

7 Breath As Postural Process

As announced in §1, “Posture is here understood to be the flow through space and time of all activity ... of bodily support and movement in the course of living.” My work would certainly be incomplete without an exposition of how each of us effects, through postural action, the essential gaseous exchange of oxygen and carbon dioxide in our bodies, commonly called “breathing.”

I approach the task with misgiving because, even though I have deeply (so to speak) studied breathing over many years, I also realize the difficulty—ultimately, the impossibility—of putting into linear words a process that takes place not only in three-dimensional space but also in the fourth dimension of time. Nevertheless, I must try because 1) the subject is so important, 2) it is so little understood, and 3) there is so much misleading writing and teaching about it. Truth be told, you would need to look long and hard to find a source equal in both scope and brevity to that you are about to read—a veritable Martini, concentrated and powerful, of respiratory lore. Here I hope to reveal for you the Optimal Metabolic Breath, “metabolic” referring to the entire complex of physical and chemical processes that maintain life.

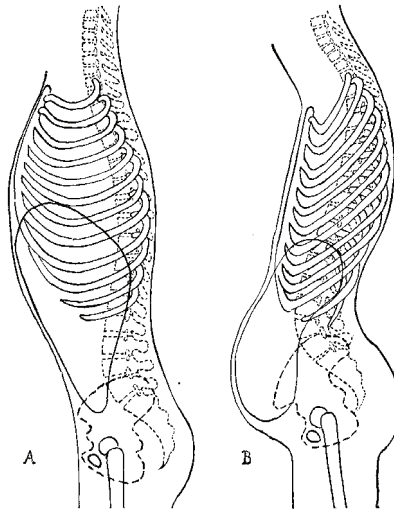
Let’s begin by understanding that “breathing” isn’t a specialized skill that we need to acquire through rote

practice or exercises, like typing. In fact, “breathing,” like “neck” (p. 17), isn’t a something at all, other than a *label* for the psycho-physical process in which certain actions and reactions, both muscular and chemical, result in the necessary exchange of gases in metabolism.¹ Hardly a trivial distinction, among other things this means that you shouldn’t be trying to “breathe correctly” according to some or other dogmatic formula—“breathe from your diaphragm,” for example—but rather that you are much better served by coming to understand, in order productively to manage, the postural pattern that results in optimal respiration.

The case actually is that when we truly Lengthen, everything takes place as it should! But with four chapters already on Lengthening, what more can be said? That little word “truly” is the Devil wherein the details now to be gleaned lie.

Look at this picture (Illustration 6, reversed):

¹ In the interest of communication, however, and sheerly out of habit, I often use “breathing” as a substantive, reminding myself that I am referring to a verbal label and not a discrete physical thing.



In which rib cage do you think your lungs (and heart, too) would be happier to live? If A is the obvious answer, the next question is, how does rib cage A get that full, expansive shape? A little study will help you see that it is the action of the abdominal muscles that moves the viscera (the “bag,” p. 24) as a unit, and that the direction of movement is back toward the spine and also up toward the head. (Actually the movement is also down, but since the bony pelvis blocks the way, the main displacement is up.) This hydraulic action (the viscera are 70% or so water and thus, essentially, non-compressible) pushes up on the diaphragm, which goes all the way round the bottom of the rib cage and domes up into it (think of a contraceptive diaphragm, in terms of its properties of encirclement, containment, and mobility), and thus the rib cage is pushed up from below by the viscera as moved by abdominals as well as held up from the back by the spine.

Our next project is more fully to understand the abdominal musculature. From the inside outward, there are four distinct layers, shown in Illustration 9 :

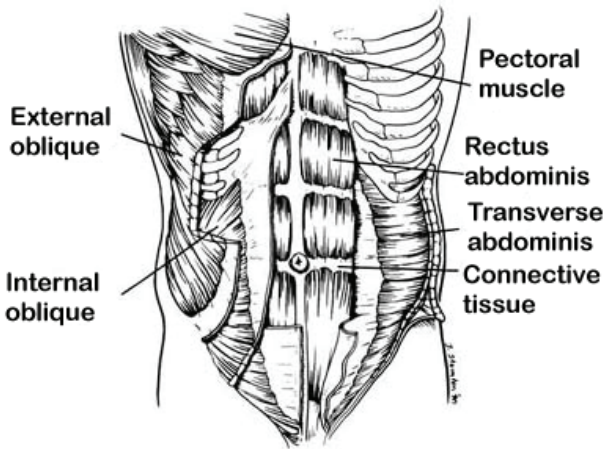


Illustration 9

The innermost layer (transverse abdominis) runs mostly crosswise or transversely, the second and third (internal and external obliques), run slantwise in complementary directions, while the fourth (rectus abdominis) runs vertically from the pubis to the lower rib cage. These four layers of muscle act for the most part synergistically, which means that even though each has its own nerve supply, and thus the capacity for separate activation, they work essentially as a team in the same directions, depending on the support and/or movement required, rather than antagonistically to produce a change in movement direction, as in flexing the bicep, for example.

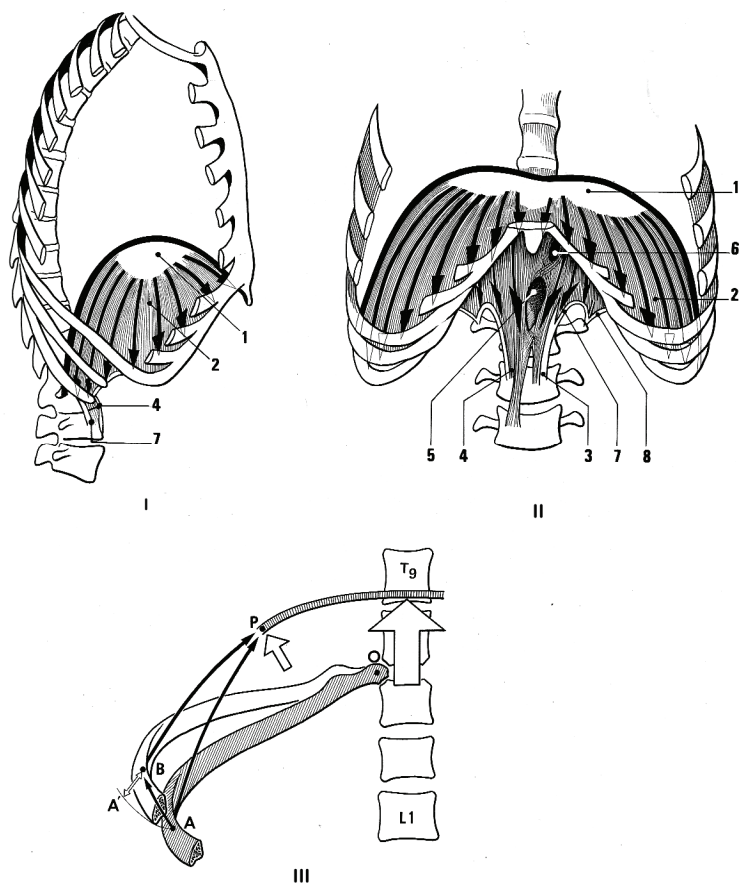
It is the fourth or top layer, the two recti abdominis, that most concerns us in terms of our postural model and

therefore of our consciously organized postural behavior. Notice that structurally the two recti abdominis are not a single muscle on each side, but rather, because of the intervening connective tissue (all-white on the diagram), form two “stacks” of four segments each. Notice also that the lowest segment, running from pubis to just below the navel, is much longer than the others. Now, it’s most important to know that each of these segments (eight altogether on both sides) has a separate nerve supply from the spinal cord, meaning that we have the potential for differential control of these muscles (accounting, among other things, for some of the intriguing movements of exotic dancing). In terms of our more prosaic postural model, however, the main implication of this arrangement is that we can control the lower abdominal musculature separately from the upper; it is distinctly possible, and as we will see, definitely desirable, to maintain supportive muscle tone in the lower segments (pubis to navel) while allowing the upper segments to release and lengthen, in both the inflow and the outflow of breath. This is the essential feature of the postural model that both provides support for the spine (which certainly needs it) and also allows movement of the rib cage, where the lungs live.

In questioning students over the years about how they think we breathe, I’ve learned that often enough they believe that, when we breathe in, the inspired air inflates the lungs and moves the ribs. Actually it is the reverse: we either raise the ribs or lower the diaphragm or both, which increases the internal volume of the thorax, which

lowers the pressure, which causes air from outside the body at higher pressure to flow into the internal area of lower pressure, thus “taking a breath.”

Now we need to see how this movement of the rib cage is produced, probably the most difficult aspect of our model to visualize and really “get.” When you have contemplated the three two-dimensional images of Illustration 10 sufficiently to model them in your mind—first in the three spatial dimensions and then in time—you will have reached a point where you, with Paul the Apostle, no longer “see through a glass darkly,” but rather in the full light of understanding—as Hamlet soliloquized, “a consummation devoutly to be wished”!



From *The Physiology of the Joints*, Vol. 3, Second Ed.,
 Kapandji, I. A., 1974, page 147, Churchill Livingstone,
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Illustration 10

Diagrams I and II of Illustration 10 basically show the anatomical features of the diaphragm as it attaches to and is positioned in the rib cage (disregard all of the arabic numerals and refer only to I, II, and III). To note is that the diaphragm domes up inside the rib cage, and

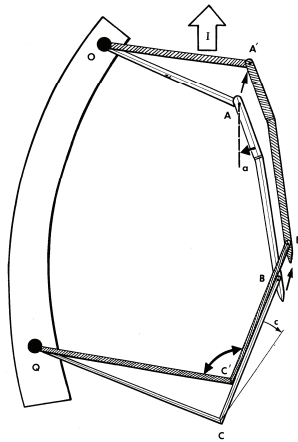
that the top of the dome (in white) is not muscular but tendinous—connective not contractile tissue. Also that muscle fibers connect the dome with the lower ribs, and additionally to the spine in back.² Of course the area under the diaphragm isn't empty as in the diagram, but rather full of viscera—the “bag.” While ostensibly too obvious even to point out, this aspect of structure is often omitted in accounts of respiratory mechanics,³ but indeed is crucial to understanding how the rib cage is moved by a definite resolution of forces within the body. It is Diagram III that shows in schematic form the muscular actions that produce this resolution of forces.

Look at Diagram III as if the shaded rib were the beginning of an inbreath. The diaphragm contracts, meaning that the muscle fibers that connect it to the lower ribs shorten (schematically Segment A-P). Since the distance between A and P is shortening through muscle contraction, the rib is pulled laterally from A through an arc to A', and also, because of the pivoting action of the rib's attachment to the spine, upwardly to B. And, because the entire rib cage is structurally connected, the displacement illustrated by A to B in the diagram actually represents a

² These anatomical facts contrast sharply with the naive concept I held as a young clarinetist, namely, that the diaphragm was a flat muscle running straight across the middle of my body which more-or-less flapped in the breeze of breathing.

³ For example, *Science of Breath: A Practical Guide*. Swami Rama, Rudolph Ballentine, M.D., Alan Hymes, M.D. (Honesdale, PA: Himalayan International Institute of Yoga, Science and Philosophy, 1979).

total movement of the rib cage “out and up.” Illustration 11 gives a sidewise view of this total movement (starting on the inbreath from C and moving to C' and corresponding points), clearly showing the “forward” component as well (that is, if undue muscular tensions are not distorting this movement).



From *The Physiology of the Joints*, Vol. 3, Second Ed.,
Kapandji, I. A., 1974, page 143, Churchill Livingstone,
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Illustration 11

The foregoing represents a kinematic⁴ analysis of rib cage movement. We must now proceed to an understanding of the kinetics involved—movements don’t just happen without forces to produce them! Look again at Illustration

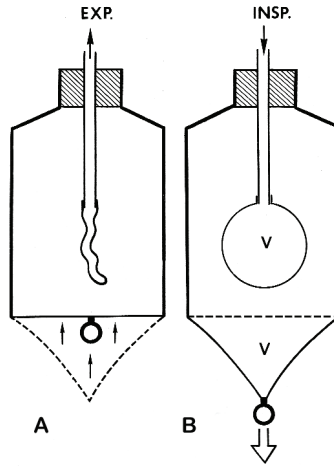
⁴ “Kinematics” refers to spatial displacement in movements regardless of the forces producing them; “kinetics” refers to the actual forces. For example, from the movement standpoint, a movie is a purely kinematic presentation.

10, Diagram III. That mysterious white arrow under the diaphragm represents a directional force, like a vector in a classical physics diagram (excepting that here the magnitude of the force is not-to-scale). So we are meant to see that there is a force acting upward on the diaphragm and that it is coming from below, but, at least from this diagram, we have no clue about what is producing it. Please look again at the illustration on page 47. There we see that the abdominal musculature in B is relaxed, allowing the viscera to drop down and forward, while in A it is energized, pushing the viscera back and up. It is this contraction of the abdominal muscles, as transmitted through the viscera, that produces the force represented by the white arrow. If this upward force is sufficient to keep the dome of the contracting diaphragm relatively high on the inbreath, then, instead of the diaphragm's descending (flattening) as it contracts, and pushing the viscera down and forward, it remains high and, over the fulcrum of the underlying viscera, lifts—picks right up—the rib cage. Don't be discouraged if at first you don't see this: it is as much a skilled accomplishment—requiring practice over time—to form and hold this four dimensional model in the mind as it is to manifest it in the body.

In the foregoing analysis, I've alluded to the structural division of the abdominal musculature into upper and lower. Now it's time to see the functional significance of this structural arrangement. We saw above how each of the eight segments of the two recti abdominis muscles has a separate nerve supply, meaning that with each is

the possibility of differential control. Functionally speaking, if the lower segments remain energized (skillfully contracted) during the respiratory cycle, and the upper segments are allowed to release and lengthen, then both high support of the diaphragm and also movement of the rib cage are optimized. Contrariwise, if this musculature is tightly held, top to bottom—as in “suck in your gut”—then the upward movement of the rib cage is curtailed—think of the guys (ropes) holding a tent down—and the resulting tension of competing muscular actions—the diaphragm pulling up and the recti abdominis pulling down—not only compromises efficient respiration but, in extreme cases, can lead to physical and emotional discomfort. Try it for yourself: suck in your gut and hold it while taking a few breaths; I would be surprised if you didn’t find it decidedly uncomfortable. No wonder strong men faint while maintaining the military position of Attention!

Contrasted with this model of Breath as Postural Process is the one commonly called Breathe from Your Diaphragm—the ubiquitous directive given to singers, wind players, actors, glass-blowers, etc., not to mention the ordinary person who has enrolled in an exercise class. In terms of practical instruction on this less-than-explicit directive, the student is generally advised to relax the belly on the inbreath, so as to avoid the shallowness and tensions often associated with the dreaded “chest breathing.” Illustration 12 gives quite a clear picture of this process by means of a simple mechanical model:



From *The Physiology of the Joints*, Vol. 3, Second Ed.,
 Kapandji, I. A., 1974, page 153, Churchill Livingstone,
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Illustration 12

Here we see a bell jar fitted with a rubber diaphragm stretched across the bottom, a ring attached to the diaphragm for pulling it down, a glass inlet tube to which is fitted a small rubber balloon, and a stopper through which the tube passes. Timewise, Diagram A represents both the end of an expiration (EXP.) and beginning of an inspiration (INSP.), and Diagram B the end of an inspiration. We are meant to understand that, as the diaphragm is pulled down from its starting place in Diagram A (inbreath), the volume of the enclosed space (V in Diagram B) increases by the amount of diaphragmatic displacement, hence the pressure falls and air moves from the area of higher pressure outside into that of lower pressure inside, hence inflating the balloon (lungs)

attached to the inlet tube, as in Diagram B, quite a fair illustration of the “breathe from your diaphragm” model.

Allow me to question you socratically: “What’s wrong with this model? What in it doesn’t correspond to the actual anatomical facts that we’ve discussed?” Yes, the “diaphragm” closes the bottom of the “rib cage” and yes the physics are correct, *but* (and it’s a *big but*, pardon the expression), a bell jar is rigid and a real rib cage moves! A real rib cage moves out, up, and forward as powered by the diaphragm as discussed earlier with Illustrations 10 and 11. *The lungs live in the rib cage!* Why would one choose to restrict their vital functions by a type of coordination that didn’t provide for them to be filled and emptied by movements of the entire rib cage, instead of only the diaphragm? Given the information presented here, there are no reasons other than ignorance or indifference, as I see it.

Of course (and you’re right for thinking so), in real life the matter isn’t nearly that calamitous. We do get the O_2 and get rid of the CO_2 in spite of what we know or don’t about it. As I say to my students, there are two kinds of breaths in this world, the unconscious ones and the conscious ones, and the former far outnumber the latter. Nature has ensured that this process go on more-or-less automatically for as long as life continues. But this is really not an excuse for not giving due attention to how this vital (Latin—*vīta*, life) process takes place and how we might enhance it.

How the process takes place has been the subject, as best I could manage it, of all of the foregoing; suggesting that it might be enhanced provokes a demand (or at least a polite request), to know “Why?” Here are some of the major physiological reasons:

1. All circulatory and blood-quality aspects of bodily function are enhanced as more lung tissue is utilized.
2. There is more space in the rib cage and therefore less pressure on the contents, namely lungs and heart.
3. The heart is generally supported higher in the body, lessening the distance between it and the brain, and thus reducing pumping effort.
4. The opening and closing of the rib cage—think of a bellows—in itself functions as a large pump complementing the pumping action of the heart.

Something I want to make very clear here is that nothing advocated in this chapter is a “breathing exercise.” If that is what you seek, you may find many, many such in books, websites, and classes on yoga, t’ai chi, chi kung, and other systems. Exercise in the sense of special activities for special purposes is not my thing. What *is* my thing is normal posturality, and what I have tried to show is how such a normal (Lengthened) posturality includes enhancement of the respiratory function, as well as every other metabolic function. Take it as a maxim, like any structure, *we function best at our full structural dimension.*

I would be remiss not to re-emphasize that most of our breaths are unconscious and reflex ones—the only ones that we can modify are those of which we become aware. And the only ones of which we become aware result from the curious phenomenon of *remembering*. Strangely enough, remembering is something that we ultimately cannot force ourselves to do, in spite of all the strings-around-fingers and latest technological gadgets that go off at regular or random intervals. True remembering is a function of *wanting*—Freud said it so well in observing that the lover does not forget his appointment! So if we are interested in the benefits—or more modestly, some of the experiences—of a normal posturality, we have to *remember* actually to use ourselves in new and non-habitual ways according to principles that we only provisionally accept until validated by our experience. Only through the risky investment of practice can come skill.

Also I say again that this book is not intended for self-instruction in any comprehensive sense—there are simply too many individual variables, both in constitution and acquired habit, to provide the necessary detail. Anyone who has ever felt the need for and actually had lessons from a good teacher in any skill whatever will understand this. That said, I will close the chapter by describing a means of beginning to explore the concepts I've here advanced.

Lie on your back on the floor with your knees drawn up comfortably, soles of feet on floor, and enough support

under your head (books, firm pillow) to keep it more-or-less level relative to your torso. Place your hands on your lower rib cage, elbows out to the side, and notice what you feel as you breathe “normally” (that is, without any attempt to change). Now try not to move your rib cage at all as you take in a gently filling breath—this is not an athletic event—a slight pressure inward of your hands may help at first. When you’re successful at this coordination, you will perceive a pronounced upward movement of your entire abdominal area, and you will be experiencing the “breathe from your diaphragm” mode of respiration. Do it a few times to clarify both the movement and the experience. Now, leaving one hand on your lower rib cage, put the other on your lower abdomen between navel and pubis, and form the intention of taking a breath in without letting the lower abdomen rise at all. When you realize (make real) this intention (it may take awhile), you will perceive a pronounced outward and upward movement of your rib cage, and you will be experiencing the “breath as postural process” mode, with the exception that, due to gravity in the supine position, the release and outward movement of the upper abdominal musculature will likely be hardly perceptible or not at all. Naturally, practice tends to improve performance, so do both modes alternately a few times while still lying down.

Come back to standing, placing one hand over the area between your navel and rib cage and the other between your navel and pubis. “Suck in your gut” a few times, tightening the muscles under both hands, and noticing

how you move and how it feels. Now let that go, and try just pulling your lower abdominals inward an inch or so, and holding them there while breathing in (again, this may take one, a few, or many trials). When you are successful at maintaining the inward focus of your lower abdominals on a gently filling inbreath, then try allowing the area under your upper hand simultaneously to release and move forward. At first it may well feel like “you can’t get there from here,” or like rubbing your head and patting your stomach at the same time, but I promise the coordination is there for you. When you’re successful, you will be experiencing the first bloom of a practice that can lead you, in my experience, to a new level of psycho-physical well-being.

Just to be clear, it’s not a question of breathing either one way or the other of the two modes discussed here as we go through our days—that would be perfectionistic and unproductive, in addition to impossible. It’s rather a matter of developing awareness in an important skill and being able to perform it when we remember it because we choose to do so. You might reasonably ask, “Well, gee, how many of these Optimal Metabolic Breaths would I need in a day to do me any good?” and my answer to you would have to be, “Honestly, I don’t know.” For myself, however, my answer is that every single one taken is one more than would have otherwise been the case—a step in the right direction. Such is the nature of process, in postural action as well as in financial investing and all the other things we do in the hope of return—faith by

whatever name is never far from us in the pursuit of happiness, including health and well-being.

Addendum August 2025

N.B.; in BPP solely for gaseous exchange, exhalation is mainly passive, i.e., the effort at the end of inhalation is relaxed and the contraction of the rib cage effected mainly by gravity and the elastic recoil of the lung.

Having now, a dozen years after first publication, created a certification for *Breath as Postural Process*[™] (BPP), I want to say that, obviously, there are many techniques and methods for this crucial aspect of human use and functioning. And yet, for reasons given in this chapter (pp. 58ff.), I claim that BPP is superlative for consciously cultivating a posturality that unifies the inner movements of breathing with the outer ones of existential posture. But I emphasize that there is no necessary conflict between BPP and any other technique, provided the distinction is made between 1) BPP as serving the waking needs of non-performance gaseous exchange, and 2) the breath requirements either of specific performance—speaking, singing, wind-instrument playing, etc.—or of sleep, a function of unconscious reflex. So, in terms of breath management in all the various forms of “doing,” the question will be what is chosen as best for the purpose, and to that end there is surely no dearth of opinion and instruction.