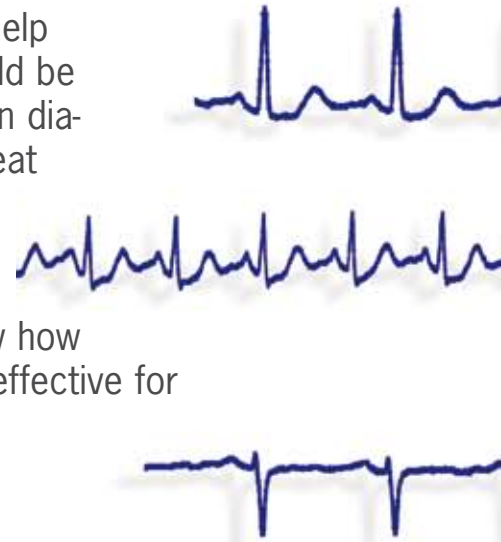


Heart Rate Variability as an Indicator of Health

How healthy are we and which treatment can really help us? How many trips from physician to physician could be avoided if heart rate variability could be considered in diagnosis. It indicates how the length between heart beat intervals varies greatly. In general, larger fluctuations correspond to higher autonomic regulatory ability of the body and thus to stronger life energy. Measurements of heart rate variability can thus show how healthy a person is and whether a treatment will be effective for him or not.



By Prof. Dr. med. Kai Börnert, Machern und Dr. Eng. Michael Süß, Aue.

Despite the latest developments in Western medicine, many illnesses and mood disorders persist, for example cardiovascular diseases, hypertension, cancer, allergies, attention and performance deficit, fatigue, depression, burnout syndrome.

Basic Autonomic Regulation

If you are looking for the cause, then you need to turn to the system that represents the basic regulation of the body. The basic functions of human

beings, respiration, metabolism, the cardiovascular system, the digestive system, the endocrine system, the immune system etc., are controlled by the autonomic nervous system, which means that they are largely independent of will and consciousness.

The autonomic nervous system, consisting of the sympathetic and parasympathetic systems, adjusts the regulation of the biological system to changing internal and external parameters.

Fight and Flight Survival Strategies of the Regulatory System

Clearly, if you look at the original sense of this complex regulatory process, then its meaning for the survival strategies of the biological individual is obvious. If an animal or a man living in its native habitat (Wilderness) perceives real danger (for example, a predator), then there results a vital threat, that is, the regulatory system is responsible for

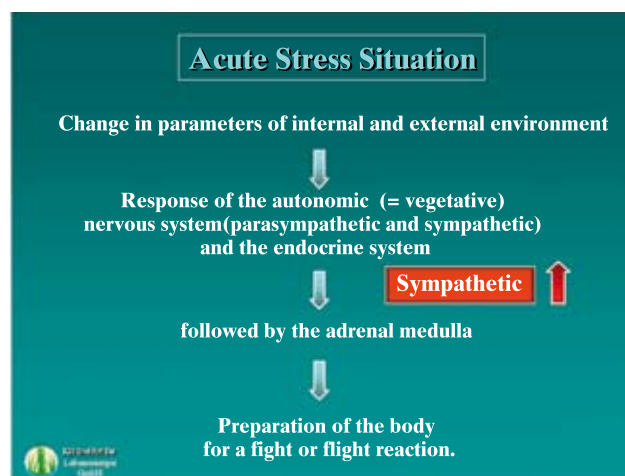


Fig. 1: Reactions of the Body to Stress.

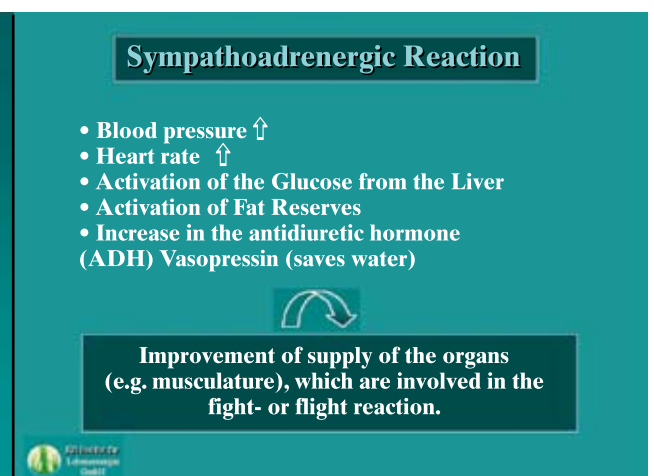
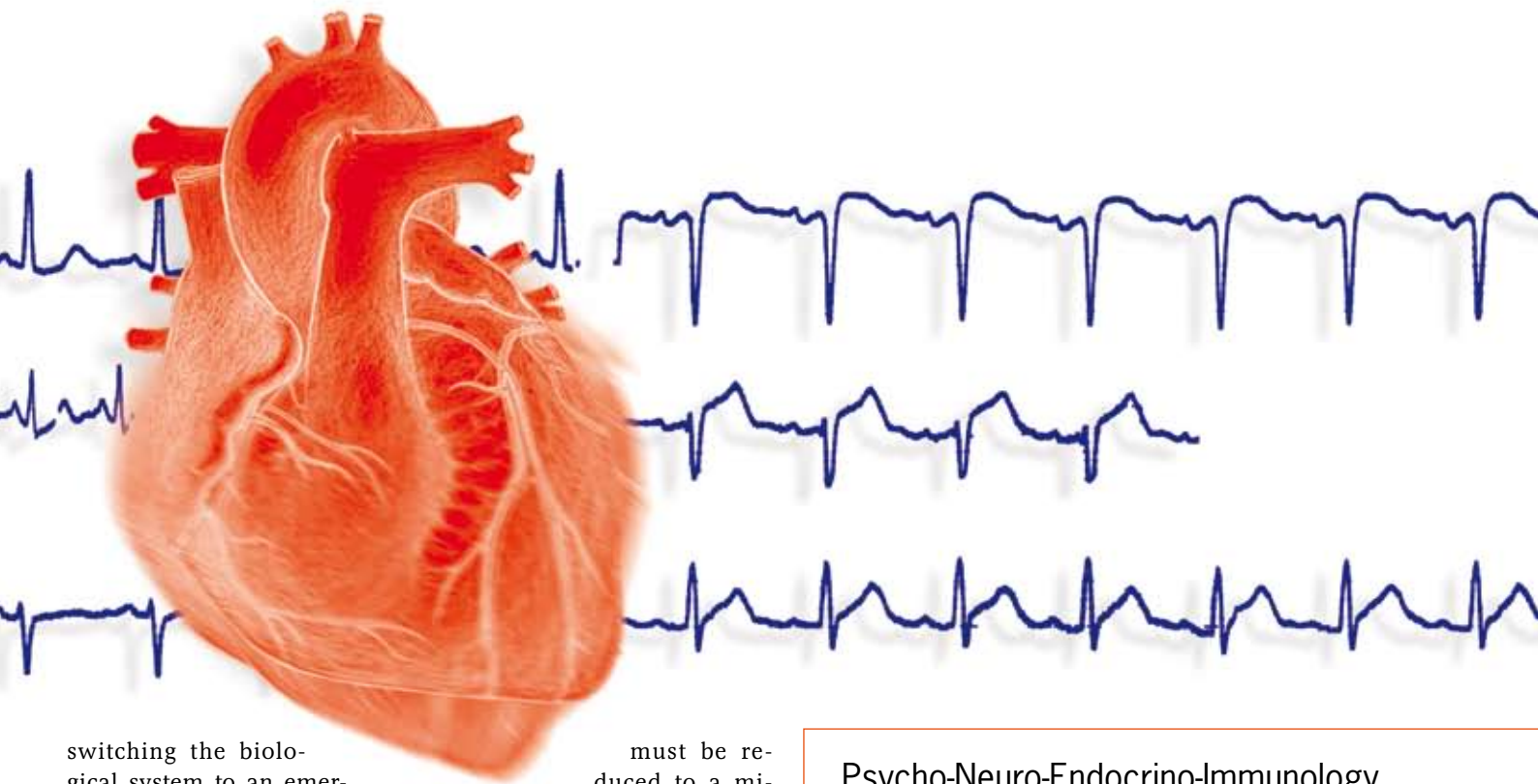


Fig. 2: Course with Activator of the Sympathetic Nervous System.



switching the biological system to an emergency or alarm program. The basis of the alarm reaction are the neural and hormonal mechanisms. These lead to an alarm status and prepare the body for a primeval reaction of fight or flight. Therefore, it is necessary to activate all systems that are required for it. The subsystems, however, which are not absolutely necessary (digestion, the immune system and so forth)

must be reduced to a minimum in their metabolism. Only by the efficient management and arrangement of the Inner resources (energy) does the biological system have a chance to successfully undertake fight or flight, that is to survive. The regulatory system also corresponds to the in-situ task of a so-called

Psycho-Neuro-Endocrino-Immunology

For Energy and Information Medicine the system of basic regulation according to Alfred Pischinger is the basis for energy and information exchange in the human body. The composition of body fluids in the extracellular space is controlled by the autonomic neural fibers. Thus, the autonomic nervous system has a direct influence on basic regulation through the so-called extracellular matrix. The interaction of individual cell agglomerations and organ systems is based on the transportation of energy and the exchange of information. The information sources are autonomic neural pathways and hormones. The exchange of information is organized in the autonomic nervous system by control circuits. The central autonomic control in the core areas of the limbic system and the brain stem continuously receives afferent information from the periphery and controls the interaction between the organ systems with sympathetic or parasympathetic efferences (forwarders from the center to the periphery). The neuroendocrine system acts as a biochemical support system. This information chain, which is known under the concept of the Psycho-Neuro-Endocrino-Immunology, is ultimately the energy system that determines the regulation breadth in the human body.

This energy system determines the life energy and is responsible for health and well-being.

The functional exchange of information cannot be measured directly at the molecular and cellular biology level, but can be measured in the organ systems, which are influenced by the autonomic basic regulation. The main measurable indicator of this information chain is the heart rate variability.

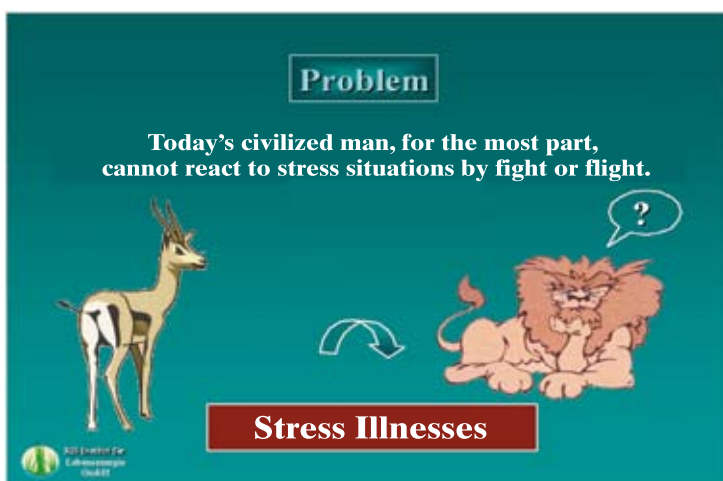


Fig. 3: Absence of Fight and Flight.



functional system in order to realize the request put forward. Basically, it is the reaction of the activated sympathetic part of the autonomic nervous system (ANS), followed by the activation of the adrenal medulla

with the release of adrenaline and noradrenaline. The sympatho-adrenal reaction leads to an increase in blood pressure and the heart rate in order to insure better supply of energy and oxygen to the organs, which are actively involved in fight or flight. In order to cover the expected increased energy needs, glucose is activated from the liver and the fat reserves are mobilized. The antidiuretic hormone (ADH) reduces

urine production and increases the blood pressure. There are many other consequences of the fight/flight reaction, which cannot all be listed here. It should be noted that with stress the autonomic nervous system sets all these bodily functions into motion. All the changing parameters such as blood pressure, heart rate or free fatty acids are normalized again, if the animal or man executes the fight or flight action. These processes can have problematic effects, if in response to them no physical action such as fight or flight follows, as is usually the case today. The stress parameters are then not normalized. We find many of these parameters in modern medicine as risk factors for cardiovascular, metabolic and other chronic diseases. Experimental studies of classical medicine confirm the fact that chronic stress leads to various diseases. So Curtis BM et al 2002 write: "lasting adrenergic stimulation increases the risk for cardiovascular disease" to name just one example. Since a software update in humans is unlikely, the efficient balancing of the autonomic nervous system both in the treatment of chronic diseases as well as in their prevention is vital.

What do the heart rate fluctuations reveal?

They allow the analysis of the autonomic nervous system. The question arises: which measured value is the most efficient for analyzing the functional status of the autonomic nervous system? Lying at the center of consideration is the heart. The change in heart rate is a universal reaction of the entire body to any impact from environmental reactions. The traditionally measured average heart rate mirrors, however, only the "end effect" of the numerous regulation impacts on the cardiovascular system. Two people with the same average heart rate could then have different autonomic regulation conditions. That is, the same average heart rate can correspond to various activity combinations of the chain links of the system controlling the autonomic homeostasis.

This can be measured by the Heart Rate Variability (HRV), that is by the Bioregulation Analysis (BRA). The variability of the heart rate refers to the degree of fluctuation in the length

of the intervals between heart beats. The best known heart rate variability is the physiological sinus-respiration arrhythmia. This is the reduction of the duration of the cardiac interval during inhalation and the extension of the duration of the cardiac interval during exhalation. Respiratory arrhythmia dominates in the curve shape, which means there are more irregularities in the curve so that it may be assumed that the system is at relative rest (for example, sleep), which means there is minimal stimulus formation both externally as well as internally. The system is in parasympathicotonus. The analysis of the HRV is depicted in the classical manner in three graphs: the rhythmogram, the histogram and the control diagram.

Even in ancient Chinese medicine it was known that a person would die if the heart lost its regulatory capacity. Regulation is therefore a fundamental prerequisite for health and well-being. Without sufficient regulation, the organ systems cannot maintain their functions and thus

In ancient Chinese medicine it was known that a man died when the heart lost its regulatory capacity.

Cardiac Interval Diagram, Rhythmogram

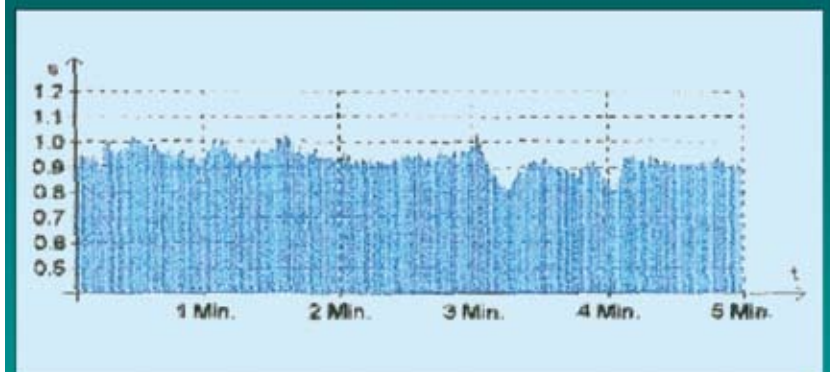
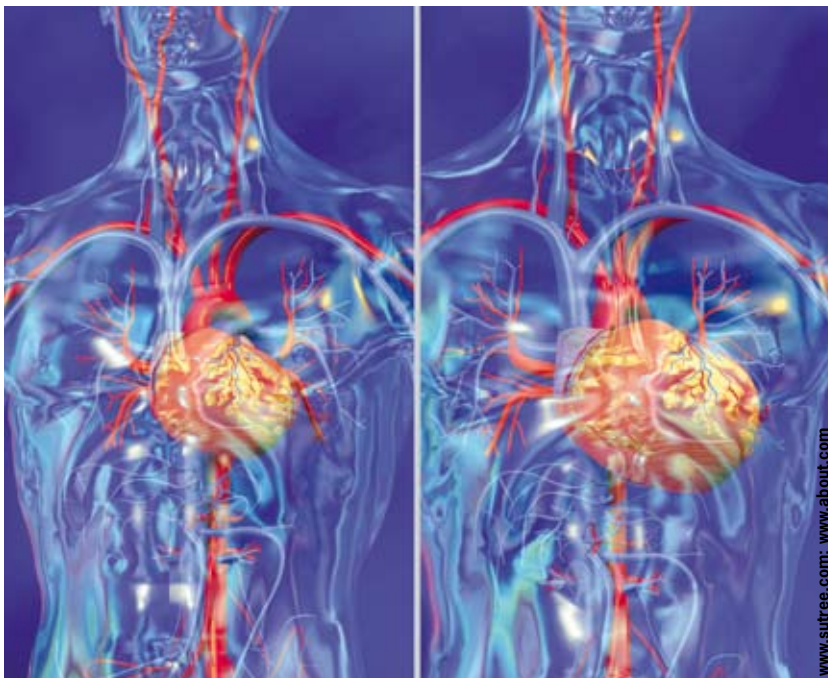


Fig. 4: Rhythmogram: The horizontal axis represents the timeline, which means the length of the examination period. For each heart beat, a vertical line is drawn on the horizontal axis. The height of the line is determined by the duration of each heartbeat. Thus, the duration of the individual heartbeats is displayed on the vertical axis. The upper end of each heartbeat is now the contour of a curve. If the biological system oscillates and thus displays an age-dependent control latitude, then the oscillation displays an irregular contour. The sympathetic nervous system dominates and the regulation capacity is reduced so that all points are almost identical in height and the contour of the curve shows an almost horizontal line. The system is under strict regulation.



The rhythm of the heart arises from the interplay of tension (left) and relaxation (right) of the heart chambers

function disorders result that subsequently lead to diseases. After a heart attack, stroke and with chronic diseases the autonomic regulation is restricted or blocked. From burnout to depression the metabolic syndromes caused by a dysbalance in the autonomic nervous system functions can be detected. The most important parameters with such function disorders is the variability of the heart rate as an indicator of regulation capacity.

The heart rate variability is the most important parameter for the exact assessment of the functional vitality, of health and well-being. Health, zest for life, well-being and functional vitality are in very close relationship with the regulatory processes in the system of basic regulation. All energy exchange processes on a biological and informational level are therefore subject to regulation, scope of regulation and adaptation behaviour in

Fig.5: Histogram
The histogram (c) derives from the EKG (a) and the interval-tachogram, a series of blood pressure intervals (b). The horizontal axis is divided into specific areas. Each area corresponds to a certain heartbeat length (for example, a length of 0.40 - 0.45 seconds or a length of 0.45 - 0.50 seconds, etc.). It is now displayed on the vertical axis which percentage of heartbeats of the examination period lie in the corresponding area. With good regulation on a gauss distribution (continuously normal distribution) of the points can be found in the middle of the horizontal axis. With a stress-related restriction of the regulatory scope the points wander into the left field of the graph, usually there are only 2-3 areas in which the heart beats lie. The harmonious gauss distribution is reversed (see Fig. 8).

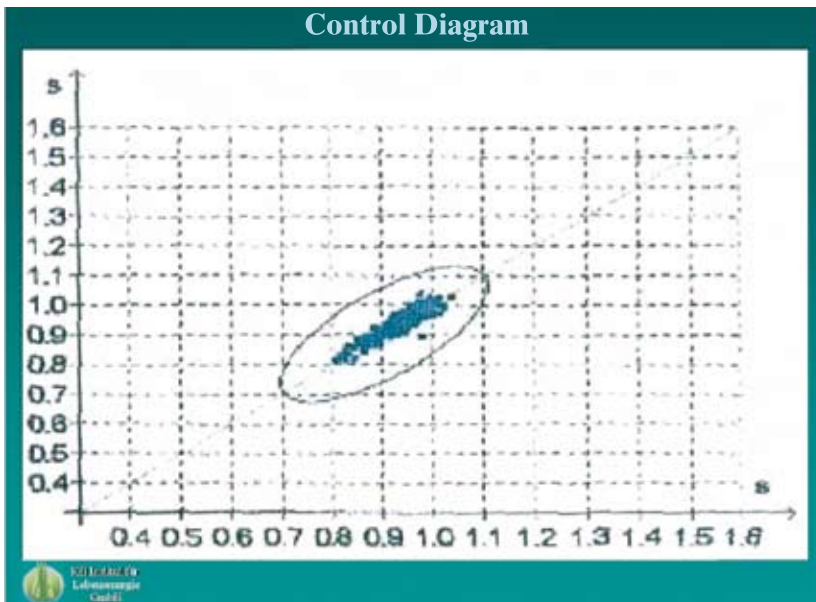
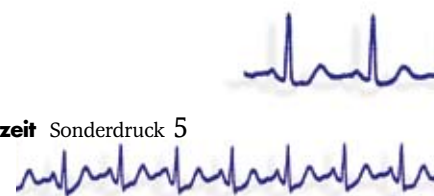
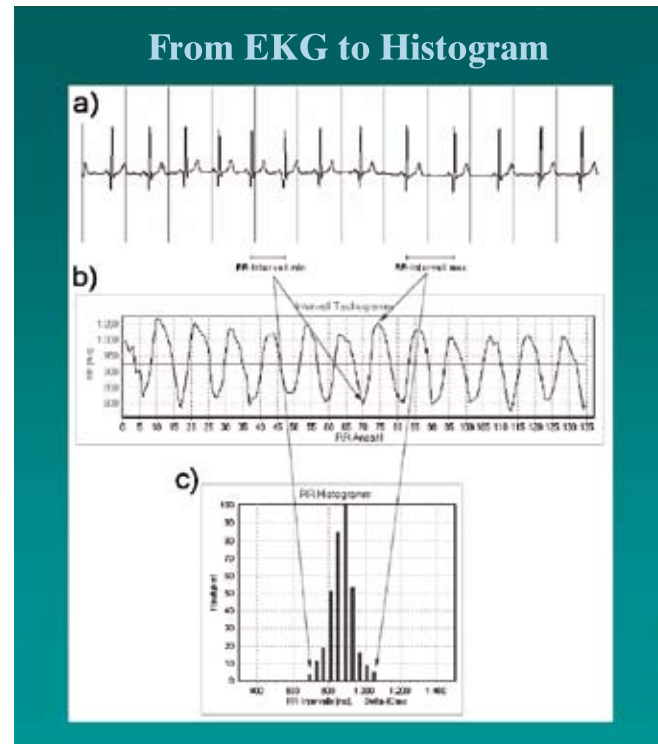


Fig. 6: Control Diagram:
The duration of each heartbeat is displayed on the horizontal as well as the vertical axis, which means that a beat will be displayed on the horizontal axis, the next on the vertical, then again on the horizontal etc. With good regulation scope, which means different long heartbeats, there is a point cloud in an elliptical shape (Fig. 6). Strict regulation and sympathetic dominance lead to nearly identical long heartbeats. The point cloud wanders diagonally into the lower left corner of the diagram. The form is circular and is focused almost to a point.

(Fig. 8). ©Fig. 1-6: Bornert/Sun





Evaluation April 26, 2005

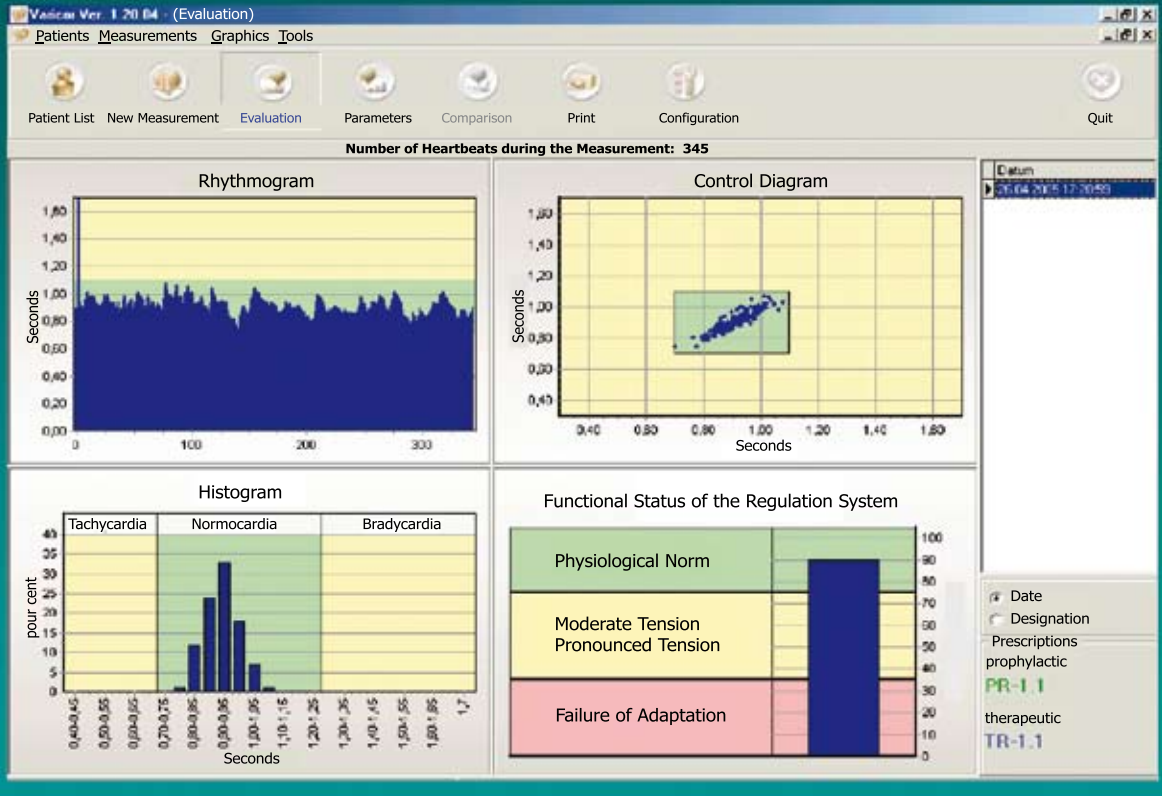


Fig. 7: Patient with good autonomic nervous system balance.

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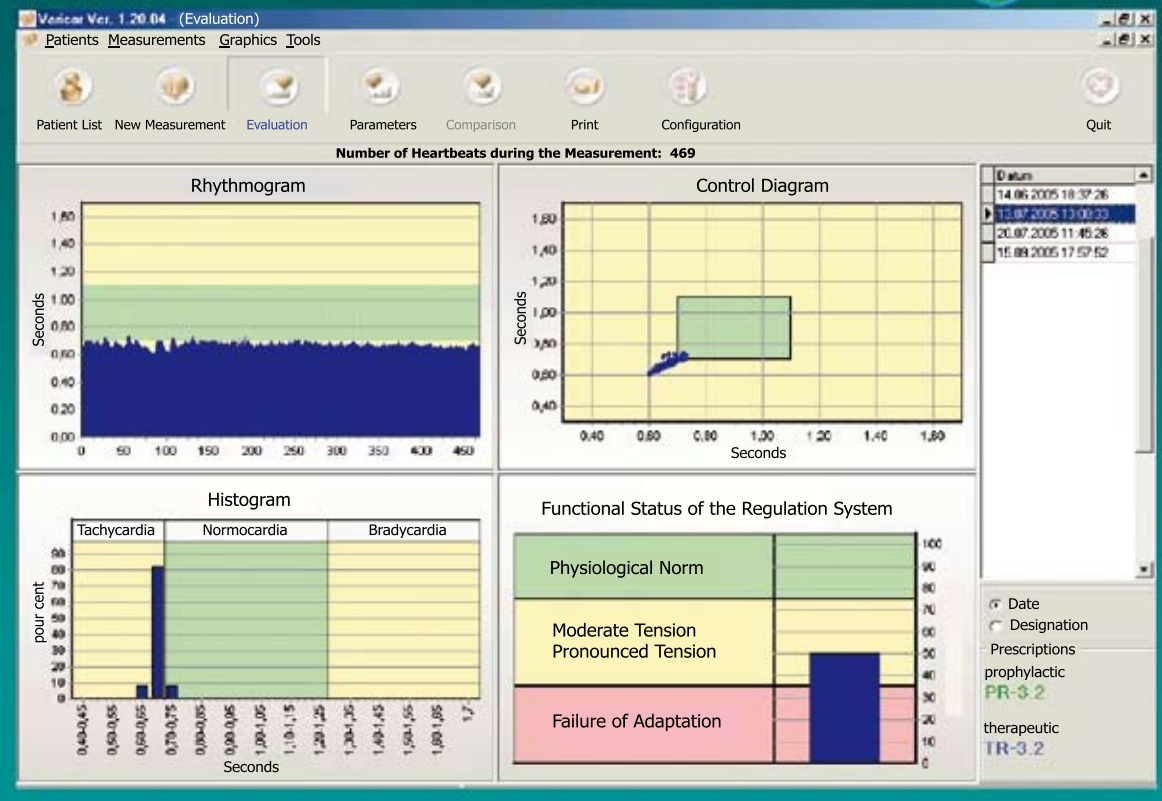


Fig. 8: Patient with chronic stress adaptation syndrome with clear sympathetic dominance

the autonomic nervous system. The self healing strength of the immune system and the self healing strength of the soul can only be activated in a parasympathetic tone position. Regenerating relaxation is only effective in a unity of body and soul. This is where important issues for health prevention and medical wellness derive from.

The Heart Rate Variability (HRV) is an optimal method for assessment of bioregulation (of the autonomic nervous system regulation).

It is very simple in terms of information acquisition because only an EKG is necessary. From this the subsequent cardiac intervals will be analyzed. Despite the simple data acquisition the HRV provides extensive data

on the state of autonomic nervous system regulation and the activity of the various control levels. ■

Who measures heart rate variability?

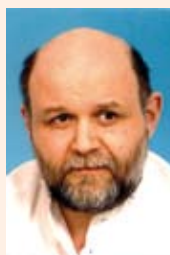
Thus far, only some private hospitals and a few classical clinics provide a heart rate variability examination. The measuring devices required for this are manufactured by different companies. Examples of clinics, which interested parties can contact are: Erlangen University Hospital, University Hospital of Dresden or New York University.

The Authors

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PhD in Medical Sciences, 1988

Promotion, until 1992 specialist training at the Orthopedic Clinic of the University of Leipzig, training in a variety of complementary procedures: acupuncture, neural therapy, chirotherapy, homeopathy, Bach Flower therapy, applied kinesiology, psychokinesiology per Klinghardt, physioenergetics, global scaling. Since 1995, he has worked in private practice. Work with a variety of diagnostic and therapeutic bioenergetic procedures.



In 1993, founded the "KB Institute for Life Energy GmbH", performance of numerous training events. In 2007, Post-doctoral qualification in medical sciences, development of the E-M-A-C concept, 2008 appointment as a professor by the "International Interacademic Union".

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