragm": "A configuration of rectus and oblique myofascial structures, at which the potential for palintonos in the vertical is often locked in one direction." This constitutes a shift in focus from the definition of a diaphragm from a structural/anatomical perspective alone, to a functional/ structural perspective, more in harmony with the scope of Rolfing practice.

NOTES

Greenman, Philip, *Principles of Manual Medicine*, Williams and Wilkins, 1996, p. 237.

Newton, Aline, "Basic Concepts in the Theory of Hubert Godard," *Rolf Lines*, July 1995.