Hello all,

Figure 1: Stephen Elliott observing the respiratory arterial pressure wave using a blood pressure cuff.

Welcome to Volume 1, Issue 12 of *Alternativz*. In the last *special edition*, we described our initiative to reign in essential hypertension, the form of high blood pressure that the NIH and CDC offers "has no known etiology". Essential hypertension makes up 90-95% of all cases in the US, affecting 60 million Americans and hundreds of millions more around the world. High blood pressure and its complications cost the US ~90 billon dollars in 2010.

We now have the first working model of the instrument that we are branding ***Heart Pro***. We choose this name because it is ultimately the heart that gains the benefit of optimal breathing and bears the burden of suboptimal breathing – the heart has to work harder in the absence of effective diaphragm movement. This is especially true for the right heart which must vacuum venous blood back to the chest in the absence of effective inhalation.

Our thesis is that essential hypertension is caused by sub-optimal movement of the diaphragm. When the diaphragm fails to move, it causes the circulation to slow. In traditional Chinese medicine, this condition is referred to as "blood stagnation". When the blood slows, arterial blood fails to move with adequate flow and the autonomic nervous system increases pressure to facilitate more flow. It does this by increasing the power of the heart beat and by constricting arteries. Alternatively, when we breathe with adequate depth and regularity, it facilitates circulation and normalizes blood pressure. Conventional blood pressure measurement ignores this critical fact.

We intend to revolutionize blood pressure measurement by assessing the degree to which breathing is facilitating circulation, and instructing the user to breathe in a productive manner. We do this by assessing the degree to which breathing produces the wave, this wave being detected by a blood pressure cuff, along with conventional systolic and diastolic measures. This is in keeping with US patent #7458937, assessment of the respiratory arterial pressure wave using oscillometry.

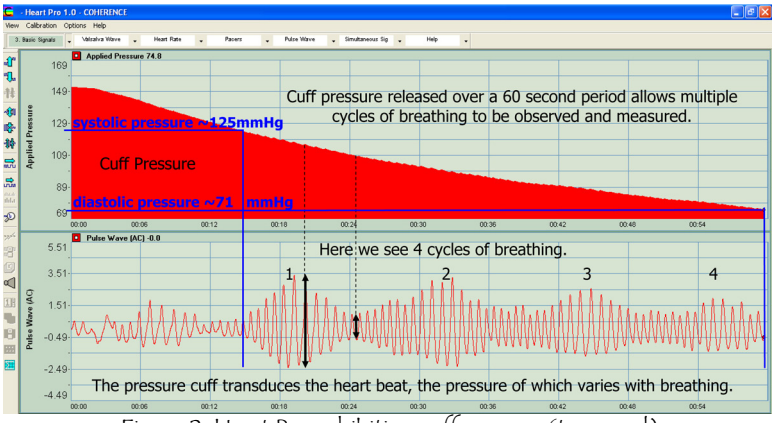

Figure 2: Heart Pro exhibiting cuff pressure (top panel), and heart beat (lower panel). The heart beat is modulated by respiration.

Figure 2 presents a working proof of concept of the instrument. It detects and presents pneumatic pressure, the top panel being cuff pressure and the bottom panel being the pressure of the heart beat which is modulated by breathing. In this example, cuff pressure is pumped up to 150mmHg and released over a period of approximately 60 seconds, during which we capture 4 cycles of Coherent Breathing, i.e. breathing at the nominal rate of 5 breaths per minute with comfortable depth. Systolic pressure is ~125mmHg; diastolic pressure is ~70mmHg.

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Heart beat peaks and valleys are correlated with the known pressure of the cuff to determine dynamic heart beat pressure as a function of breathing. In use, the instrument will present this variation to the user in various simple formats, for example the spoken words, "*Your systolic pressure is normal. Your diastolic pressure is slightly higher than what is recommended. Your breathing is relatively rapid and shallow. It is recommended that you learn to breathe more slowly and deeply.*" Quantitative results will also be provided for user or health professional.

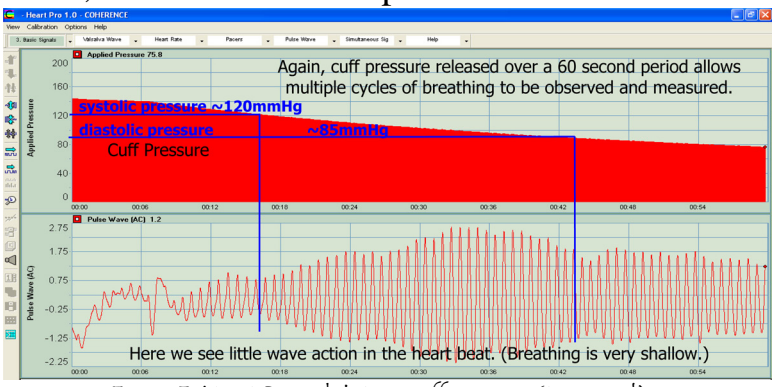

Figure 3: Heart Pro exhibiting cuff pressure (top panel), and heart beat (lower panel). The heart beat shows little evidence of breathing.

Alternatively, Figure 3 depicts shallow breathing. Here we see little wave action in the heart beat. This is what the heartbeat pressure of the average breather looks like – little variation. Likewise, if we examine heart rate variability (variation of the heartbeat in time), it also varies little.

Finally, here is another capture of the pressure when the cuff is at a resting pressure of ~40mmHg. In the top panel we see "the wave" rising and falling during 5 cycles of Coherent Breathing. The heart beat (bottom panel) is rough due to the light pressure exerted by the cuff and relatively poor transduction from the arm into the cuff.

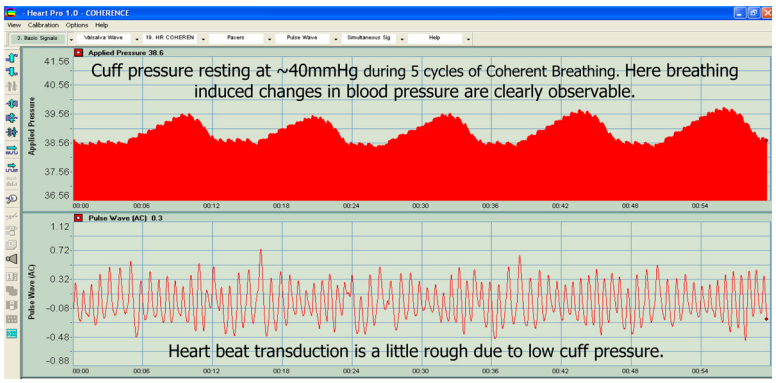

Figure 4: Pressure cuff resting at ~40mmHg demonstrating waves in the blood pressure with each cycle of Coherent Breathing.

We (the small development team) are very pleased with the progress we have been able to make over the last month. We consider it a breakthrough that significantly changes our momentum and shortens the time it will take in completing the prototype and getting the final product to market.

Our next steps are to work out the measurement algorithms and certify their accuracy such that we can report a highly accurate measure of *the wave*. Paraphrasing *Medical Physiology* (Guyton & Hall 2002), "deep respiration" can yield changes in the arterial pressure of up to 20 millimeters of mercury. During Coherent Breathing, I believe that I have seen variations as high as 50mmHg. [Determination of systolic and diastolic pressures via oscillometry is prior art.]

We continue to seek additional investors that would like to bring an end to essential hypertension and its health and financial consequences. We would like to thank those who have expressed interest or offered their financial support for this initiative.

Thank you for your interest, Stephen Elliott, President, COHERENCE LLC

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