

## Heart rate variability measurement

Humans have an internal nervous system which regulates heart rate, breathing, sleep, hormones and much more. In contrast to the peripheral nervous system, of which we are consciously in control (e.g. finger movement), there is also an autonomous nervous system, that functions independently from our consciousness. Just imagine if you had to tell your heart to beat 100.000 times a day, or if you constantly had to remember to tell your digestive system to start digesting. Quite an effort – and imagine the consequences if you were to forget!

The autonomous nervous system has two main systems, the sympathetic and the parasympathetic system. The sympathetic system dominates when we are under stress and active during the day. The parasympathetic system dominates when we sleep, laze around and recover.

When we are chronically overworked the parasympathetic system disappears more and more and we can no longer recover properly. If this chronic overload continues, the sympathetic system degenerates and our life-energy decreases. This is a typical process with patients who experience chronic stress and tend to burn out.

Intervals between heart beats become similar when the sympathetic system dominates. When the parasympathetic system dominates the intervals between heart beats become irregular, the heart just sort of sprawles along.

In measuring heart rate variability we make use of these characteristic changes dependent on the autonomous nervous system. The more varied your heart rate is, the more balanced you are and the more energy you have. The more monotonous your heart rate, the less energy you have and the more chronically stressed your body is. In this way we measure how relaxed or stressed you are.

### *How is the measurement taken?*

You will have a device (roughly the size of a cigarette pack) attached to your chest by 5 electrodes, which you will be asked to carry around on your body for 24 hours. The device will then record your heart activity for a time period of 24 hours and will calculate the interval differences of all 100.000 heart beats.

You can sleep, exercise and work normally with the device attached. For showering you can take it off.

### *What kind of information do we receive?*

1. Heart rate variability
  - a. We get information about the condition of your internal nervous system
  - b. We see whether you are chronically stressed, even in a burnout, or whether you are full of energy (here we get a picture of the last few months and not just the day of the measurement)
  - c. We can determine when your best performance time throughout the day is.

- d. We get information about whether you recover over night or in breaks in between
2. The heart rhythm over 24 hours
    - a. Are you suffering from heart rhythm disorders and if yes what kind?
    - b. When and how low is the lowest puls (usually during sleep), when and how high is the highest puls (e.g. during exercise)?
  3. Your breathing over 24 hours
    - a. Do you ever stop breathing while asleep (sleep apnoea syndrome)?
    - b. How long do these episodes last?
  4. Your sleep profile
    - a. Do you get to sleep easily?
    - b. Do you have a normal sleep pattern with deep sleep and dream phases?
    - c. Do you recover while sleeping?

#### ***What is the goal of this measurement?***

Many patients who are steering toward a burnout are unable to correctly perceive their own condition. Using this method we can show and prove to you where you stand, based on validated measurements.

Once measured, the goal is that you, together with your doctor, can determine measures that can help you get from poor results back into the safe zone.

We can give you security, that if your results are good you are on a safe way regarding stress management.

We can also determine heart problems (heart rhythm disorders), disorders of the nervous system and sleep disorders.

#### ***How is the measurement taken?***

You will be given a device that will be attached to your chest by means of 5 electrodes. Our medical assistant will install the cables and attach the device to your body. She will provide you with all the practical information you need (e.g. how to handle showering) and you will be asked to carry the device on you for the next 24 hours. You come back the next day and our medical assistant will remove the device for you. On rare occasions slight skin irritations may occur where the electrodes were stuck on.

You will be given a 45-minute appointment with one of our doctors to discuss your results.

This appointment will be made roughly two weeks after the measurement, in order to give us enough time to evaluate your results.

### *Can the measurement be done somewhere else than in Baden?*

We will send you the setup device by mail. You will also receive a video containing all the information you need for attaching the device. Please carry the device on you during 24 hours. Then pack the device into the supplied package and send it back to us without delay. You will be given a 45-minute appointment with one of our doctors in Baden (ifa Institut für Arbeitsmedizin, Kreuzweg 3, ABB-Areal, 5400 Baden) to discuss your results. The discussion can also be held by videoconference.

### *How confidential is my data?*

The measurement results are strictly confidential and are subject to medical confidentiality. The data is saved on our servers in ifa and archived there.

### *How do you get an appointment for the medical examination?*

Write us an e-mail to the following address: [HRV@arbeitsmedizin.ch](mailto:HRV@arbeitsmedizin.ch). We will contact you and arrange an appointment.

If you are a line manager and would like to register an employee for an examination, you have the possibility to send us an e-mail and ask for an appointment for your employee. We will promptly contact the registered person and arrange an appointment. Your employee will decide autonomously about taking part in the measurement or not. There will be no feedback given to the line manager about the results. Anonymity will be guaranteed to the employee.

### *What preparations are required from your part?*

In order to determine whether there is a discrepancy between your subjective stress experience and the measurement results, we need your information from a personal questionnaire.

You will find this in German under [www.stress-no-stress.ch/checkp/checkp.php?language=de](http://www.stress-no-stress.ch/checkp/checkp.php?language=de) in French under [www.stress-no-stress.ch/checkp/checkp.php?language=fr](http://www.stress-no-stress.ch/checkp/checkp.php?language=fr)

Please print out your results and bring them with you to the appointment with the doctor.

You will be asked to keep a diary (as complete as possible) on the day of the examination. You will receive a corresponding template when you get your device attached.

### *What measures could be necessary when results are bad?*

There is a very broad range of possible measures. We differentiate between two main groups:

1. Individual measures, i.e. what can I change to help me feel better? More exercise, good work-break-structure, methods of relaxation, learning a healthy sleep pattern, mental dissociation or even personal coaching can be very helpful to decrease stress levels. The

correct measure has to be individually discussed with every examined person and should be adjusted to his/her examination results.

2. Organisational measures, i.e. changes at your work place. Talks with superiors, changes in work content, work load or even work place could be options here.

The main goal is good health and high life quality in order to ultimately be able to experience a high and long lasting performance.

### *What are my benefits?*

1. You can follow and understand the results of the measurement.
2. Figures and charts give you a realistic idea of stress and your state of exhaustion. The results of the measurement make sense to you and give you the impulse to change your way of living if necessary.
3. The discussions with the doctor have a sustainable effect.
4. Patients who believe that their way of living is healthy but the results of the measurement give us another evidence (can be characteristic for patients with a burnout) are willing to change their lifestyle and to accept further treatment.
5. You can make the difference between a „burnout“ and a „depression“. Persons with a depression only are not in a state of exhaustion
6. The 24-hour ECG additionally gives us information about the rhythm of your heart and your respiration while you are sleeping. If we register anything pathological, we can treat it.