



Welcome to *Essential Hypertension – Concept, Origin, History, & Commentary*, Volume 2, Issue 4 of *Coherent Breathing*.

At present, I have a singular focus for Coherent Breathing, this being to eradicate the pandemic before the pandemic, *Essential Hypertension*. The reason for this singular focus is that essential hypertension, elevated blood pressure for no apparent reason, harms the health and well-being of a large percentage of the global population, shortening lives and increasing years lived with circulatory disease and its myriad consequences both physical and mental. Because it is a *symptom* of circulatory malfunction, it is a critical underlying health condition.

“Essential” has come to be understood as *natural*, as something that we just have to live with. Synonyms for essential are “inherent”, “basic”, “indispensable”, as relating to disease, “idiopathic”. The definition of idiopathic is: “arising spontaneously or from an obscure or unknown cause.” A second definition is: “peculiar to an individual”. (Merriam-Webster) Where did this idea come from, that something that negatively affects ~60% of the world’s population is without identifiable cause?

The term “essential hypertension” was coined by Eberhard Frank in 1911 who named it *Essentielle Hypertonie* (German). The condition (elevated arterial pressure without identifiable cause) was also recognized by others in Germany, France, and Britain in this timeframe, the first sphygmomanometer having been developed in Germany in the 1880s. (Essential Hypertension And Its Causes, Paul Korner, Oxford University Press, 2007). Early on, researchers and physicians attributed all high blood pressure to kidney disease, but this low-grade elevated blood pressure was ultimately found to exist in people without renal dysfunction. For a time, it was accepted as a fact of life, but over the next few decades essential hypertension was found to be a strong indicator of future health risk and death from circulatory events. Korner points out that it was life insurance demographers that came to this determination in 1926 and that the Framingham study of 1948 supported the findings.

The Menninger Foundation conducted a study of Behavioral Treatment of Essential Hypertension published in *Biofeedback and Self-Regulation*, Vol. 11, No. 4, 1986. Their rationale: *The development of biobehavioral treatment techniques for essential hypertension is a current health science priority. There is a need to reduce cardiovascular risk in a large segment of the population while minimizing newly discovered risks of chemotherapy.* Their protocol was that developed in 1979 involving cognitive explanation (education), multiple forms of biofeedback, and diaphragmatic breathing exercises combined with relaxation. The outcome demonstrated that 55% of 77 patients with Essential Hypertension were able to reduce their systolic/diastolic blood pressures an average of 15/10 mmHg as well as stopping the use of “chemotherapy, what we know today as pharmaceuticals. So, while the study does not describe the circulatory mechanics that lead to lowering blood pressure, it is a good demonstration that Essential Hypertension can be controlled via conscious action. The Coherent Breathing *methodology* employs the same fundamentals of relatively slow, deep, rhythmic breathing combined with the conscious relaxation of The Six Bridges, the fundamental protocol that I found in the early 2000s timeframe to elicit the Awakened Mind brainwave state, for which, at that time, there was not an exacting protocol.

What we’ve learned since then is that breathing coherently generates and sustains the Valsalva Wave, blood flow rising in the arterial tree during exhalation and rising in the venous tree during inhalation, including blood flow in the brain, which I argue is necessary for human health because we are vertical. This finding was presented for the first time at the 2013 ISNR annual conference, where it was shown that “the brain does experience the wave” and when it does it generates synchronous electrical waves that are 10X the amplitude of functional brainwaves delta, theta, alpha, and beta. In order to see these waves, my research colleague Tato Sokhadze, PhD., then at The University Of Louisville School Of Medicine, removed the low frequency filtering on a 128 channel Electrical Geodesics EEG machine, the same thing we had done in the development of Valsalva Wave Pro, the COHERENCE instrument that simultaneously assesses variation in blood volume and heart rate (HRV). To my knowledge, this *wave in the brain* had not been described previously. A reason why it hadn’t is that very early on, low frequency filtering had been implemented in both EEG and HRV biofeedback instruments, as breathing induced changes in EEG was considered “physiologic noise”

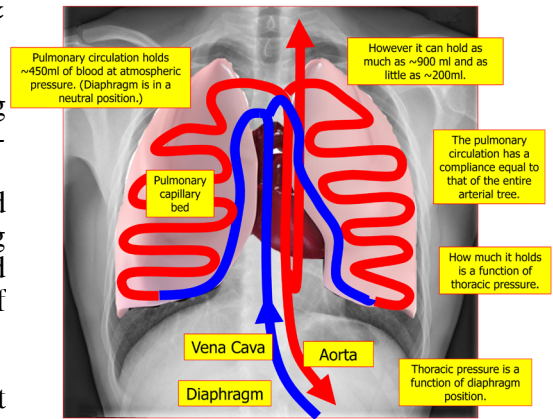


Figure 1: The Thoracic Pump (Click)



that got in the way of detecting functional bands, then of most interest. The problem is that this low frequency filtering was then forgotten about for ~50 years. In the early application of Coherent Breathing in combination with EEG biofeedback, we discovered that it is “breathing” that elicits the desired changes in EEG, i.e. an instant increase in alpha amplitude, and within 8-12 minutes, increases in delta and theta amplitudes, and a decrease in beta, brainwaves associated with sympathetic bias. So, the results of the Menninger study are not surprising. What is confounding is that *essential hypertension* has lived on, even with advancements in technology that make clear the mechanics of circulation. It is easy to conclude that modern medicine is turning a blind eye and at the same time profiteering from the general ignorance of the population, including doctors.

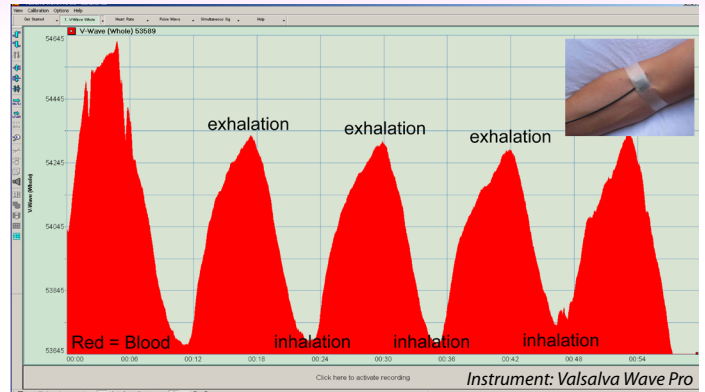


Figure 2: Blood Volume At The Medial Cubital Vein

So the principal concept has been alive and well for over 100 years, prompting Korner’s incredibly deep dive into neural and non-neural mechanisms that are in play. Unfortunately, any discussion of “breathing” or the lungs is absent from the 600 page work, and is generally absent from medical literature that one might find with a Google search, with the notable exception of Resperate, the only FDA-cleared non-drug medical device proven to lower blood pressure. Resperate is a breathing biofeedback device that employs a chest strap and audible tones that lead the user to slow their breathing down, thereby increasing diaphragm range of movement. Increasing diaphragm range engages the “thoracic pump” (Elliott, 2008), causing blood to flow, specifically venous and capillary blood.

When the thoracic pump is operating with significance, predicated on diaphragm range of motion, a significant amount of blood is drawn from the venous tree filling the dense capillary bed of the lungs with each inhalation. The amount of blood drawn from the venous tree via the right heart depends on the depth of inhalation, i.e. the degree to which the diaphragm moves downward, downward motion generating a relative vacuum in the sealed cavity in which both heart and lungs reside. Venous blood rushes through the right heart into the lungs to meet this negative pressure, thereby emptying the venous tree of a large volume of blood, let’s say .5L. This blood in the venous tree is immediately replaced by blood flowing from the pervasive capillary membrane during exhalation. If instrumented, we can observe an immediate drop in venous blood volume with each inhalation, and the vein refilling during exhalation. (See Figure 2). When we exhale and the diaphragm moves upward, blood accumulated in the lungs during inhalation, now oxygenated, flows out of the lungs into the left heart and back into the arterial circulation, thereby completing the circle, where I argue that blood flow in the arterial and venous trees should be approximately equal breath-to-breath. When venous flow is lower than arterial flow, arterial pressure will be high; when flow is equal arterial pressure cannot be high. We want blood to flow in a circle *unimpeded*. But what is this impedance and how might it arise....?

The simple answer to this question is by failing to move the diaphragm with significance. The diaphragm has +/-5 centimeters of range, yet many of us get by on less than +/-1 cm of movement. 1 cm of downward movement generates 5 times less negative pressure in the chest and is therefore 5X less effective in compelling venous blood to flow, placing 4/5s of the burden on the right heart which must act as a vacuum pump. My readers have heard me harp on this for years, that it is not the job of the right heart to act as a vacuum pump. Venous return is the job of the large powerful diaphragm. The right heart’s job is to shuttle and check venous blood flowing into the lungs.

$$\text{Essential Hypertension} = \text{Sub-Optimal Venous Flow} = \text{Sub-optimal Diaphragm Movement}$$

Now, *essential hypertension* or elevated blood pressure with no known cause is itself, not a cause but a symptom of a much more serious issue, this being the failure of the circulatory system to work effectively and efficiently. Every cell of the body suffers this insult including those of the brain. We must ask ourselves how a misunderstanding this gross can persist for over 100 years, especially when we have the technology to see what is happening.

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