BREATHING IN HEALTH AND WELL-BEING?

Proof of the relationship between inhaling energised air and harmonisation of the autonomic nervous system by means of heart rate variability (HRV) measurement

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Introduction:
Recently I received a case description of a patient with stable angina pectoris (precursor to a myocardial infarction) from a Saudi Arabian cardiologist (G.S., King Faisal Hospital). The patient had been suffering for some weeks from chest pains radiating into the back, symptoms intensifying under the effects of physical and psychological stress and slowly dissipating at rest. Heavy smoker for 30 years, no specific medication to date. Refused a catheter investigation for further diagnosis and possible operation.

He was willing to receive the Spirovital treatment suggested by the doctor (20 minutes daily, 5 x week). After 2 weeks significant improvement in symptoms, pain-free even under stress and on physical exertion. More energy, no longer short of breath, dark circles under the eyes had disappeared. “I feel reborn…”

The subjective improvements were objectively demonstrated by accompanying HRV measurements (Figs 1-2).
This gives rise to several questions for the practising therapist and also for the scientist interested in causal relationships:

1. How is it possible for Spirovital therapy to bring about such clear subjective and objective improvements in functional symptoms and organic findings? What physiological mechanisms are responsible for this?

2. Is HRV measurement a suitable method for objectively demonstrating the effects of Spirovital therapy? What is the relationship between inhaling energised air and changes in heart rate variability?

Scientific background:
A retrospective scientific evaluation of comments from Spirovital end-users and Spirovital therapists from previous years was carried out in 2007 and produced interesting conclusions (Jung, 2009).
As far as organic diseases are concerned, the evaluation of the patient data on the effectiveness of spirowalisation showed that it had been successfully used in diseases of very different organ systems, the nervous system, respiratory tract, cardiovascular system, immune system, sensory organs, skin, locomotor system, metabolism and hormonic system.
Information from therapists related to effective use for pain management, in dentistry, oncology, respiratory tract disorders, eyes, the locomotor system, the cardiovascular system,
immune system and in metabolic disorders and for inflammation, post-operatively and as an anti-ageing treatment.

In the case of functional disorders, the end-users assessed Spirovital therapy positively for energy status (vitality, activity, load tolerance, strength, motivation), well-being (sleeplessness, mood, breathing, digestion, pain, immune status), regeneration (deepening, accelerating, relaxation, lowering pulse) and for the sensory system (smell, vision, skin, dizziness). According to the therapists’ evaluation, particularly good results were achieved for loss of vitality, sleep disorders, weakening of the immune system and poor vision.

Taken together, all of these assessments and individual experiences give the impression that spirovitalisation does not primarily influence or cure the underlying disease itself but rather represents a general basic therapy that activates the body’s own self-healing capabilities and therefore indirectly results in success and above all has a positive influence upon concomitant subjective autonomic phenomena. In most chronic diseases the latter represent the most noticeable problems (pain, restricted movement, poor concentration, loss of vitality, sleep disturbances, digestive problems and similar). The minimum requirement of all therapeutic measures is to bring this autonomic imbalance under control.

Spirovitalisation (Airnergy +) fulfils this requirement by definition and in practice, thus establishing itself as a new basic therapy to supplement and extend complementary treatment methods (Fig. ?).

**The use of complementary therapies in chronic diseases:**

Acute situations require the quickest possible, dose-correlated procedure or the concrete exclusion of certain noxae. Both relate primarily to the cellular-pathological level, which is well covered by “conventional” medicine and is very accessible to scientific (and also subjective) methods of proof.

In the case of chronic diseases (previously a small percentage of all illnesses but gradually increasing over the years and now accounting for more than half of all illnesses and deaths) the situation is different. Chronic (degenerative, civilizational) diseases mostly relate to complex control systems (the milieu, not just the individual cell), and therefore are less easily accessible to “conventional” medicine and are increasingly the main indicator for treatment with complementary methods (preferred by the patient themselves).

The aim and success of the treatment is primarily to increase subjective vitality and joie de vivre – in short to improve the quality of life. In many cases a causal therapy is not possible. By definition complementary methods include, as a part of the overall medical approach, the stimulation of the body’s own individual healing and ordering powers by using natural medications or stimuli that have little or no side effects, such as Spirovital therapy.

Complementary methods can be used in chronic illnesses, functional disorders and feelings of ill health and as an adjunct to typical conventional treatments.

Here the primary aims are:

1. Increasing oxygen supply and utilisation
2. Harmonisation of biological-cybernetic functions and their stabilisation
3. Optimisation of the milieu (inter-cellular substance).

All of these aspects relate to the whole organism in a general sense rather than to the local seat of the disease. The aim is to create the optimum conditions for possible self-healing or an externally-induced healing process with minimal intervention.

Of primary importance for this are the endogenous control systems, which must be maintained or restored, but in any case optimised and stabilised for the individual case. Essential prerequisites for this are oxygen supply and utilisation to cover the respective requirements and also efficient self–cleansing of the milieu (“decoking” of the inter-cellular tissue, neutralisation of oxygen radicals).
Bio-cybernetic influencing of the endogenous control systems makes use of certain selected stimuli (such as e.g. energising the respiratory air), to activate desired reactions (microcirculation, oxygen supply, metabolism, elimination). The organism should be stimulated to produce “expedient” reactions. The individual course (intensity, duration and extent) of many diseases, in particular chronic complaints, depends upon the respective reactive capacity of an individual. An understanding of this is becoming increasingly important for therapeutic treatment.

The regulatory situation such as the regulation band width (negative: regulation rigidity) has its main anatomical effect in the extra-cellular matrix (inter-cellular space, milieu) (Fig. 3). The main physiological actors (mechanisms) are the autonomic nervous system, the endocrine system, the immune system and the psyche. As is well evidenced, they are closely interlinked so that it appears to be diagnostically and therapeutically expedient to use a method that covers the whole psycho-neuro-endocrino-immunological axis, gives evidence-based results, is simple to carry out, is easy on the patient and the therapist (in terms of time, organisation, evaluation) and is cost effective.

Fig. 3: Extra-cellular matrix (primarily consisting of collagen fibres) with fibroblasts formed in it (rat cornea)
(from WEINL, 2009)

Such a method has been developed and standardised with HRV (heart rate variability) measurement, which has a broad range of use and has since become scientifically established.

**Autonomic nervous system – autonomic regulation of vital functions:**

HRV serves to measure the autonomic, neuro-vegetative activity of the heart and can be defined as the variance (band width) over time of the heart rate during the course of the day. It is determined by an ECG or with heart rate monitors in that the time intervals between every two heartbeats (RR intervals) are recorded and graphically displayed in a coordinate system.

Whilst the absolute value of heart rate as a static parameter provides more information about the intensity of cardiovascular loading (rest, physical exertion), the HRV scatter diagram provides additional information about the quality of cardio-circulatory regulation and the underlying influencing parameters (Figs. 1-2).

The heart reacts constantly, at rest and also during physical and/or psychological loading, to signals from within the body and from the outside world, as regards heart rate, contractility, output and cardiac phase (systole, diastole). This adaptability is based (normally, i.e. in health people) on an optimal interaction between the two controls of the vegetative or autonomic nervous system, the sympathetic and the parasympathetic nervous systems.

The high-frequency electrical pulses of the** parasympathetic nervous system** bring about numerous adaptations in the entire organism, primarily trophotropic aspects such as energy saving, recovery and building processes. Its affect upon metabolism is increased assimilation (build up of energy and physical substance) and alkalinisation of the stroma. Muscle circulation decreases, digestive organs and the skin receive more circulation. Cardiac output,
heart rate, contraction and excitability of the myocardium (heart muscle) are reduced, adrenalin (stress hormone) production drops, basic mood is improved, blood pressure drops, propensity for sleep is increased, propensity for inflammation and inflammatory processes are reduced.

Conversely the low-frequency pulses of the sympathetic nervous system bring about the opposite ergotropic reactions in the sense of discharging energy and breakdown processes. Specifically this leads to an increase in destructive (dissimulatory or catabolic) metabolic processes and a more acid milieu. The muscles and heart/lungs receive more blood, their metabolism and therefore their oxygen requirement are increased (sympathetic nervous system), and this takes place at the cost of the digestive organs and skin. Cardiac output, heart rate, contraction and excitability increase accordingly, a consequence of the increased adrenalin production and secretion of the adrenal glands. The basic mood is more tense, propensity for sleep is reduced, blood pressure increases, propensity for inflammation and inflammatory processes are activated.

The vegetative nervous system is not subject to the will (“autonomic”). Without our being aware of it, it regulates the functions of the individual organs such as blood flow, respiration, digestion and the inner milieu, thus looking after homeostasis of the stroma. The individual organs or organ systems are supplied by both strands of the vegetative nervous system equally, in the sense of a super-ordinate control system. Sympathetic activation brings about an increase in motivation with all of the consequences for individual organs, the parasympathetic system looks after relaxation, recovery and restitution.

Over time the continuous activation of the sympathetic nervous system leads to exhaustion, depression and burnout and a constant under-stimulated, parasympathetic-dominant lifestyle to atrophy of the individual organs, mental underload and inability to adapt to changes in environmental conditions.

In order to maintain or restore health a balanced interaction between both strands of the autonomic nervous system is essential, whereby a crucial prerequisite is the alternate activation of the two parts in a more or less regular rhythm (circadian rhythm, predominantly the sympathetic during the day and the parasympathetic at night). Autonomic functional disorders are frequent - a trend which is growing. Up to 70 % of all outpatient consultations are thought to be associated with them. Concrete symptoms are psycho-vegetative exhaustion, vegetative dystonia, exhaustion, vegetative predominance, burnout syndrome, neurasthenia and nervousness.

Characteristic symptoms are sweating, in particular night sweats, dizziness, difficulties falling asleep and sleeping through, loss of appetite, weight loss, also morbid appetite, diarrhoea, constipation, orthostatic complaints, malaise, rapid heart rate to tachycardia, sexual dysfunction, urinary urgency, back pain with and without involvement of the spine and fibrositis.

Many chronic diseases are accompanied by a disruption to basic regulation, an imbalance of the psycho-neuro-endocrino-immunological axis, subjectively experienced as a loss of quality of life, caused by the characteristic symptoms mentioned above. In addition to causal therapy (including when it is very difficult or impossible, for example in the case of coronary heart disease, arthrosis, cancer) an important aspect of modern medicine is to eliminate or at least alleviate the subjective complaints that either accompany the underlying disease or are caused by conventional treatment. Many complementary methods, especially the inhalation of energised respiratory air, appear to be more suitable for this than the traditional, cellular-pathologically-oriented therapies.
HRV is a recognised method of evidencing these aspects - harmonisation of the vegetative axis and thereby influencing the optimisation of basic regulation.

**Heart rate variability (HRV) – evidence-based health indicator:**
The variability of a person’s heart rate indicates his/her regulation range (synonym: well-being, health). “If the heartbeat is as regular as the tapping of a woodpecker or dripping of rain on the roof, the patient will die within four days,” said a Chinese sage from the third century. About one hundred years ago the cardiologist Brauchle coined the term “isorhythmia” for this as an indicator that the blood supply to the heart was in jeopardy.

The variability of a healthy heart is at its greatest at rest at 45 – 100 beats per minute or an RR interval between 600 and 1300 milliseconds with the greatest frequency between 60 and 80 beats/minute. With the start of physical or psychological loading the mean value of the heart rate starts to increase with decreasing variability. The higher the loading, the clearer this trend becomes.

It is true that each person has his/her own individual heart rate variability depending upon age, gender, genetic predisposition, fitness and lifestyle. Nevertheless, it is possible to establish average and nominal values within certain limits. Thus resting variations of more than 100 msec in the heart rate sequence indicate a “normal” adaptation of the heart to external or internal stimuli as encountered in everyday life. In general, children have a greater variability than adults and variability decreases continuously with age.

Consequently, heart rate variability provides information about important regulation processes of the organism and from this information about the current stress or health status.

In chronic stress sympathetic activity predominates and this can clearly be seen in a lower HRV. Conversely, there is good HRV in a state of vegetative harmony (well-being, good level of health).

Analysis of HRV can be illustrated in three ways, as a *rhythmogram* (continuous registration of the individual pulse period, i.e. the interval between two consecutive heartbeats on the x-axis; marking of the respective length of the individual RR-intervals on the y-axis of a coordinate system) or as a *histogram* (recording the frequency of the individual pulse periods in a coordinate system; showing the frequencies on the y-axis, the individual RR-intervals on the x-axis) and as a scatter diagram (plotting of each individual pulse period both on the horizontal and vertical axes of a coordinate system).

Fig.

Factors that can lead to the limitation of HRV over time are health disorders and illnesses, chronic stress and high performance sport. Things that increase it over time are balance, contentment, well-being, moderate endurance training and regenerative measures.

In the short-term the HRV is altered particularly by acute stress (physical and psychological). But even mental states influence the HRV in the short term (joy, fear, shock, surprise, in summary feelings triggered by the limbic system in the brain). Other influencing factors are endogenous (respiration, blood pressure, body temperature, hormonal status), exogenous (body position, intake of food, stimulants) and constitutional (body weight, fat/lean tissue ratio) in nature.
In summary, HRV is an optimal method of assessing bio-regulation so that it is an excellent tool for demonstrating the effectiveness of inhaling energised respiratory air.

**Energised respiratory air – alternative bio-regulator?**

Improved oxygen supply to and utilisation by each individual cell of the body and the intercellular ground substance and also the cleansing of the ground substance (of metabolic end products; of harmful substances produced by respiration, food or endogenous metabolism; oxygen radicals) should serve to harmonise them by cleaning them up and also primarily by activating the control mechanisms. In chronic diseases and functional disorders metabolic end products are increasingly deposited in the stroma (the extra-cellular matrix), and it is the release and removal of these via improved venous and lymphatic drainage that is the aim of many complementary methods and in particular of Spirovital therapy.

In Spirovital therapy there is a short-term elevation of the oxygen in the ambient air from its basic state to a higher energy level (singlet state) due to the effects of light of a specific wavelength in the presence of a specially selected photosensitiser.

This higher energy level of oxygen “only” lasts for fractions of a second until it reverts into its basic state and the energy that is thereby released passes into the surrounding water that is then inhaled together with the “normal” atmospheric oxygen in the surrounding air (Fig. ).

**Fig.**

The further steps of spirovitalisation are not yet completely understood. However, based on numerous accounts (by patients), case descriptions (from therapists) and from the first provisional results of clinical studies, it is certain that important processes take place particularly in the mitochondria (the aerobic power stations of the cell) and in the stroma (extra-cellular matrix). These primarily relate to five areas (increase in circulation, increase in O₂ utilisation, optimisation of the immune system, activation of protein synthesis, stabilisation of oxidative equilibrium). Three fundamental metabolic processes have been identified in this connection:

a. Increase in 2,3-biphosphoglycerate:
   Apparently Spirovital therapy increases 2,3-biphosphoglycerate in the erythrocytes thereby moving the oxygen binding curve to the right so that, at the same partial oxygen pressure in the erythrocytes, oxygen saturation drops or oxygen release to the tissue, i.e. also into the individual body cells and there into the mitochondria, the place of ATP production, is improved.

b. Activation of cytochrome-C-oxidase:
   Cellular respiration is taken to mean the functional complex of glycolysis, citrate cycle and the respiratory chain. In the first step of energy production glucose and fat are gradually broken down (conversion of energy-rich substrate into energy-poor CO₂ and water). Whilst 2,3 biphosphoglycerate activates glycolysis (breakdown of glucose to form pyruvate), ubichinon Q and cytochrome C are active within the respiratory chain in that they transfer the liberated electrons to an enzyme complex, cytochromeoxidase where they react with oxygen and reduce it to water (chemiosmosis). This process sets in train oxidative phosphorylation (conversion of energy-poor ADP into energy-rich ATP). There is much to suggest that cytochromeoxidase is activated by Spirovital therapy.
**c. Inhibition of NADPH-oxidase:**

Cellular metabolism (energy production, elimination of toxins) increases the requirement for $O_2$. This results in the increased release of reactive oxygen species, which under normal conditions perform an important function in the body, for example destroying phagocytised foreign bodies (such as bacteria and viruses). NADPH-oxidase acts as a catalyst for this. Although the production of oxygen radicals is important in defensive reactions, it can be harmful when too much is inhaled or produced as a result of stress, illness, ageing or environmental damage, especially in endothelial cells, smooth muscle cells, myocardial cells and fibroblasts (NO-inactivation, decrease in endothelial reactivity, precursor to heart attack and other vascular diseases). Spirovital therapy decreases the activity of NADPH-oxidase and thus results in reduced formation of oxygen radicals, in other words the antioxidative capacity of each individual cell increases. This is in clear contrast to traditional oxygen therapies such as, for example, von Ardenne’s multi-step oxygen therapy.

Spirovital therapy represents a complex therapeutic method that, by harmonising the basic regulation in the extra-cellular matrix and in the individual cells of the body, leads to an improved oxygen supply in the mitochondria and thereby activating the cell’s own energy production (ATP) and contributing to the regulation of the cellular metabolism in the organism as a whole. Both preventatively and curatively spirovitalisation activates and supports crucial bio-regulatory processes in the sense of a holistic and universally-applicable treatment. Particularly in therapy and rehabilitation Spirovital therapy accompanies and supports clinical treatment concepts and conventional medical interventions.

**Results of studies into the influence of energised respiratory air on HRV:**

**I. Knop, 2003**

*Methodology:* $n_1 = 15$ (7 w, 8 m; 15 – 45 a); $n_2 = 5$ (3 m, 2 w)

*Parameters:* $s_pO_2$ (oxygen saturation), BM (function of basal metabolic rate of tissue), HRV

*Results:* HRV: Improvement after Spirovitalisation by an average of 44% (after subtraction of the normal change at rest of 11% still 33% = highly significant; $s_pO_2$: no change; BM: significant decrease

*Discussion:* Immediate reaction of autonomic nervous system towards optimisation; increase in efficiency by increasing the regulation and scatter range; optimisation of metabolic processes; stabilising and increasing adaptability of basic health.

**II. Eccles, 2004**

*Methodology:* Pilot study; $n = 6$ (2 asthmatics); short observation period (4 x 20 min each)

*Parameters:* Red and white blood picture (morphology and activity); HRV (function and adaptability of the autonomic nervous system), lung function (PEF = peak expiratory flow, $FEV_1 =$ one second capacity, $FVC =$ forced vital capacity, subjective effects.

*Results:* Significant improvement in HRV ($p < 0.04$)

Increase in PEF by more than 20% 
Remarkable regression in rouleaux formation of erythrocytes 
Tendency to increased activity of the white blood picture 
Subjective increase in well-being
Discussion: Clear influence upon various control systems towards activation of the autonomic nervous system, elevation of energy status and expansion of control band of the organism.

III. Briant, 2006
Methodology: Experiential study of pre/post operative oral surgery in own practice:
Parameters: HRV, HR = heart rate, adaptation coefficients SDNN and CV, SI = sympathetic activity, RMSSD: parasympathetic activity
Results: Immediate drop in HR, reduction in sympathetic tone, increase in parasympathetic tone
Discussion: Dramatic optimisation of cellular energy supply by flooding of free energy valencies, direct onset of cellular regeneration, shortening of healing times by approximately 50 %.

IV. Kucera, 2007
Methodology: n = 37 (23 – 83 years, 21 w, 16 m, different diseases: CHD 21 x, hypertonia 17 x, DM II 14 x, DM I 1 x, COPD 1 x, M. Crohn 2 x, glaucoma 1 x, chronic fatigue syndrome 1 x, rheumatic polyarthritis 2 x, bronchial asthma 2 x)
Parameters: HR, SDNN (total activity of regulation systems) RMSSD = parasympathetic activity, SI = activity of the sympathetic system, HF % = activity of the parasympathetic system, LF % = activity of the vasomotor centre, TP = total performance of all spectral components of the regulation systems.
Results: Significant increase in HRV (RMSSD: p = < 0.001; SDNN: p = < 0.01)
Significant reduction in sympathetic activity (SI: p = < 0.001)
Significant increase in total performance (TP: p = < 0.001)
Discussion: Significant reduction in stress of the whole organism, significant increase in metabolic and energy reserves, significant increase in efficiency of the autonomic nervous system, harmonisation of the autonomic regulation systems.

V. Hottenrott et al., 2009
Methodology: n = 40 (21 – 31 year-old sports students, healthy; randomised, placebo-controlled, double blind study; semi-supine position; total measuring time 41 minutes; 3 measurement times: measurement time 1 (10 minutes relaxation), measurement time 2 (Spirovitalisation), measurement time 3 (10 minutes rest)
Parameters: HR, LF, HF, CSI (cardio stress index)
Results: Significant differences in mean values between the verum and placebo groups (HR: p = < 0.001; LF: p = < 0.01; HF: p = 0.008; LF/HF: p = 0.019)
Significant changes between measurement time 2 and measurement time 3 for LF (p = 0.011), HF (p = 0.006), LF/HF (p = 0.026)
Significant changes in HR between measurement time 1/measurement time 2 (p = < 0.001) and between measurement time 1/measurement time 3 (p = 0.015)
Discussion: Significant optimisation of HRV, in particular decrease in HR and sympathetic activity with simultaneous increase in activity of the parasympathetic system, significant reduction in stress index of the cardiovascular system, economy of cardiac activity
The results obtained by the five authors can be summarised as follows:

**Subjects:** n = 98 (Study III: no information), healthy subject and patients with different diseases

**Results:**
- Optimisation of HRV (drop in heart rate, increase in LF, decrease in HF, increase in TP)
- Reduction of sympathetic drive
- Increase in parasympathetic tone

**Statistical significance:** all data are highly statistically significant

In the respective discussions the five authors come to the following conclusions regarding the relationship between spirovitalisation (inhaling energised air) and the influence upon HRV:

- Immediate reaction of the autonomic nervous system towards optimisation
- Increase in efficiency by increasing regulation and scatter range
- Optimisation of metabolic processes
- Stabilisation and increase in adaptability of basic health
- Significant influence upon various control systems towards activation of the autonomic nervous system
- Increase in energy status
- Expanding the control range of the organism
- Dramatic optimisation of cellular energy supply by flooding of free energy valencies
- Direct onset of cellular regeneration
- Shortening of healing times (in oral surgery) by approximately 50 %
- Significant reduction in stress of the whole organism
- Significant increase in metabolic and energy reserves
- Significant increase in efficiency of the autonomic nervous system
- Harmonisation of the autonomic regulation systems
- Significant optimisation of HRV
- Significant decrease in heart rate
- Significant decrease in sympathetic activity
- Significant increase in parasympathetic activity
- Significant reduction in stress index of cardiovascular system
- Economy of cardiac activity

In brief, the conclusions can be summarised to give us the following bullet points:

- **Optimisation of heart rate variability** (decrease in heart rate, decrease in HF = high frequency, increase in LF = low frequency)
- **Optimisation and harmonisation of the vegetative autonomic nervous system** (decrease in sympathetic tone, increase in parasympathetic tone)
- **Increase in regulation range of the organism**
- **Optimisation of metabolic processes** (increase in energy status, increase in energy reserves, accelerated cellular regeneration, shortening of healing times, economy of cardiac activity)
- **Reduction in stress of cardiovascular system and the whole organism**
- **Stabilisation of basic health**
Thus we are able to answer the questions posed at the beginning. Because of the increase in oxygen supply and oxygen utilisation of the stroma and of each individual cell of the body and furthermore the neutralisation of oxygen radicals, Spirovital therapy leads to harmonisation and energisation of all organ systems, operates as an optimal basic therapy that, like all complementary methods, possibly in combination with traditional conventional methods, puts the body in a position to overcome functional disorders and organic conditions equally, in other words to unfold its inherent effects. Here the mechanisms are adequately explained by the increase in 2,3 biphosphoglycerate, the activation of cytochrome-C-oxidase and the inhibition of NADPH-oxidase. HRV measurement has proven to be a scientifically recognised, cost-effective, practical and patient-friendly method of demonstrating the effects of Spirovital therapy. Both methods represent a valuable supplement to routine treatment in daily practice.

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