

Manual for BioSign HRV Smartphone App



BioSign
SCIENCE FOR A BETTER LIFE

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Introduction

The BioSign HRV-App

The BioSign HRV App enables you to have mobile and easy-to-use HRV monitoring and HRV training based on our research and development over the last 20 years and the experience of tens of thousands of users of our HRV technology worldwide.

The app is an extension of our HRV concept and integrates seamlessly into the existing concept for self-measurement and biofeedback-based HRV training. The connected myQiu cloud ensures that your data is not lost, enables additional analysis and the involvement of therapists, trainers and coaches.

Who is the app suitable for?

A well-functioning parasympathetic nervous system is a central component of health and well-being and is expressed in a "healthy" heart rate variability (HRV). The parasympathetic nervous system is the "heart" of our ability to regenerate. Have you ever asked yourself any of these questions?

- How good is my ability to regenerate?
- How has it changed recently?
- How is my daily form?
- Can I still compensate for current stress?
- Are my lifestyle changes or other therapeutic measures working?
- Does my physical activity improve my parasympathetic system or does it harm it?

Regular HRV measurements with the BioSign HRV App will help you with the answer.

Are you looking for a simple, effective way to train your parasympathetic nervous system?

The BioSign-HRV app enables you to do biofeedback-based HRV training with a scientifically proven effect*.

Training with the BioSign HRV App strengthens the parasympathetic nervous system, emotional balance and performance.

A notice:

The only requirement you have to bring with you is a "normal" heartbeat, in medical terms a sinus rhythm of the heart.

* Sci Rep 11, 6650 (2021). <https://doi.org/10.1038/s41598-021-86149-7>

A meta-analysis on heart rate variability biofeedback and depressive symptoms.

Pizzoli, S.F.M., Marzorati, C., Gatti, D. et al.

How do I use the BioSign HRV App?

In order to use the app for HRV measurements and biofeedback or to upload measurements from the Qiu plus, you need a myQiu account. The measurements and biofeedback exercises are uploaded to the myQiu server, analyzed there and the evaluation is returned to the app.

To just configure the Qiu plus or to carry out a firmware update for the Qiu plus, you do not need a myQiu account.

Please note that the normal Qiu is not compatible with the app as this device does not yet have Bluetooth functionality. Only the Qiu plus can do that.



You can give your therapist or coach access to the data in your myQiu account via their HRV scanner. This means that care can also be provided at a distance.

HRV monitoring can be carried out from the results of the biofeedback sessions and, if necessary, RSA measurement or short-term HRV can also be carried out.

Individually created questionnaires can also be integrated into the app.

Compatible BLE sensors

The heart rate is recorded by various sensors. BioSign is working flat out to expand the range of sensors. You can currently use the app with the following sensors:

	<p>Polar H7, H9, H10 ECG-precise recording of the heart rate</p>
	<p>Kyto HRM Kyto Heart Rate & HRV Sensor (Model: Kyto2935) optical ear clip sensor for pulse detection</p>
	<p>Qiu plus //@@@</p>

Compatible sensors can be found in our online shop:

<https://site.biosign.de/en-gb/shop/BioSign-HRV-App-c142285606>

You can find the Qiu plus in our online shop:

<https://site.biosign.de/shop/Qiu-myQiu-c142279158>

How can I get the app?

You can get the app from the Google Play Store or the Apple App Store.



Features of the BioSign HRV App

- HRV Biofeedback: effective breathing exercise with real-time feedback on parasympathetic activity.
- Many adjustable parameters, such as breathing rhythm, exercise duration, exercise difficulty, voice instructions, background music.
- Deep Breathing Test: 1 minute pulsed breathing to stimulate the parasympathetic nervous system, measurement of the vegetative reserve
- Short-term HRV: 5-minute resting measurement
- Individually configurable questionnaires before or after a measurement/biofeedback exercise or stand-alone

First steps after installation

To use the app, a myQiu account is required for many functions. If you already have a myQiu account (e.g. for the Qiu and the myQiu PC software) you can enter your access data directly.

To just configure the Qiu plus or to carry out a firmware update for the Qiu plus, you do not need a myQiu account.

Please note that the normal Qiu is not compatible with the app as this device does not yet have Bluetooth functionality. Only the Qiu plus can do that.

Create a myQiu account

In the menu (top right) press "Manage myQiu account" or any button that calls a function that requires myQiu access (RSA measurement, HRV measurement, HRV biofeedback, ...). Follow the instructions. You can either enter your login details if you already have a myQiu account or create a new myQiu account.

To create a new myQiu account, enter a username, password and a valid email address (with repeats) on the "LOGIN" page.

In the next step you will be asked to enter your personal information.

If you want to log in anonymously to myQiu, please proceed as follows:

Create an anonymized myQiu account

Instead of your real name, enter any name, e.g., "Eric Musterman". When entering your date of birth, you should not deviate too much, because your age will be taken into account in the analysis. We recommend a maximum deviation of ± 1 year. You only need to state your height precisely if you also want to manage your weight data and your body mass index with myQiu. You can also enter this information later.

If you confirm your information with "Save", your myQiu access will be created. You will immediately receive a verification email from the myQiu server. Open this e-mail with your e-mail program and click on the link shown to activate your myQiu access. You will then receive free full access for 7 days.

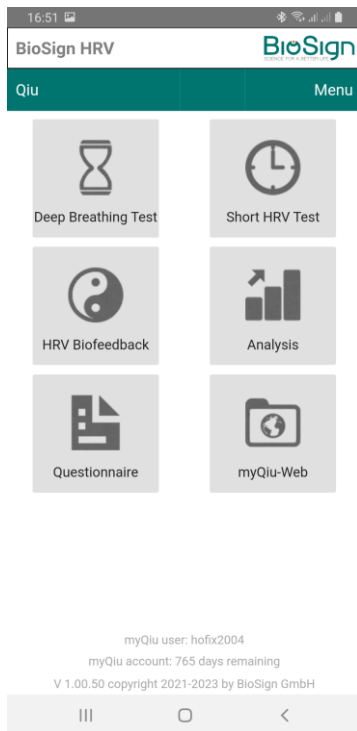
Permanently set up myQiu access

After the 7-day trial period has expired, you can continue to use myQiu by entering a license code. You can obtain a license code, for example, in our BioSign online shop (<https://site.biosign.de/en-gb/shop/myQiu-c142326951>)

Enter myQiu access data

If your myQiu access data is not yet stored in the app, the app will require you to enter the data after starting a function that requires access to myQiu. Once data has been stored, the app automatically connects to myQiu.

Overview in the main window



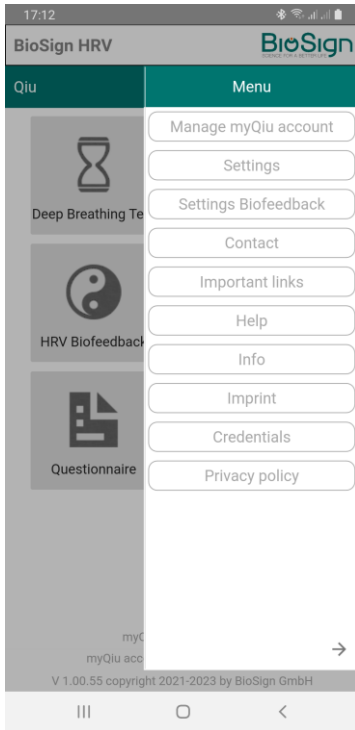
In the main window of the BioSign HRV App you will find the buttons for the most frequently used functions:

- Deep breathing test
- HRV measurement
- HRV Biofeedback
- Analysis
- Questionnaire
- myQiu Web

In the title bar you will find the menu item "Qiu" on the left and "Menu" on the right

With "Qiu" you manage the soon available "Qiu+" with Bluetooth connection to the app.

"Menu" takes you to the following functions:



- Manage myQiu account
- Settings
 - > General settings
 - Biofeedback settings
 - > All important settings for biofeedback
- Contact
 - > contact form
- Protocol
 - > Log display if log is activated remotely
- Important links
 - > Links to BioSign web pages, shop, ...
- Help
- Info
 - > About the version
- Imprint
- Credentials

HRV Biofeedback

Basics of HRV Biofeedback

From chaos to order

A variable heart rhythm is better than a rhythm that is too rigid. However, it is even better if it is possible to convert the disordered, "chaotic" heart rate variability into an ordered, "rhythmic" heart rate variability (see figure).

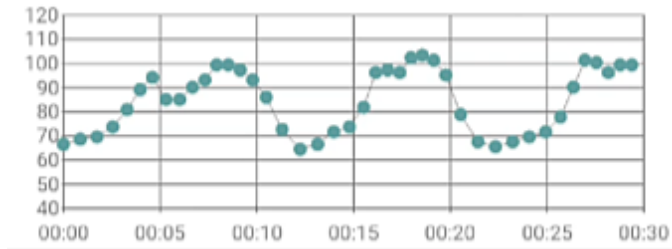


Fig.: Rhythmic heart rate – the heart rate oscillates with breathing similar to a sine wave

Rhythmization occurs when, in a state of relaxation, breathing and heartbeat are in unison (coherence). With each inhalation, the heart rate increases and with each exhalation, it decreases. If the state of rhythmization is reached, then it has been possible to activate the "internal brake", the parasympathetic nervous system. With many relaxation techniques (e. g. yoga, autogenic training) this coupling between breathing and heartbeat happens in the state of relaxation. HRV Biofeedback can now be used to train this process in a targeted manner and, above all, receives information about how well the breathing and heartbeat are rhythmic.

How do you achieve a state of coherence or rhythm?

Breathing is the key to coherence



As already mentioned, coherence is the unison of breathing and heartbeat. Correct breathing is therefore the central component of any successful HRV Biofeedback. To help with proper breathing, the BioSign HRV App has a breathing aid.

The breathing aid is located on the left side of the screen in 3D biofeedback. You will see a colored bar that moves rhythmically up and down. It is important to breathe in rhythm with the bar. Inhale as the bar goes up, exhale as the bar moves down.

With 2D biofeedback, breathing is dictated by a circle that changes in size. Breathe in as the circle gets bigger, breathe out as the circle gets smaller again.

The set respiratory rate is 6 breaths per minute. HRV Biofeedback is most effective at this breathing rate.

If the test subject cannot cope with this breathing rhythm or finds the breathing aid annoying, you can also hide it or set a different breathing rate in the biofeedback settings.

How to find out whether breathing and heartbeat are in sync (rhythmic).

The color of the circle in 2D biofeedback and the central object (balloon, butterfly, ...) in 3D biofeedback are a very important part of coherence training. We use it as feedback, so to speak, in order to keep improving the degree of rhythm. This technique is also called biofeedback. Biofeedback is a method that is used successfully in many areas of medicine to influence otherwise involuntary bodily processes. We use biofeedback within the HRV Biofeedback to activate the "inner brake" even more.

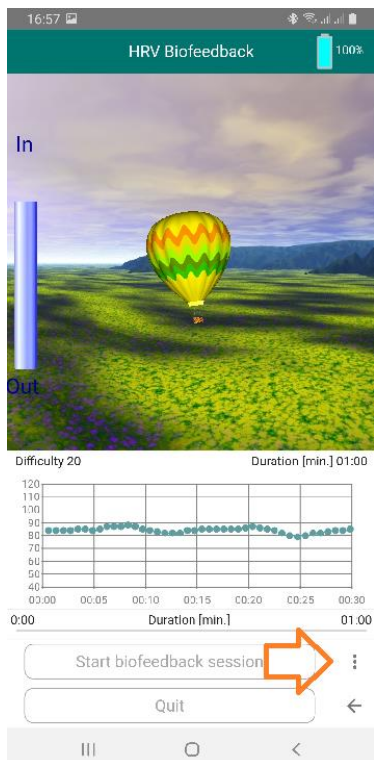
What to do if coherence is always low?

For example, is the balloon just flying off the ground, or is the circle mostly red, no matter how hard you try to breathe properly while doing the biofeedback?

First check the pulse signal. Are you sure that the pulse signal is ok?

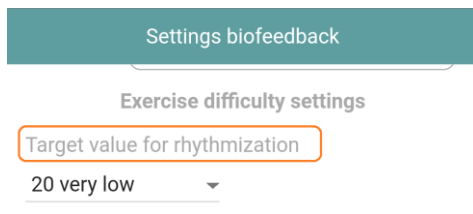
If so, please consider the following: The ability to achieve coherence varies from person to person. For example, coherence decreases with age. Likewise, high blood pressure, obesity, heart disease, chronic stress and various metabolic disorders lead to a loss of coherence. It is therefore advisable to measure the personal ability to coherence and to compare it with others. This allows you to assess whether you have a low, normal, or even high ability to coherence compared to others.

If personal coherence is low, don't let that discourage you. This is exactly the best reason to do regular HRV Biofeedback. To do this, however, you should adjust the HRV Biofeedback to the personal level in the biofeedback settings.



Click the Settings button to bring up the Biofeedback Settings window.

Scroll down to "Default Rhythmization Level".



Set the default Rhythm Level to a lower value and click OK. It should now be easier for you to get the balloon to rise or to color the circle green in 2D biofeedback. This makes biofeedback more effective.

Alternatively, you can access the biofeedback settings in the main window at the top right with "Menu".

What does the balloon in the middle of the screen mean?

The HRV Biofeedback is designed in such a way that it can be completed in a specific, preset time. The default setting is three minutes. To set a different duration, go to the Biofeedback Settings window and set a duration of your choice.

The highest possible degree of rhythmization should be maintained for the specified duration. The better this succeeds, the better the exercise is

completed in the set duration. The BioSign HRV app calculates the current degree of rhythmization and displays this using the object in the middle of the screen.

The following changes for the individual objects during biofeedback depending on the rhythm achieved:

Object	low rhythmization	high rhythmization
Balloon	Balloon sinks	Balloon goes up
Butterfly	Butterfly sinks, flutters restlessly	Butterfly goes up, smooth flying
Globe	rotates fast	Rotates less or not at all

How often and how long should you practice HRV Biofeedback?

“There is still no “scientifically verified” information on the “correct” exercise duration. From practical experience, however, one can deduce that the "right" exercise duration - i.e. the one with which there is a high probability of feeling a positive effect - varies greatly from person to person. But since you hardly know beforehand how much is good for a person or how much exercise you need, you should start with HRV Biofeedback for about three to five minutes two to three times a day. If it's good for you, you can also practice for 10 minutes two or three times a day.

Important settings in HRV Biofeedback

In addition to the settings for landscape, music, language, etc., there are a few settings that absolutely must be individually adjusted to the user. These are:

Breathing rhythm

Set the breathing pattern so that you find breathing relaxing. People with stress problems often have rapid and shallow breathing. Here it is of little

help to press yourself immediately into a very slow breathing. The frequency of breathing should be gradually adjusted. Aim for breathing around 6/min.

Exercise duration

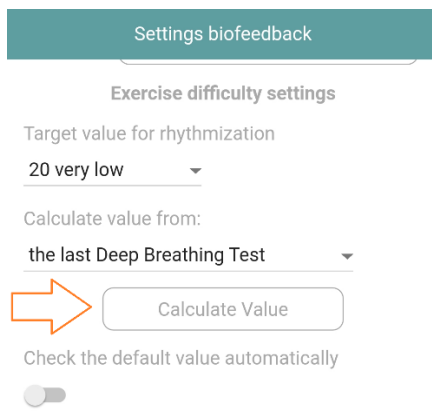
We recommend 3-5 minutes to start with. Preferably 2 or 3 emails a day. The duration can be increased over time (possibly also by reducing the daily exercise frequency).

Default level of rhythmization (degree of difficulty of the exercise)

It is important to set the HRV Biofeedback for you in such a way that there is good dynamics in the reproduction of the current coherence (balloon rises and falls, circle is green and red, ...). It does you little good if, for example, the circle is constantly red, no matter how hard you try to breathe calmly and relax mentally. Likewise, e.g. a circle that is always green, regardless of whether you breathe well or badly, is pointless.

Therefore, the difficulty of the exercise must be adjusted to the individual HRV. The best way to do this is to use the results from the measurements (Short-Term HRV and Deep Breathing Test). Those with poor scores should be set to a low difficulty level.

When setting the default value, you will find a function in the biofeedback settings to calculate the suggested default value from the last Deep Breathing Test(s).






Here, a value is calculated and suggested from the last or the last Deep Breathing Tests. You can also have the set value for the default value checked automatically before each biofeedback.

The biofeedback settings in detail

see also “Important settings in HRV Biofeedback”

	<p>Choose between 2D rendering (circle) or 3D rendering (balloon, butterfly, globe)</p>
	<p>3D Rendering</p> <p>Object selection (balloon, butterfly, globe)</p> <p>Hide heart rate graph when biofeedback is started</p>

<p>Settings biofeedback</p> <p>View</p> <p>3D RENDERING 2D RENDERING</p> <p>Biofeedback color scheme</p> <p>STANDARD ENHANCED</p> <p>Color high coherence  <input type="text" value="select"/></p> <p>Color middle coherence  <input type="text" value="select"/></p> <p> <input type="text" value="select"/></p>	<p>2D Rendering</p> <p>Biofeedback circle color scheme</p> <p>Extended (Individual)</p> <p>Create your own color scheme</p>
<p>Settings respiration</p> <p>Respiration aid <input checked="" type="checkbox"/></p> <p>STANDARD ENHANCED</p> <p>Respiration rate 6 Breaths per minute</p> <p>Inhale/Exhale 50/50</p>	<p>Settings breathing</p> <p>Show/do not show breathing aid</p> <p>Standard (simple breathing)</p> <p>Respiratory rate (4/5/6/7/8/9 breaths per minute)</p> <p>Temporal relationship between inhalation and exhalation</p>
<p>Settings respiration</p> <p>Respiration aid <input checked="" type="checkbox"/></p> <p>STANDARD ENHANCED</p> <p>Time Inhale Pause Inhale</p> <p>< 5000 > < 0 ></p> <p>Time Exhale Pause Exnhale</p> <p>< 5000 > < 0 ></p> <p>resulting respiratory rate 6,0/min.</p>	<p>settings breathing</p> <p>Show/do not show breathing aid</p> <p>Advanced (Individual Breathing)</p> <p>Duration of inhalation / pause after inhalation</p> <p>Duration of exhalation / pause after exhalation (milliseconds)</p>

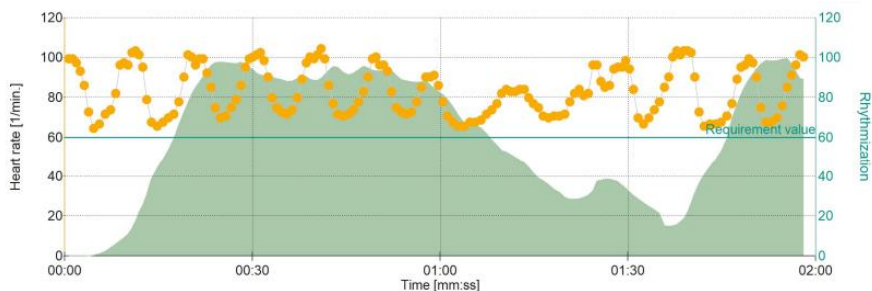
	<p>Calculation of the respiratory rate resulting from the settings (We recommend a breathing rate between 5 and 8 breaths per minute)</p>
<p>Exercise duration settings</p> <p>Exercise duration [min.]</p> <p>1 Minute ▾</p> <p>Show remaining time</p> <p><input checked="" type="checkbox"/></p>	<p>Setting the exercise duration</p> <p>1/2/3/5/10/15/20 minutes</p> <p>In the 2D biofeedback, show the remaining duration in the circle</p>
<p>Background pic</p> <p>Use own background pic</p> <p><input checked="" type="checkbox"/></p> <p>Select Pic</p>	<p>Background image (only 2D display!)</p> <p>Select and display your own background image</p>
<p>Exercise difficulty settings</p> <p>Target value for rhythmization</p> <p>20 very low ▾</p> <p>Calculate value from:</p> <p>the last Deep Breathing Test ▾</p> <p>Calculate Value</p> <p>Check the default value automatically</p> <p><input type="checkbox"/></p>	<p>Setting the difficulty of the exercise</p> <p>Default value (10-120)</p> <p>Calculate target value from the last Deep Breathing Test(s).</p> <p>Check default value automatically</p>
<p>Settings audio</p> <p>Speech output</p> <p><input checked="" type="checkbox"/></p> <p>Language</p> <p>German ▾</p> <p>Speaker</p> <p>Speaker male ▾</p> <p>Background music</p> <p><input type="checkbox"/></p> <p>MP3 filename</p> <p>Morning.mp3 🔍</p> <p>Background music volume</p> <p>Volume speaker</p>	<p>Audio settings</p> <p>Activate/deactivate speech output</p> <p>Select language (D/EN/F/I/ES/NL)</p> <p>Narrator/speaker/child-friendly</p> <p>Enable/disable background music</p> <p>Select background music</p>

	<p>Background music volume</p> <p>Speaker volume</p>
<p style="text-align: center;">Diagram DBT</p> <p>Timebase [sec.]</p> <p style="text-align: center;">< 30 ></p> <hr/> <p>HR min. HR max.</p> <p style="text-align: center;">< 40 > < 120 ></p> <hr/> <p style="text-align: center; border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 0 auto;">Reset values</p>	<p>Heart rate chart</p> <p>Time base</p> <p>HR min. HR max.</p> <p>Reset values to default</p>

Analysis of an HRV Biofeedback exercise

Heart rate/rhythmization diagram

In the heart rate/rhythmization diagram you can see:



The green line represents the set default value (difficulty) of the exercise. The default value expresses the target value of the exercise. Once it has been reached, the balloon flies at the top of the screen in 3D biofeedback, for example, or the circle is maximum green in 2D biofeedback.

The yellow dots connected by a gray line represent the heart rate curve

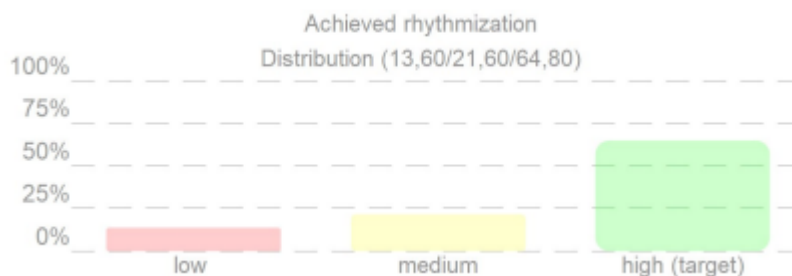
In the diagram above it is easy to see how the heart rate oscillates with the breathing during the biofeedback exercise. A large oscillation amplitude is a sign of high parasympathetic activity

The green mountain represents the achieved rhythm/parasympathetic activity

This makes it easy to follow how breathing and mental attitude affected the parasympathetic nervous system during biofeedback. The envelope of the green mountain also corresponds, for example, to the trajectory of the balloon or the coloring of the circle in 2D biofeedback. If the curve reaches the default value, the balloon has already arrived at the top edge of the screen, or the circle is at most green. In the example above it is easy to see that the default value was set too low. As a result, the movements that were above the default value were not visualized in biofeedback and the training was not optimal in these areas. The default value should be set higher (e. g. to 100) for the next exercise.

Chart Time Shares

This graph gives you information about how long you were in the low, medium, and high rhythm zones during the biofeedback exercise.



A green bar over 50% indicates that you were in the highly rhythmic zone for more than half the time of the biofeedback. This is a good value.

The BioSign HRV concept: "Tone, Flexibility, Dynamics"

The concept "tone, flexibility, dynamics" is intended to help bring order to what at first glance appears to be a somewhat chaotic juxtaposition of the many HRV parameters. It also facilitates the evaluation and interpretation and thus helps to better understand HRV measurements.

If you are dealing with a large number of variables which, taken as a whole, convey a fairly confusing picture, it makes sense to reduce the large number of variables to just a few, which, if possible, represent the central components of the data set - in our example heart rate variability – depict.

Data reduction to the essentials

We have found that the many HRV parameters boil down to three main factors.

Incidentally, for each of these main components "**tonus, flexibility and dynamics**" clinical studies have shown that an unfavorable change is associated with a significant increase in mortality. For example, mortality increases three-fold when the resting heart rate is > 90 beats per minute

compared to a resting heart rate < 60 beats per minute. Each of these factors "tone, flexibility and dynamics" therefore contains clinically relevant information that should not be missing from any HRV analysis.

So there are essentially three questions that we ask in an HRV analysis:

- What is the **tone** of the heart rate curve?
- What is the **flexibility** of the heart rate curve?
- And what is the **dynamics** of the heart rate curve?

Age plays a big role

In order to come to an overall assessment of the HRV, we still have to take into account when assessing the individual main components of flexibility, dynamics and tone that the respective age largely determines the performance of our neurovegetative regulation. With increasing age, the performance of the autonomic nervous system decreases. We lose approximately 1 to 1 1/2% per year of the original level of performance we had when we were young, with each major component being affected differently by the aging process. The heart rate decreases slightly with age, so the heart beats a little slower, which is basically positive, whereas flexibility and dynamics are significantly lower in old age than in younger years. The respective 30 measurement results for flexibility and dynamics must therefore be age-corrected, which the HRV scanner does automatically for you.

Comparability with values of other people of the same age

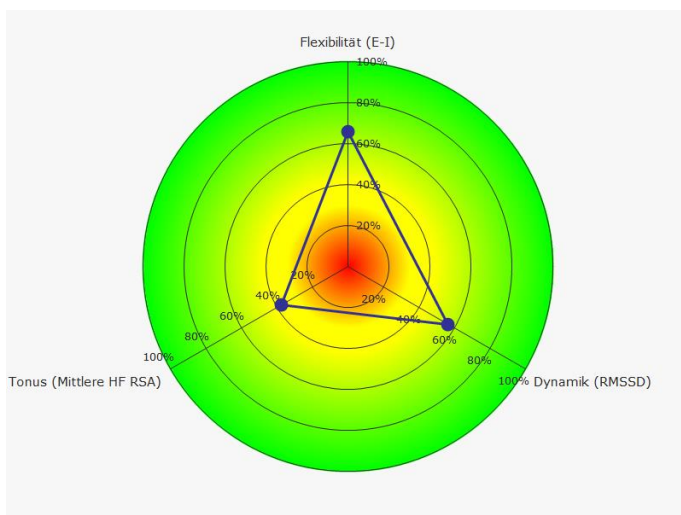
In the end, of course, you want to know whether the measurement result shows good flexibility or, for example, the dynamics are insufficient. However, this is not readily apparent from the mere numerical values of the HRV parameters. The BioSign HRV app therefore translates the results of the HRV calculations into rank values between 0 and 100%. These rankings indicate how many out of 100 healthy people of the same age have poorer HRV. For example, a percentage rank of 10% for flexibility means that only 10 out of 100 healthy people have worse flexibility and the vast majority of 90% have a better score. The dynamics are analogous. When it comes to

tone, a 10% result means that only 10 out of 100 healthy and physically fit people have an even higher heart rate and 90% have a slower heart rate. We remember that a high parasympathetic tone is characterized by a low heart rate.

In summary, the **"Tone, Flexibility and Dynamics"** concept allows for a meaningful structuring of the HRV parameters, taking into account all the important main components of the HRV. With the concept, the focus is on the essentials, the superfluous is left out and no longer obscures the view of possibly important changes in neurovegetative regulation. The concept of flexibility, dynamics and tone can also be communicated and explained to the measured persons very well and with comparatively little effort. This makes HRV measurement more efficient.

Understand the rank diagram

Rank diagrams depict the most important measured values of the HRV analysis on a rank scale from 0 to 100%.



With the help of this scale we can evaluate the measurement result and make a statement about whether it is a bad result (0%) or a good result (100%).

From metric to rank value

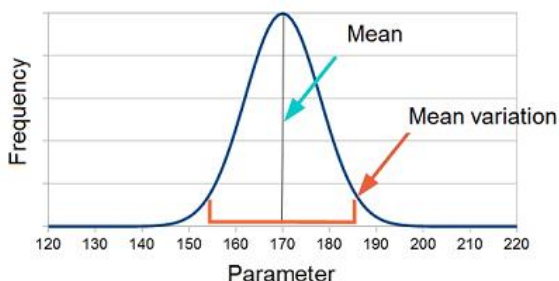
To do this, however, it is necessary to convert the individual HRV measurement values to the corresponding rank value.

To understand how the BioSign HRV App does this, let's look at the following example:

In a group of people, we measure height and, as might be expected, find that most people are of different heights.



If we plot how often individual body sizes occur in a graph, we get the associated distribution curve.

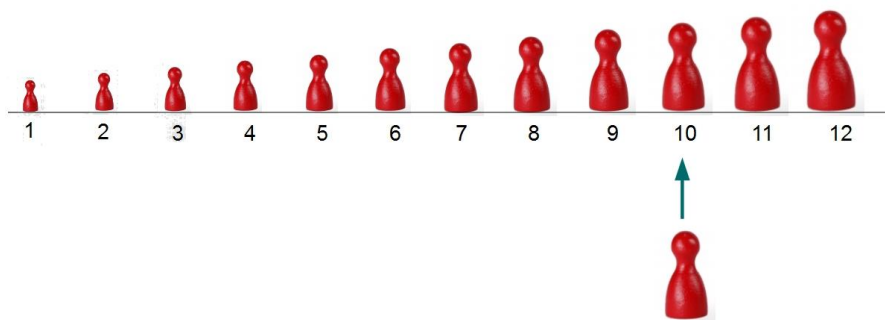


A well-known example of a distribution curve is the Gaussian distribution. We can now see the mean value and the scatter range from the distribution

curve. We can see right away that measured values occur less often the further they are from the mean. Now, to determine the rank of a single metric, we rank the individual metrics by size.

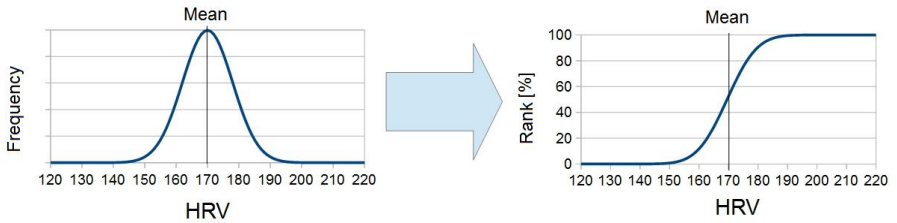


We then get the rank of each individual measured value in percent by determining the rank of the measured value in the first step, i.e., at which point in our size-sorted sample the measured value is classified.

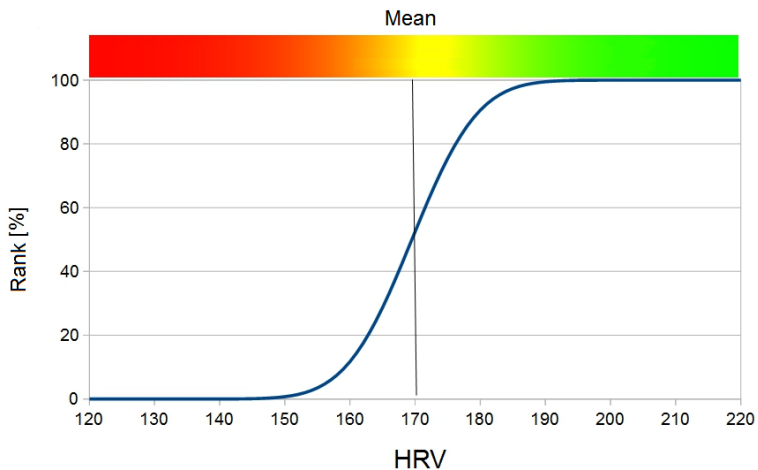


If we divide this rank number of our metric by the total number of metrics and multiply by 100, we get the percentage rank of the metric.

In the BioSign HRV App, the associated distribution function is now stored for each standard parameter, so that the associated percentage rank can be calculated for any measured value.



For better illustration, the percentage area of the BioSign HRV App is colored according to the traffic light principle, so that it is clear at a glance whether the respective result is a good or bad result.



50% of people are in the rank range between 25 and 75 percent. It is important to understand that 50% of people are in the 25 to 75 percent range, which is the range for what is normal but still tells us whether we are above or below the median for our age group.

Deep Breathing Test

The Deep Breathing Test is a standard test of HRV measurement. The aim of the measurement is to record the maximum available parasympathetic regulatory capacity (reserve) under deep and slow breathing.

The Deep Breathing Test (determination of respiratory sinus arrhythmia) reliably determines the current adaptability of our internal control and monitoring system using a neurophysiological test procedure that has been proven in medicine for four decades. Regular measurement supports the identification of health risks, acute mental and physical stress and gives positive feedback on successful lifestyle changes.

The characteristics "Flexibility", "Tone" and "Dynamics" describe the three components of your parasympathetic ("internal brake").

Prepare measurement:

As with any HRV measurement, the Deep Breathing Test also requires careful preparation. If possible, all factors that could have an influence on the neurovegetative balance should be avoided or at least taken into account in the analysis.

These include e.g.:

- Coffee or nicotine shortly before the measurement
- current inflammatory diseases (infections, injuries)
- heavy physical (sport) and mental (stress) exertion in the last few days

The Deep Breathing Test should be performed while seated. The Deep Breathing Test is a function test, i.e. it must be actively processed. The decisive factor is the maximum deep inhalation and exhalation according to the specifications of the breathing circuit. Breathing should be practiced before starting the measurement. The measurement should only be started once the respiratory rhythm has been found. The shift in blood volume caused by breathing forces the body to regulate. The result of the measurement shows us how well the autonomic nervous system is able to do this.

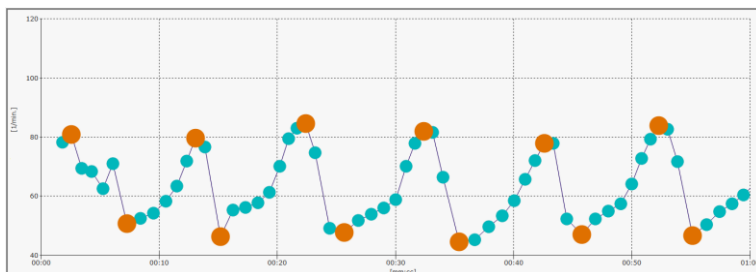
Perform measurement

During the Deep Breathing Test, make sure that you breathe deeply and evenly.

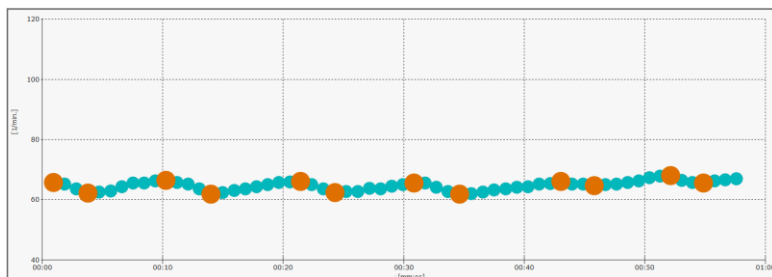
Analysis

The course of the heart rate should show a constant respiration-dependent up and down during the Deep Breathing Test.

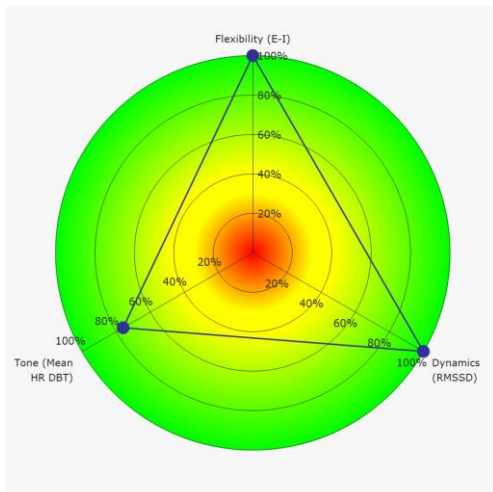
The image below shows a typical course of the heart rate during a Deep Breathing Test of a healthy subject.



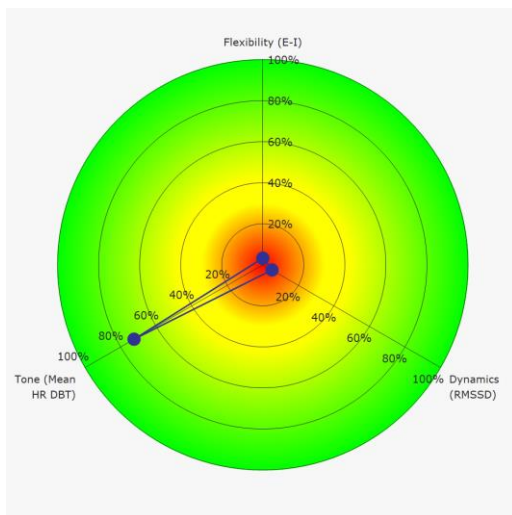
The image below shows a typical course of the heart rate during a Deep Breathing Test of a subject with significantly limited heart rate variability.



A typical result for a healthy subject might look like this:



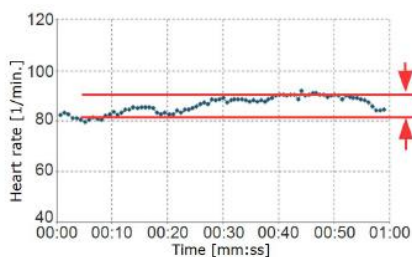
The following images show a result of a test subject with limited regulatory ability:



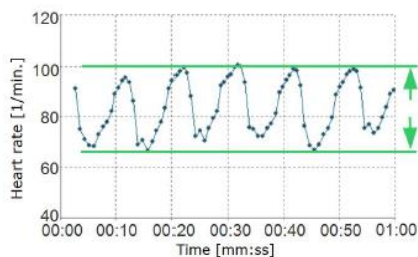
Target parameters of the Deep Breathing Test

Flexibility

"Survival of the fittest". This often-misunderstood phrase in the context of Darwinian evolutionary theory literally means "survival of the fittest". This adaptability, which is necessary for survival, is an absolute must at the level of body regulation and is guaranteed by a well-functioning heart-brain axis. A high flexibility value reflects a good adaptability of our cardiovascular system. On the other hand, permanently low flexibility values are an expression of a lack of adaptability. For example, a low flexibility value is a prognostically unfavorable sign after a heart attack*.



Example of very low flexibility (heart rate oscillation no longer present)



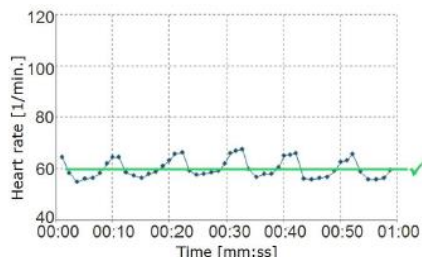
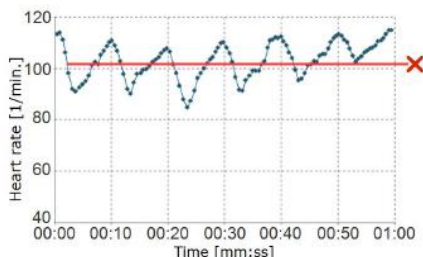
Example of high flexibility (large amplitude of heart rate oscillation present)

*A simple bedside test of 1-minute heart rate variability during deep breathing as a prognostic index after myocardial infarction. Katz A, Liberty IF, Porath A, Ovsyshcher I, Prystowsky EN. *Am Heart J.* 1999 Jul;138(1 Pt 1):32-8.

Tone

At rest, our body's own braking and regeneration system (parasympathetic) is the active part of our heart-brain axis. Only an efficient parasympathetic system can optimally control bodily processes and enable our vital adaptability. A good basic parasympathetic tone is expressed in a lower heart rate. For example, people with a heart rate > 90/min have more than three times the risk of death than people with a heart rate < 60/min*.

Example of low parasympathetic tone (high mean heart rate) Example of high parasympathetic tone (low mean heart rate)



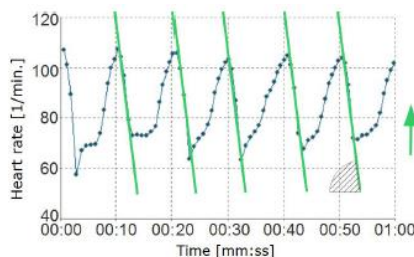
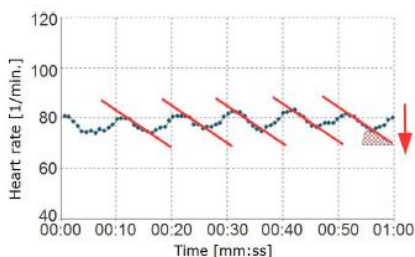
Example of low parasympathetic tone (high mean heart rate)

Example of high parasympathetic tone (low mean heart rate)

*HABIB, G.B. 1999. Reappraisal of heart rate as a risk factor in the general population. Eur. Heart J. Suppl. 1: H2-H10.

Dynamics

An essential feature of an efficient heart-brain axis is the speed at which information is processed and the body is regulated. Comparable to the brake test in a car, the faster the system comes to a "standstill", the more powerful the built-in brake is.



Example of a heart-brain axis that only has low dynamics. The heart rate changes only slightly from heartbeat to heartbeat.

Example of good dynamics. The heart rate changes very much when you exhale (drops in heart rate).

HRV measurement

The Short-Term HRV measurement is a proven and clinically tested test for assessing heart rate variability at rest.

Prepare measurement:

As with any HRV measurement, determining Short-Term HRV requires careful preparation. If possible, all factors that could have an influence on the neurovegetative balance should be excluded or at least taken into account in the analysis.

These include e.g.:

- Coffee or nicotine shortly before the measurement
- current inflammatory diseases (infections, injuries)
- heavy physical exertion (sport) or mental stress (stress) in the last few days

The Short-Term HRV measurement should ideally be carried out lying down or sitting (if possible, with legs raised).

Before the measurement begins, you should be in the final lying or sitting position for a few minutes so that a vegetative state of rest can set in.

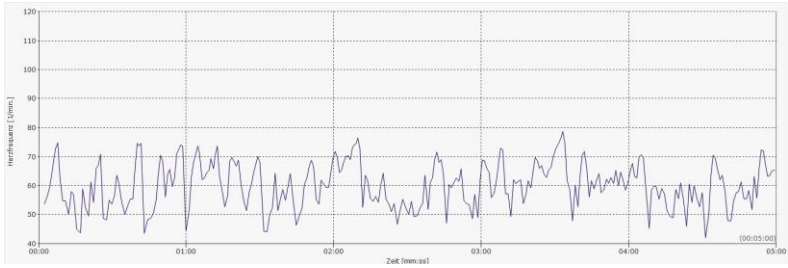
Perform measurement

During the short-term measurement, make sure that you are lying still and breathing normally.

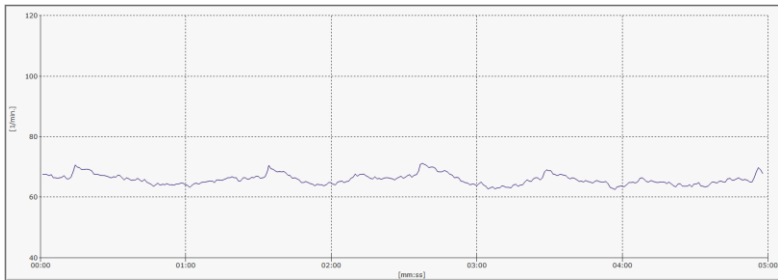
Analysis

The heart rate curve should show a steady up and down during the short-term HRV, where the heart rate should be in the normal range (60-80 bpm).

The image below shows a typical course of the heart rate during a Short-Term HRV measurement of a healthy subject.

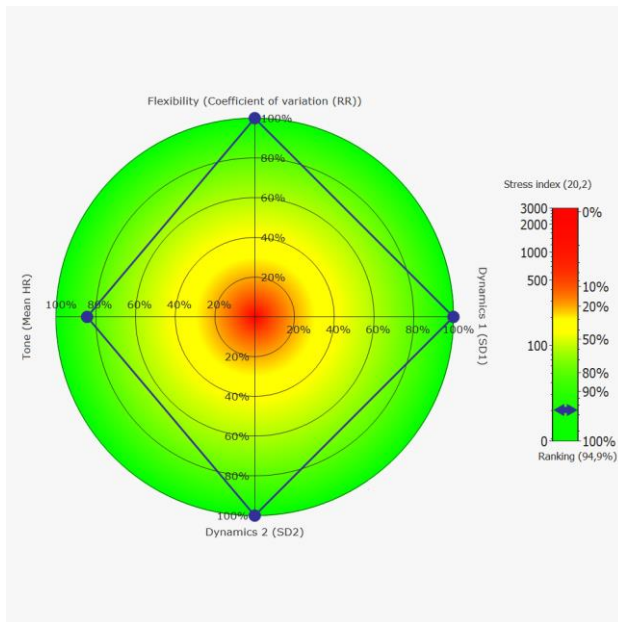


The image below shows a typical course of the heart rate during a Short-Term HRV measurement of a subject with significantly limited heart rate variability.

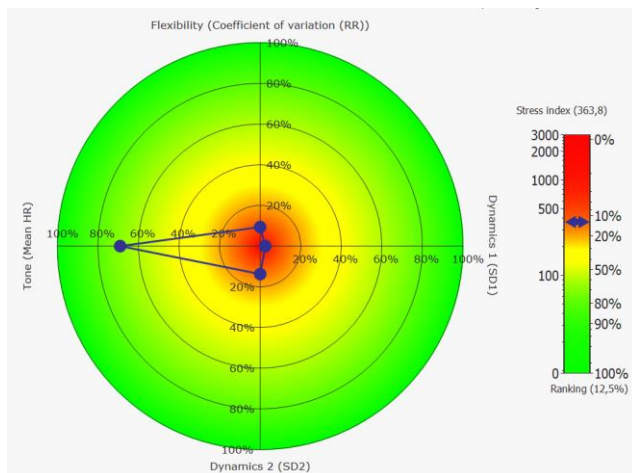


Standard values are stored for the most important parameters of the short-term HRV. This enables the current measurement results to be compared with the results of healthy people of the same age.

A typical result for a healthy subject might look like this:



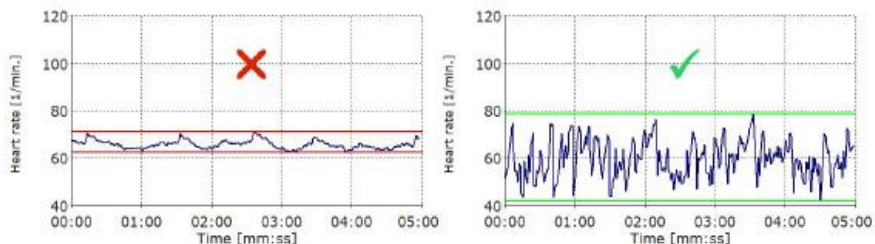
The following picture shows a result of a test person with limited ability to regulate.



Target parameters in the rank diagram of the Short-Term HRV measurement

Flexibility (coefficient of variation RR)

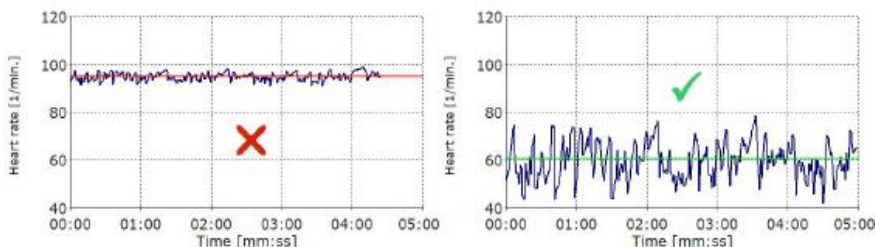
Adequate adaptability is vital and is ensured by a well-functioning internal brake (parasympathetic nervous system).



A high flexibility value reflects a good adaptability of the cardiovascular system. Permanently low flexibility values are an expression of a weakness in the parasympathetic nervous system and can impair health. Acute events such as infections, stress and strain can temporarily reduce flexibility.

Tone (mean HR)

Only an efficient parasympathetic system can optimally control bodily processes and enable our vital adaptability.

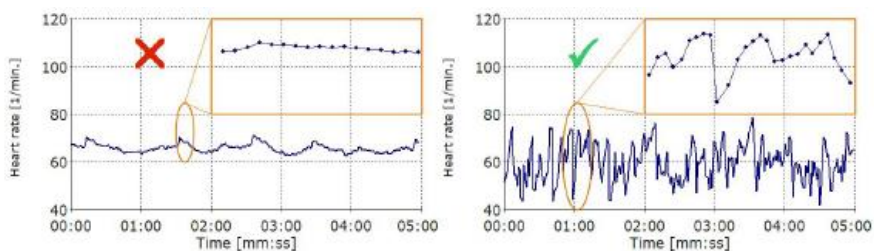


A good basic parasympathetic tone is expressed in a lower heart rate. For example, people with a heart rate > 90/min have a significantly higher health risk than people with a heart rate < 60/min.

(HABIB, G.B. 1999. Reappraisal of heart rate as a risk factor in the general population. Eur. Heart J. Suppl. 1: H2–H10.)

Dynamic 1 (SD1)

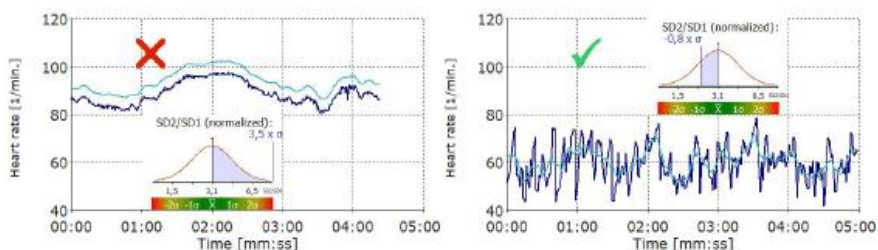
Rapid changes in heart rate at rest are an expression of a well-functioning "internal brake".



They are a sign of fast information processing and good adaptability.

Dynamic 2 (SD2)

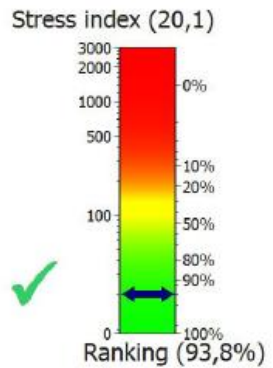
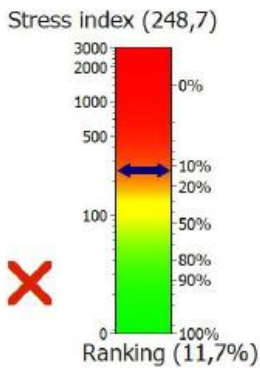
In addition to the rapid changes in heart rate (see Dynamic 1), slow changes in heart rate also occur.



These changes result from both the activity of the "accelerator" (sympathetic) and the "brake" (parasympathetic, vagus nerve). Your appearance is therefore initially neither good nor bad. However, slow and fast changes in heart rate are usually in a "healthy" relationship (SD2/SD1 quotient). If the slow dynamics (SD2) predominate, the influence of the parasympathetic nervous system is too small for optimal regulation. An imbalance between the sympathetic and parasympathetic nervous system cannot be ruled out in this case.

Stress index

The stress index is particularly sensitive to the unfavorable combination of low heart rate variability and a high heart rate.



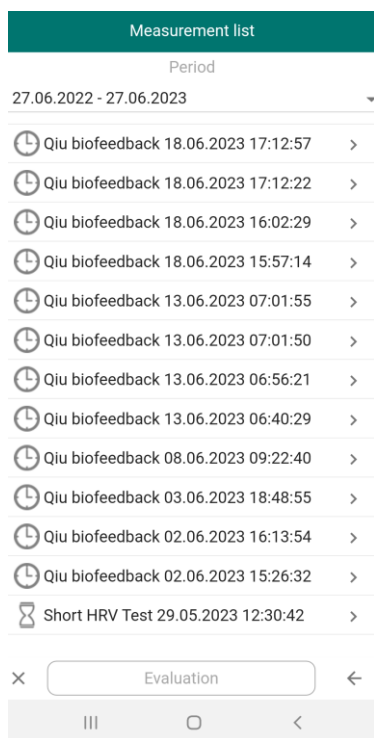
It correlates significantly with recognized risk scores such as the PROCAM score. Very high stress index values at rest can indicate an increased cardiovascular risk.

Analysis

The analysis of the measurements and the HRV Biofeedback are carried out via the myQiu server. For this purpose, the measurement data is loaded into your myQiu account, evaluated there and you receive either a report as a PDF or a display in the app.

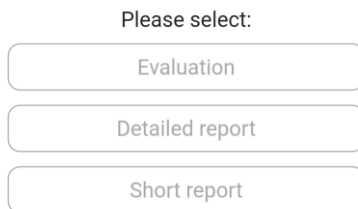
List of all measurements

The list shows all measurements that are in your myQiu account. In the upper area you can select the period from which measurements are listed.

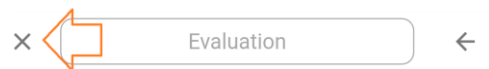


Mark the desired measurement and press "Evaluate" or press the arrow on the right for the desired measurement.

The selection window for the requested display of the analysis then appears:



You can also delete measurements from your myQiu account inventory here. Highlight the desired measurement and press X at the bottom left:



The analysis is carried out either as a PDF report or as a display within the app.

The details of the analysis can be found in this help in the explanation of the individual measurement types.

myQiu-Web

Here you come to myQiu-Web. You can find more information in the myQiu Web documentation.

<https://www.biosign.de/myQiu-Web/Dokumentation%20myQiuWeb%20EN.pdf>

Questionnaire

In the BioSign HRV app there are individual questionnaires from your therapist. There are questionnaires that are displayed before or after a measurement or HRV Biofeedback and there are so-called stand-alone questionnaires that can be carried out independently of a measurement or biofeedback.

More features

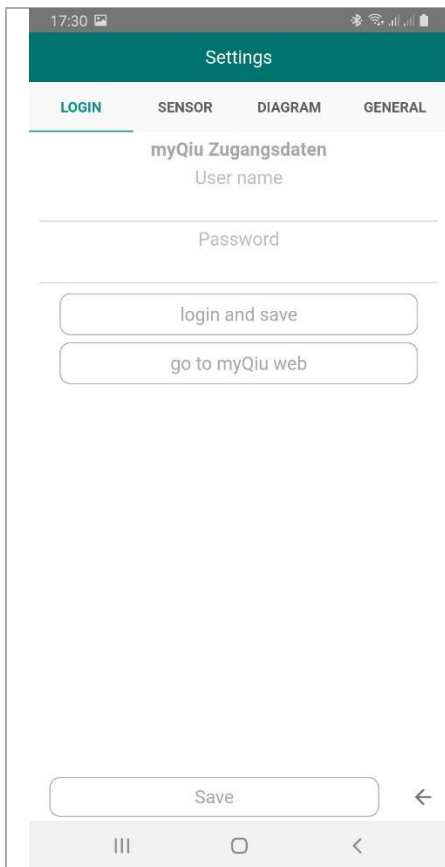
In the right menu of the main window, you will find a few more features. Activate the menu by pressing "Menu" in the upper right corner of the main window.

Settings

The Settings window contains several tabs

LOGIN

Information about your myQiu account

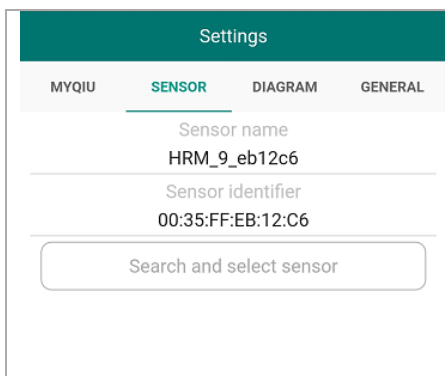


A myQiu account is required to use the app. If you already have a myQiu account (e.g., for the Qiu and the myQiu PC software), you can enter your access data directly.

If your myQiu access data is not yet stored in the app, the app will ask you to enter the data in the settings after it has started. If data is stored, the app automatically connects to myQiu. You will then see the information from your myQiu account.

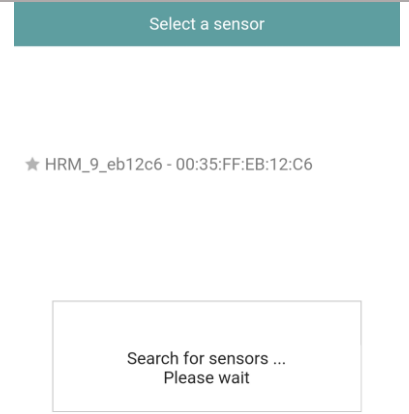
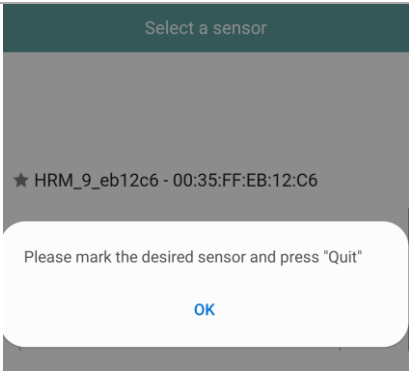
The "Go to myQiu-Web" button takes you to the browser-based management of your myQiu account.

Sensor

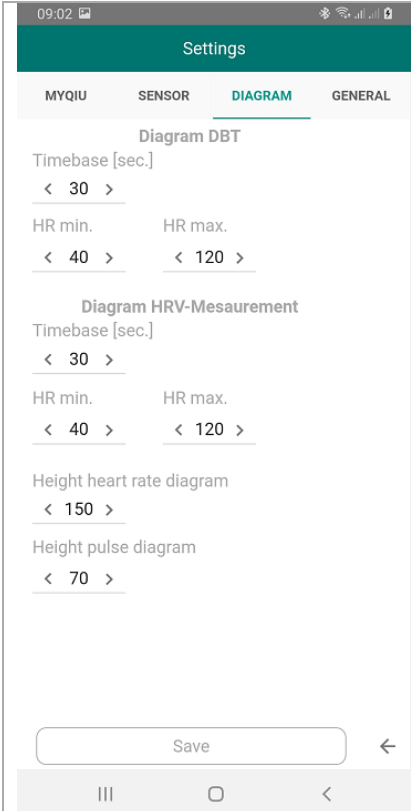


Here you can see which sensor is currently registered in the app. When starting a measurement or HRV Biofeedback, the app automatically connects to the sensor specified here.

If no sensor has been entered yet, you can search for a sensor here. If the entered sensor is not found when starting a measurement, you

	<p>will be automatically directed to the search window.</p>
 <p>The screenshot shows a screen titled "Select a sensor" with a teal header. Below the header, a star icon is followed by the text "HRM_9_eb12c6 - 00:35:FF:EB:12:C6". At the bottom, a white dialog box with a thin border contains the text "Search for sensors ..." and "Please wait" below it.</p>	<p>Sensors found and compatible with the app are displayed.</p>
 <p>The screenshot shows the same "Select a sensor" screen as above. A white dialog box with rounded corners is overlaid on the screen. It contains the text "Please mark the desired sensor and press 'Quit'" and a blue "OK" button at the bottom.</p>	<p>Please mark the desired sensor and press "Save".</p>

Diagrams



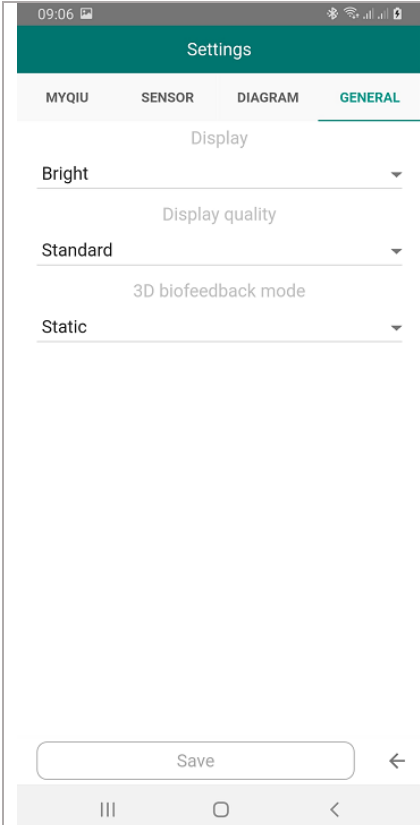
The screenshot shows the 'Settings' application with the 'DIAGRAM' tab selected. The settings are organized into sections:

- Diagram DBT**
 - Timebase [sec.]: < 30 >
 - HR min.: < 40 >
 - HR max.: < 120 >
- Diagram HRV-Mesaurement**
 - Timebase [sec.]: < 30 >
 - HR min.: < 40 >
 - HR max.: < 120 >
- Height heart rate diagram: < 150 >
- Height pulse diagram: < 70 >

At the bottom of the settings screen, there is a 'Save' button and a back arrow. The Android navigation bar is visible at the very bottom.

Here you can make settings for the appearance of the diagrams in HRV measurements.

General settings

	<p>General settings for the appearance and behavior of the app</p> <p>Display: light/dark (on iOS automatic adaptation to the scheme set there)</p> <p>display quality of the graphics</p> <p>3D biofeedback mode</p>
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Contact

Here you can send us a message.

Important links

Shows you important links to other websites of BioSign GmbH

Protocol

The BioSign HRV App has a built-in log function that can be used in case of technical problems. For this purpose, a logging function can be activated remotely for each individual user. The app then logs the internal process and the log can be viewed in this window and e.g., sent to us by email.

[Help](#)

Help on the app

[Info](#)

About the current and previous versions of the app

[Imprint](#)

Information on the manufacturer required by law

[Credentials](#)

Credentials for media used