

# HEART COHERENCE

A simple and effective method to combat the effects of chronic stress

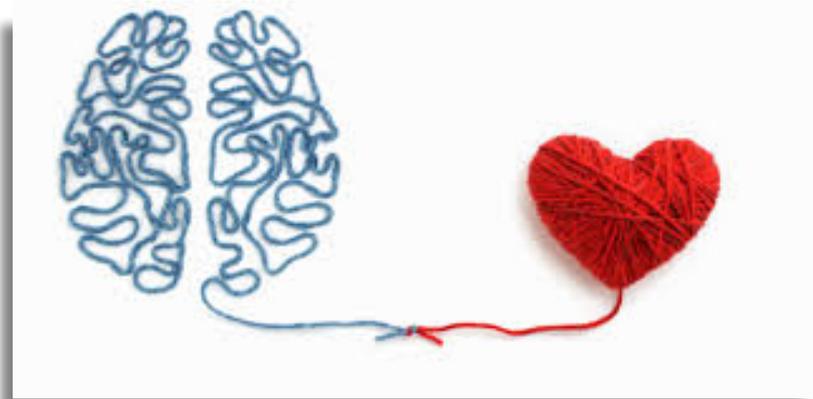
Barnabé Moulin, Osteopath DO MROF-MROE

## Orthosympathetic Nervous System

It is the activator of the functions of reaction to brief and intense stress. It can be used to trigger flight or combat. It stimulates adrenaline secretion by the adrenal glands. Through its action, the heart rate (HR) accelerates as well as the respiratory frequency (RF), the pupils dilate (mydriasis, for better visual acuity), the blood pressure increases in order to supply more blood to the muscles. But also, it puts the digestive functions to rest.

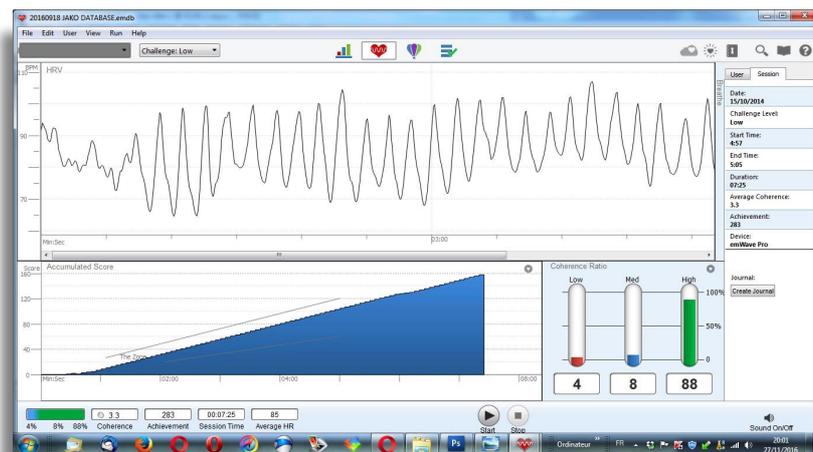
## Parasympathetic Nervous System

He's the manager of the calming down and resting functions. Through the Wave Nerve (or Xth cranial nerve), it will stimulate digestion and tissue regeneration, lowering HR and RF. Through the Oculomotor Nerve (3rd cranial nerve), the pupils tighten (miosis).



## What is Heart Coherence?

Popularized in the United States by Stephen Elliott and later in France by David Servan-Shreiber, it is a technique of voluntary breath control, Heart Coherence (HC) tends to regulate the balance between the two nervous systems (see box) that regulate the autonomous activity of the body. This balance is upset by chronic stress and can lead to harmful consequences for those who can no longer manage it.



Example of software for measuring and practicing Cardiac Coherence

## Hormones of stress

Adrenaline is the hormone for brief and intense stress. When the brain receives a danger signal or strong stimulation, it sends a signal to the hypothalamus (a gland located at the base of the brain) which will send a nerve signal to the adrenal medullary glands (located in the centre of the two glands that cover the top of the kidneys, they secrete adrenaline and noradrenaline) which in turn will release this hormone into the bloodstream.

Cortisol is the chronic stress hormone. Produced as a relay of adrenaline, in the minutes that follow, it will activate lipolysis (degradation of fat reserves to produce sugar and nourish vital and muscular functions), thus increasing the blood sugar level in the blood. It is secreted by the adrenal cortex (peripheral part of the adrenal glands, surrounding the adrenal medulla, they also secrete aldosterone which controls mineral balance and DHEA which fights against the degradation of body tissues).

## The effects of chronic stress



When a danger appears in our environment, we have the capacity to react. When, for example, crossing a pedestrian crossing, a vehicle appears, it is thanks to the activation of alarm signals via the orthosympathetic system (see box) that we are able to take a leap. It is this same mechanism that allows a bird to take flight when a cat approaches and wants to bite it.

Apart from this brief and intense stress, the return to calm is done via the parasympathetic system, which can give after this sprint to the pavement, this feeling of having the legs cut off. For the bird, it will immediately land elsewhere and continue to sing or peck.

On the other hand, unlike the animal, the human being will not immediately forget what has just happened. He will begin to ruminate over the event. The brain, taking up this information as a permanent danger, will continue to make the effort to flee. But, very quickly, the secretion of adrenaline will be relayed by cortisol, which is the hormone of permanent stress but at a lower intensity (see box). It is exactly this phenomenon that is triggered when we are exposed to situations that "in normal times" would be unbearable for us (living or working conditions, relational situations, financial difficulties, pollution, poor lifestyle, deprivation of freedom, etc.).

This chronic stress will eventually reach the limits of the individual's adaptive capacities, exhaust his hormonal production, draw on his resources even if it means endangering the organism (the body will degrade the stocks of minerals contained in the tissues in an attempt to meet production needs). Thus, the state of health deteriorates, and pathologies can then appear (insomnia, inflammatory diseases, demineralization, depression, burn-out, cardiac, respiratory and digestive pathologies, immune problems, etc).

## *The Vagus Nerve and the Vagal Tonus*

Among the tools available to the body to regulate the balance of its two autonomous nervous systems, the Vagus Nerve is the most effective. Managing the thoracic (heart, lung, thymus, pericardium) and abdominal organs (liver, pancreas, digestive system, influences on the urinary and genital systems), it promotes tissue recovery and regeneration, relaxation and rest.

We will therefore talk about Vagal Tonus (VT) to measure the level of activity of the Vagus Nerve. The higher the VT, the more effective the regulatory capacity of the Vagus Nerve is. Conversely, a low VT will be synonymous with an inability to regulate the orthosympathetic nervous system and therefore a "runaway" of autonomous activity.

## *The Heart Rate Variability (HRV)*

The simplest way to measure Vagal Tonus is the Heart Rate Variability (HRV).

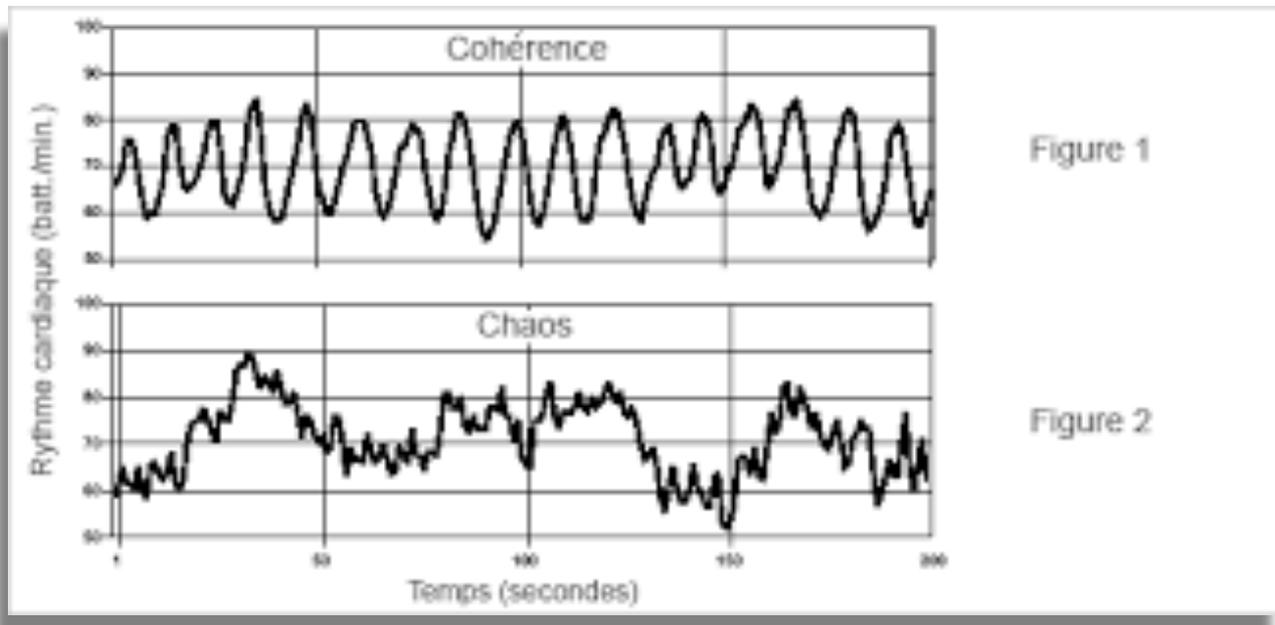
The HRV is the physiological difference in heart rate between inspiration (under orthosympathetic control) and expiration (under parasympathetic control). Thus, HRV increases on inspiration and decreases on expiration. This HRV is quantifiable on the electrocardiogram, by measuring the space between the QRS curves (see diagram). The greater this variability, the more adaptive the body has. The HRV increases at rest and during the day it decreases during stress, action and at night.



*Measuring the gaps between QRS curves on an ECG recording*

## *The Effects of Heart Coherence (HC)*

In order to improve the HRV, there are several techniques, the simplest and most studied of which is Heart Coherence. It is the number one tool to stimulate Vagal Tonus.



Variations in HRV measurements during an Exercise (Figure 1) and a Stress or Chaos Situation (Figure 2)

Numerous studies have noted significant effects on different pathologies:

- cardiacs: it's a technique that has been widely used for many years in cardiac rehabilitation centers.

- Cerebral: the practice increases GABA secretions and therefore increases concentration and memorization capacities, coordination and language (very useful for children with attention disorders with or without hyperactivity, ADHA), as shown by a visible elevation on the electroencephalogram of the waves  $\alpha$ . There is also an increase in hormone secretions (dopamine, serotonin and oxytocin).

- Respiratory: impact on allergies and asthma via a decrease in the stress response on the respiratory system.

- Digestive: by its vagotensor effect, Cardiac Coherence stimulates the secretion of digestive enzymes. It is very easy to observe an increase in motility (proper movements of the digestive organs) and an improvement of the migrating motor complex. These effects are therefore beneficial against bacterial proliferation in the small intestine, irritations of the colon, constipation, etc.

- Immune defences: a significant increase in IgA and other defence agents in the digestive system has been demonstrated, which is one of the first immune defences. The increase in VT stimulates the thymus, the site of production of T-lymphocytes.

- Metabolic: a decrease in visceral fat, stimulation of the hepatic system and better regulation of blood sugar levels are observed.

### *For the athlete*

An athlete with a high VT will be more tolerant of the demands of competition and resistant to the pain of exertion.

Freedivers are known to have a high HRV, which allows them to tolerate long periods of hypoxia and to adapt to the pressure during deep dives.

Athletes with a good HRV have increased DHEA secretions.

The HRV is a telling indicator of an athlete's state of fatigue and recovery capacity. For the coach, it is an important element allowing the monitoring and adaptation of training loads.

During the competition, it is beneficial to practice exercise to improve recovery (breaks, half time, runs, etc.).

### *How to Practice Heart Coherence?*



Method 3.6.5 is summarized below:

**3 times a day**

**6 breathing cycles per minute**

**5 minutes per exercise.**

**365 days / year**, as the effects to be beneficial require daily practice.

The exercise is practiced in a seated position, with a straight back, it consists in taking voluntary control of one's breathing, preferably ventral, like this:

- Inspire slowly for 5 seconds through the nose.
- Breathe out slowly for 5 seconds either through the nose or through the pursed lips.

In order to improve efficiency, please remember to relax all areas of the body:

- Shoulders up to the hands
- Face, jaws, tongue
- Diaphragm, belly, perineum
- Feet to the pelvis.

With practice, efficiency can be improved through visualization techniques.

It can be practiced in a group or alone, guided or not.

Many mobile phone applications offer to guide you via visual or sound, or even vibrations.



### *Some variations*

Depending on whether you are looking for a more relaxing effect, it is possible to extend the effect on the parasympathetic system by breathing in for 4 seconds and breathing out for 6 seconds (4/6).

Conversely, a stimulating effect will be produced by an inspiratory time greater than the expiratory time (6/4). One can also practice "square" breathing by including one-second pauses in inspiration and expiration (4/1/4/1).

In case of intense stress, it is also possible to practice it for even one minute, in traffic jams, before an exam, a meeting, etc.

### *The osteopath's point of view*

Through its direct action on the autonomic nervous system, the regular practice of Cardiac Coherence is an essential ally in the pursuit of full health. It is a valuable tool to be recommended for all patients young and old.

By acting directly on the structures, thus lifting physical limitations, Osteopathy and Heart Coherence are a good duo that will help the body to regain its functional fullness.

Barnabé Moulin, osteopath DO mROF-mROE

Graduate of CSOF-Toulouse, certified by ESO-Maidstone (Kent-GB)

Passionate about osteopathy, its history, physiology, exploration, but also sports and in particular cycling. In parallel to my activity in a consulting practice since 1997, I have been working with top cycling teams since 2014 (Astana, Bahrain McLaren, KMC Orbea). I share my experience and knowledge through publications (articles, videos, conferences).