

# Heart Coherence Increases Order of Crystallization Patterns in Dried Saliva Study

Annette Deyhle Ph.D. and Jackie Waterman

HeartMath Research Center, Institute of HeartMath, Boulder Creek, CA, October 2013.

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## **Abstract:**

Twenty volunteers participated in a pilot study on the effect of coherence practice on the ordering of crystallization patterns in drops of dried saliva. The hypothesis tested in this study was that states of high heart coherence would result in increased order and complexity in crystallization patterns. The study found that coherence practice increased the ordering and complexity of crystal structure in 18 of 20 participants. Hence, we believe the use of saliva crystallization patterns is a viable method for showing the effect practicing coherence induced by positive emotions has on the information embedded in bodily fluids. This study also demonstrated how heartfelt feelings of appreciation and compassion and a coherent state could change the structural patterns in the participants' saliva.

## **Introduction:**

Crystallization is the process of formation of solid crystals precipitating from a solution in which a solute from a liquid solution to a pure solid crystalline phase occurs. Crystallization is therefore an aspect of precipitation, obtained through a variation of the solubility conditions of the solute in the solvent, as compared to precipitation resulting from chemical reaction.

The crystallization process consists of two major events: nucleation and crystal growth.

Nucleation is the step in which the solute molecules dispersed in the solvent (water) start to gather into clusters. However, if the clusters are not stable, they redissolve. The crystal growth is the subsequent growth of the nuclei that succeed in achieving the critical cluster size. Once the first small crystal – the nucleus – forms, it acts as a convergence point for molecules of the solute touching or adjacent to the crystal so it increases its own dimension in successive layers. Nucleation and growth continue to occur simultaneously as long as supersaturation exists.

Supersaturation refers to a solution that contains more of the dissolved material than could be dissolved by the solvent and thus, the rate of nucleation and growth is driven by the existing

supersaturation of the solution. The level of supersaturation can be increased by, among other methods, allowing the solution to evaporate. Depending on the conditions, either nucleation or growth may be predominant and as a result, crystals with different sizes and shapes are obtained. The nature of the crystallization process is governed by both thermodynamic and kinetic factors (motion of the molecules and the forces and energy acting on them), which can make it highly variable and difficult to control. It is usually much easier to dissolve a perfect crystal in a solvent than to grow a good crystal again from the resulting solution, which means that the nucleation and growth of a crystal are primarily under kinetic, rather than thermodynamic control. In other words, energy in the form of heat has no internal direction, and therefore forces, with purposeful energy or information, control crystal formation.[1, 2] Therefore, assessing crystallization processes and patterns has been used extensively for detecting the influence of external forces acting on the crystallization process, including very subtle action at a distance, where presumably no significant flow of energy has occurred. For example, Piccardi showed in the 1960s that the physical and chemical properties of a colloidal suspension on Earth were affected by the cycles of solar activity.[3-5] This finding has been confirmed by others who have suggested that liquid water is the medium for the information transference and also have proposed that electromagnetic fields are the only known fields that can induce long-range interactions in living systems.[2]

Water is the universal medium for all biological activity. Nearly two-thirds of the human body and one-half, by volume, of each of our organs consist of water. This amounts to approximately 10 gallons of water, largely enclosed within trillions of cells. Increasing evidence indicates that the water within living cells is highly structured, arranged in various intermolecular conformations held together by extensive hydrogen bonding networks, giving it quite different properties and behavior from bulk water. It appears, further, that the structuring of cellular water is critical to the healthy chemical functioning of the cell.

The sensitivity of water to subtle influences inspired Masaru Emoto to freeze water and look at the resulting ice crystals, which he interpreted as “messages in water.” Emoto’s work has led to both acclaim and controversy in equal measure.[6] Professor Bernd Kröplin of the University

of Stuttgart in Germany also has done extensive work with water. Kröplin authored the book, *The World in a Drop* [7]. He dried different fluids such as water, saliva, blood and urine and studied the resulting crystallization patterns. He found that both water and biological fluids were affected by the person applying saliva to a microscope slide. [7] For example, Kröplin explains in *The World in a Drop*, when different people applied the same solution it resulted in slight differences in the appearance of the evaporated drop. Furthermore, when the same person applied the same solution on different days, a daily fluctuation in the appearance of the dried drop could be observed when the person was not “centered”. [7] However, in his book, he states that this “misalignment” could be corrected by the experimenter (Minnie Hein) centering herself again. [7] So it appears that an individual and the emotional and physical state of an individual can influence the results. Hence, looking at dried saliva drops is not an absolute reproducible science if it is carried out by different individuals or on different days. In our study, because the *individual*, Annette Deyhle, applying the saliva drops did it all in one sitting in about an hour, we assumed that the results for the 20 participants would be comparable.

During the early 1990s the Institute of HeartMath also conducted a series of crystallization experiments in its laboratory as an assessment of water’s ability to receive and store “energetic” information. Using carefully controlled experimental conditions, solutions of sodium chloride, sodium chloride and albumin and cupric chloride, we found that crystals tended to form in more finely divided, filamentary patterns than control solutions when exposed to biomagnetic and magnetic fields. [8] Seeing the effect, however, required exposing numerous samples to the field because there was a high degree of variability in the experimental samples. At that time, before digital photography enabled faster processing, and even though IHM confirmed that crystallization patterns indeed reflected subtle information effects, it was decided that this was not a practical medium with which to work.

In this study, however, we looked at differences in crystallization patterns of dried saliva obtained from a group of participants immediately before and after they used the Heart Lock-In® Technique to sustain a coherent state for 15 minutes.

Saliva is produced by three paired salivary glands and numerous minor salivary glands. Salivary

fluid consists of approximately 99% water containing a variety of electrolytes (such as Na, K, Ca, Cl, Mg, bicarbonate, phosphates and proteins, polypeptides and some other traces).[9, 10] In this context, the proteins and minerals are the solute contained in the solvent (water), and as the water evaporates, the nucleation and crystal growth processes described above occur.

Thus, the study aimed to assess the influence of heart coherence and a state of appreciation on crystallization patterns in participants' saliva. Unlike IHM's previous experiments and those of others that carefully controlled the amount of solute contained in the water, in this experiment the ratio of solute (proteins, etc.) relative to the solution (water) could not be controlled. This was not seen as a major issue because previous experiments had shown that the energetic process affecting the patterns of crystallization were independent of the amount of ratio of solute and solvent.[6-8] This is an important aspect because being in a coherent state has been shown to affect autonomic nervous system activity,[11-14] which affects saliva secretion and hormone and immune factors in saliva secretion.[15, 16] [ENREF 7](#)

### **Methodology:**

This study included 20 participants, all staff members at the Institute of HeartMath and HeartMath LLC and all verified to be able to maintain a state of high heart coherence for extended periods. Participants were instructed to donate a small amount of saliva into glass test tubes before and after doing a 15-minute Heart Lock-In® (a HeartMath technique)[17] in which they focused on feelings of appreciation and compassion and radiating these feelings into the planetary field environment.[18]. For each participant, several drops of saliva (approximately three microliters each), were applied on a microscope slide with a syringe, and then allowed to air-dry naturally. A Zeiss Universal transmitted-light microscope with a 10-fold magnification objective was used to view the saliva drops and a camera (model No. G41-140/I-e) was used to photograph the dried saliva samples.

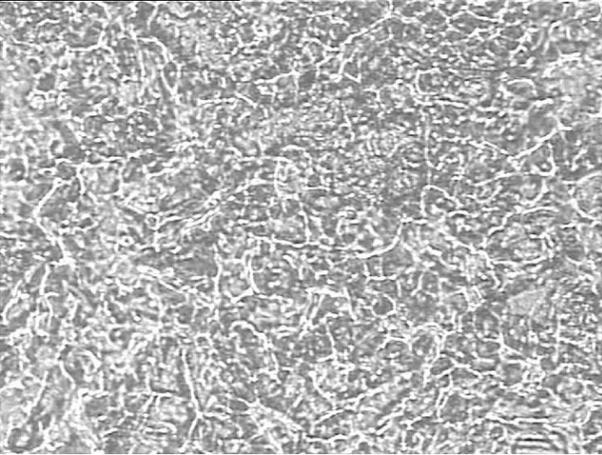
After donating the pre-Heart Lock-In saliva sample, the 20 participants participated in the 15-minute Heart Lock-In in a group setting. All participants shared the same room for their coherence practice. After the Heart Lock-in, saliva samples were taken again, air-dried on a

microscope slide and photographed.

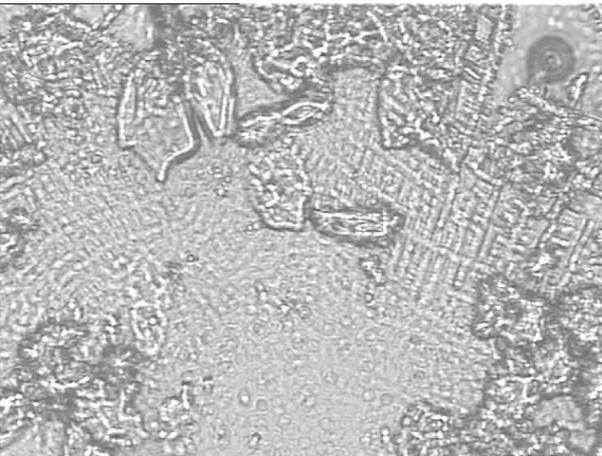
**Results:**

Pre-coherence practice:

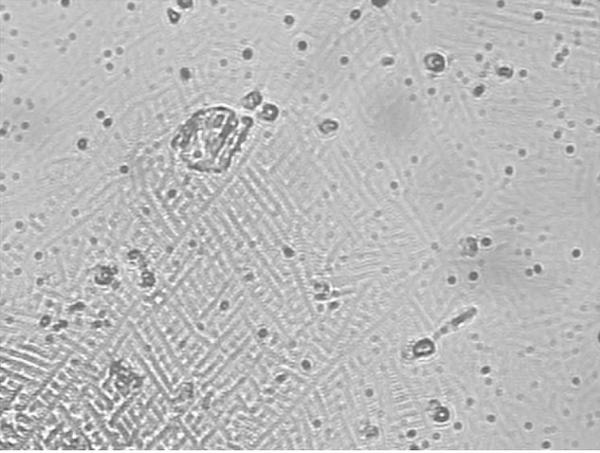
Fourteen of the 20 participants' saliva samples showed either no (Figure 18A) or little crystal structure (Figures 7A, 13A) before the coherence practice.



Sample 18A. Pre-coherence practice: no visible crystal structure.

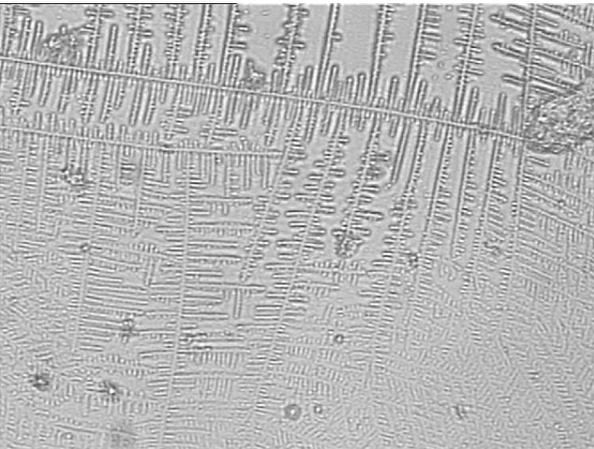


Sample 7A. Pre-coherence practice: some crystal structure.

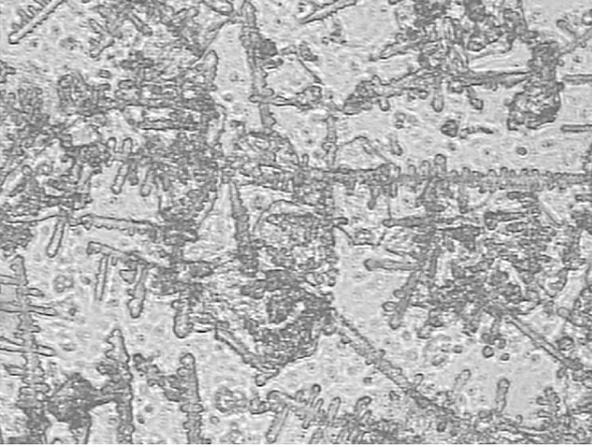


Sample 13 A. Pre-coherence practice: some crystal structure.

Six of the pre-coherence samples (1A, 5A, 9A, 12A, 14A and 19A) displayed more crystal structure before the coherence practice. See samples 1A and 5A.



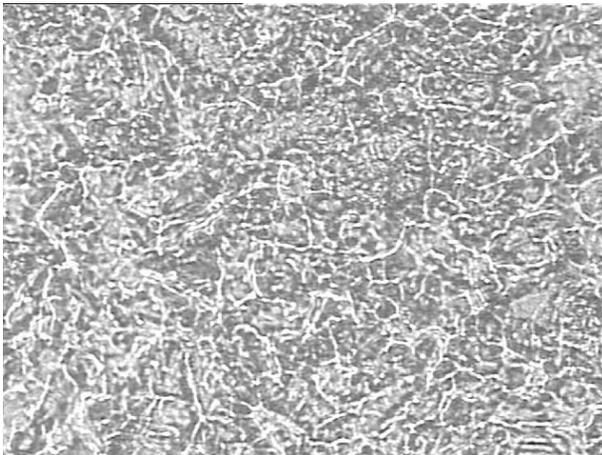
Sample 1A: Pre-coherence practice: more distinct crystal structure.



Sample 5A. Pre-coherence practice: more distinct crystal structure.

### Post-Coherence Practice

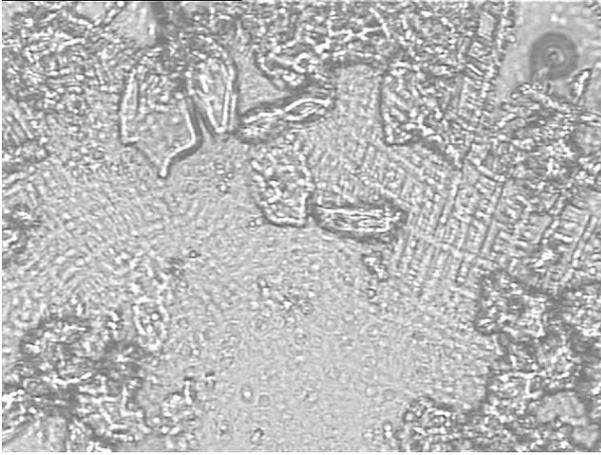
After the 15-minute Heart-Lock-in practice, 18 of the dried saliva drops collected from the 20 participants clearly showed increased order, crystallization patterns and crystal size. Two of the participants' saliva showed no obvious changes pre- or post-coherence practice. All of the 14 samples that had no or little crystal structure pre-coherence practice (18 A to 18B, 7A to 7B, 13A to 13B) had increased crystal order and crystal size post Heart-Lock-in. (See below.)



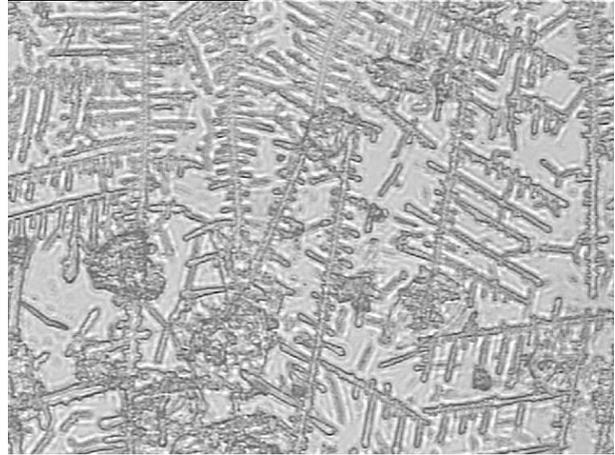
Sample 18A. Pre-coherence practice:  
no crystal structure.



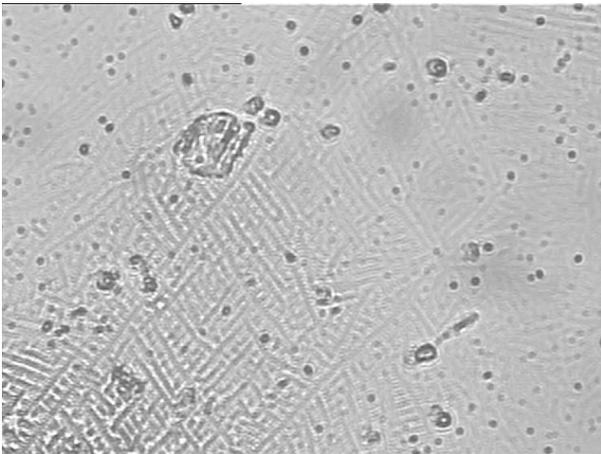
Sample 18B. Post Heart-Lock-in:  
crystal structure now present.



Sample 7A. Pre-coherence practice: little crystal structure.



Sample 7B. Post-Heart-Lock-in: more crystal structure.

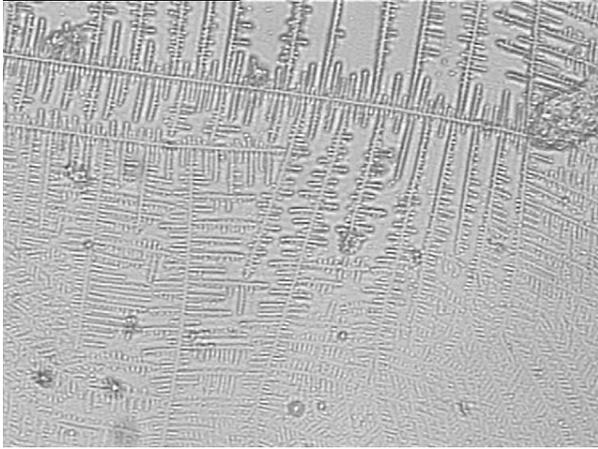


Sample 13A. Pre-coherence practice: very little crystal structure.

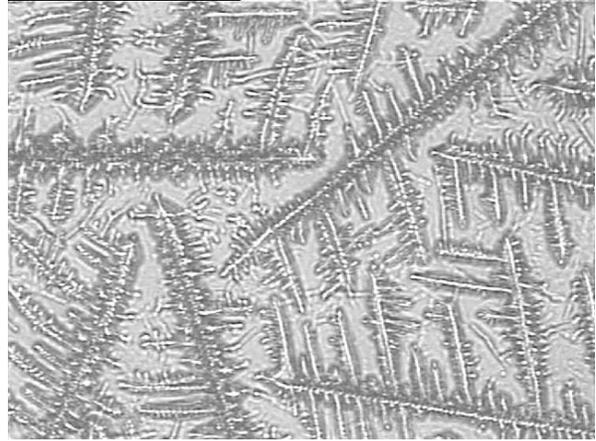


Sample 13B. Post Heart-Lock-in: more crystal structure.

In the six cases in which a more distinct crystal structure was already present before the coherence practice, larger and more ordered crystals were observed following the coherence practice. (See 1A to 1B, 5A to 5B, and 12A to 12B.)

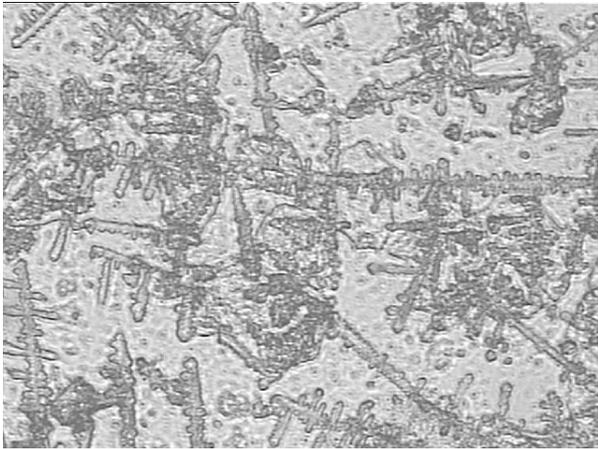


Sample 1A. Pre-coherence practice: small crystals.

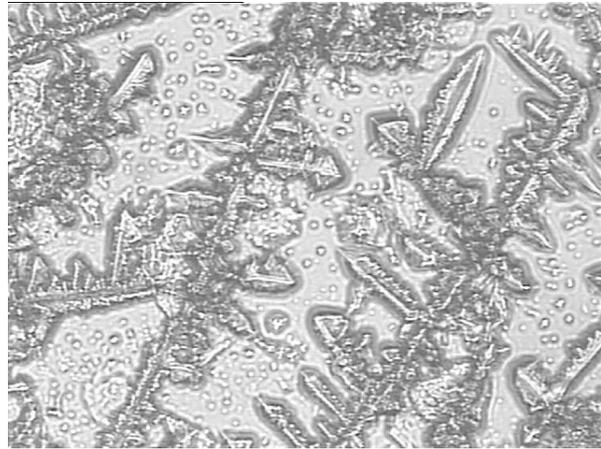


Sample 1B. Post-Heart-Lock-in: larger more ordered crystals

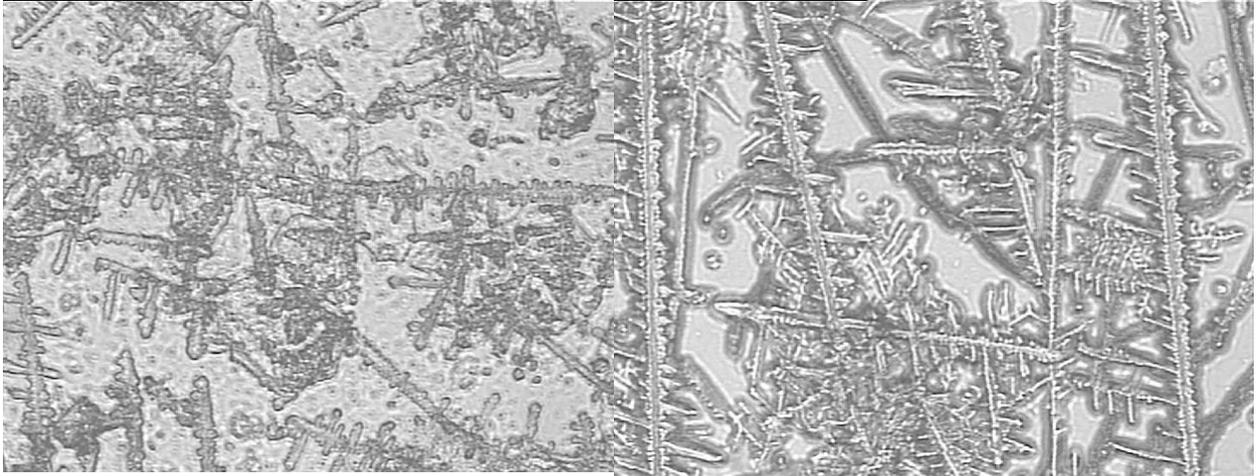
Sample 1B. Post-coherence practice: larger and more ordered crystals than in 1A (left).



Sample 5A. Pre-coherence practice: small crystals.



Sample 5B. Post Heart-Lock-in: larger and more ordered crystals.



Sample 12A. Pre-coherence practice: small crystals.

Sample 12B. Post-Heart-Lock-in: larger and more ordered crystals.

## Discussion

Of the 20 participants, 18 showed increased crystal structure and order following the coherence practice. Furthermore, the crystal size and order increased after the coherence practice.

The participants in this study were all well practiced in being able to maintain a heart-coherent state, and it is likely that the majority of them were able to sustain a high level of coherence during the trials. However, because we did not measure the actual coherence levels of each person while they practiced the Heart Lock-In, we do not know whether the level of coherence and the crystal size or patterns were correlated to the coherence levels. A hypothesis to be tested in a more detailed follow-up study would be to examine whether the level of coherence of an individual directly relates to a more structured crystallization pattern of a dried saliva drop. Also, it could be that the crystal size of dried saliva would increase as a person's coherence level increases. The fact that some of participants in this study were unable to achieve more structured crystal patterns could be related to their mental, emotional and physical states before or during the Heart Lock-in practice. It should be noted that Kröplin reported in his book that in his trials about 20% of participants' dried saliva drops showed a

more chaotic structure after receiving their chosen method of alignment. [7]

Prior to a future study, additional information could be obtained by doing a short survey of participants' emotional, mental and physical issues. Other than Kröplin's work[7], there is little research available with which to compare the results of this pilot study. It would be interesting to see, if, for example, different emotions and the resulting changes in the magnetic field produced by the heart correlate with different crystal structures in the saliva. Much interesting work remains to be done in this area of research, particularly how different emotional states and associated information in the body's magnetic field is reflected in the crystallization patterns of bodily fluids.

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