Checking health of me and my family and customers, for the happiness of life!

Accumulated stress measurement / Mind-body relaxation
Providing analysis data for accumulated stress or heart rate
Inducing mind-body relaxation through analysis of the autonomic nervous system

Vascular age measurement
Measuring vascular health age type and vascular compliance

Measured data DB management
Providing a graph showing the tendency of changes for previous test results
Do you know?

- That 70% of patients visiting first medical care have diseases due to stress?
- That cardiovascular diseases are the number one and two mortality in the country and overseas?
- That the ‘vascular age is forties’ in obese children?
- That stress/vascular age can be improved by health management?

Are you free from chronic diseases?

With one finger! Check your health in advance!
What is vascular age/accumulated stress self-measurement system?

It is a service that self-checks the health status related to accumulated stress and vascular age with a self-measurement software and a portable self-measurement apparatus regardless of places such as at home or at the office.
Vascular age / accumulated stress self-measurement system screen

When the vascular age/accumulated stress self-measurement system is turned on, the following screens are appeared and then the self-measurement starts.

Measurement Main screen & measuring time

Accumulated stress measurement
Self measurement for accumulated stress. The measurement takes 5 minutes and vascular age is also measured during the first 1 minute. During the 5 minutes of measurement, related contents and information are appeared on the screen every 30 seconds.

Vascular age measurement
Self measurement for vascular health age. The measurement takes 1 minute, and checks for vascular health age type and vascular compliance.

Mind-body relaxation measurement
Monitor the autonomic nervous system and induce mind-body relaxation

User management
Registration management for individual user

Test history management
Database management of measurement results for individual user and analysis of changes in test results
uBioNet Service
(vascular age/accumulated stress self-measurement system)

It is a service that self-checks the health status related to stress and vascular state, which can be checked at the hospital or health center, with a portable self-measurement apparatus regardless of places such as at home or at the office.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anybody who is interested in health</td>
<td>At home, at the office, anywhere</td>
<td>Health contents such as: Vascular age stress Mind-body relaxation</td>
<td>uBioClip V70 Portable self-measurement system connected to a computer or a notebook</td>
<td>Self-test on your own</td>
<td>Health management service Test and analysis, and contents service</td>
</tr>
</tbody>
</table>

How is it measured?
If it is installed using a CD, then click the uBioClip V70 icon on the background screen, or connect to www.ubionet.com and take a measurement online.

What kind of services are provided?

- Measures average pulse rate
- Provides real-time graph of heart rate
- Provides analysis data for heart rate
  - frequency domain analysis
  - time domain analysis
  - autonomic nerve balance
  - heart rate distribution
- Provides the degree of accumulated stress (stress index)
- Monitors the autonomic nervous system and induces mind-body relaxation
- Measures vascular health age
- Provides DB or measured data and graphs of changes from previous test results
Why preliminary checks for stress and vascular age are needed?

Do you know cardiovascular disease, the No. 2 mortality?

According to the 2006 statistics on the mortality of Korean people by the National Statistics Office, the first was cancer (27.6%), the second was cerebrovascular disease (12%), and the third was heart disease (8.8%). Except cancer, it is possible to live a long life if the brain and heart vessels are strong and healthy.

In case of cancer, its causes are not clear and preventive measures such as stop smoking, exercise, health check-up, and proper dietary lifestyle are generally recommended. But cerebrovascular and cardiovascular diseases are different. Because the causes or risk factors of such diseases are mostly known including hypertension, diabetes, hyperlipidemia, obesity, and smoking.

Thus, most of cerebrovascular and cardiovascular diseases are prevented or managed to avoid the fatality caused by these diseases.

Accumulated stress is caused by abnormalities of the autonomic nervous system.

The diseases due to stress are common in our society and about 70% of the visit to the first medical service, but not widely known as the disease developed from the abnormalities of the autonomic nervous system. The most used word of foreign origin in our country is ‘stress’. Also, the top 3 causes of mortality are cancer, cerebrovascular disease, and cardiovascular disease, 70% of which are caused by stress according to the analysis. Modern people live under lots of stress everyday, and sometimes stressful life is taken for granted. Stress is eating into yourself and slowly destructs your mind and body. It is like invisible air that we breathe everyday, and often remains neglected without recognizing its significance.

Reliability of uBio’s uBioClip V70

In 1996, the European Society of Cardiology and the North American Society of Pacing and Electrophysiology presented a guideline on the standards and interpretation of Heart Rate Variability (HRV), and currently, most medical devices related to heart rate analysis follow this standard. Stress measurement and HRV analysis using uBioClip v70 are based on this standard.
Vascular age/accumulated stress self-measurement system test method

Cautions in use

If test results of vascular health age are changed too much, then check the following items and refer it to the test and health management.

**In cases due to wrong position during the test**
- Position of a finger
- When a finger is cold
- When nails are deeply manicured
- When the body is moved or positioned wrong during the test
- When talking too much during the test
- When yawning or deep-breathing during the test

**In cases due to lifestyle changes**
- When drinking alcohol or stop drinking
- When smoking or stop smoking
- When taking meditation or rest
- Continuous exercise
- Changes in foods and dietary habits
- When a disease is developed or taking medications for improving blood vessels or circulation
- When taking a test just before or after the meal

Check the test position again, and re-test for accurate results.

Stress test method

Test the pulse rate following the heart rate by detecting the changes in the amount of absorbed light of hemoglobin in the blood by transmitting light on the tip of a finger through a photosensor, and then test the degree of stress for 5 minutes by heart rate variability continuously recorded in this way.

Analytical studies on heart rate variability were performed in 1996 by a Task-Force team made of the members of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, and the standard guideline was made for interpretation of HRV.

The condition of autonomic nerve system can be obtained through time domain analysis and frequency domain analysis of heart rate variability by the standard guidelines, and the stress status is measured through such condition.

Analysis method

- HRV analysis is performed by both time domain analysis and frequency domain analysis.
- Time domain analysis is a simple method for statistical analysis of heart rate variability by continuously testing heart rate intervals to obtain values such as SDNN, SDNN index, RMSSD, HRV index, and mean HRV.
- Frequency domain analysis is a method analyzing the degree of heart rate variability by frequencies to obtain TP, VLF, LF, and HF values. The interrelationship of sympathetic nerve system and parasympathetic nerve system (ANS: autonomic nerve system) for the heart can be obtained through frequency analysis.
Stress test procedures

- Connect a portable uBioClip to a computer USB.
- Press 'Stress Test & Analysis' on the main menu and the test screen will be popped up.
- Insert your finger in the uBioClip and press the 'Start' button to test the accumulated stress status.

What is vascular health age type?

In general, the vascular compliance of human body is increased as the age decreases. This product estimates the degree of vascular compliance and assesses the vascular health age type by inducing and analyzing a waveform such as 'accelerated plethysmograph' from measured data of the slight volume changes of capillaries at the tip of a finger during the heartbeat.

Vascular health age types are divided into 7 types from type A (the highest vascular compliance, young ages under 20s) to type G (the lowest vascular compliance, older ages over 80s) depending the degree of vascular compliance, and this can be used as a reference for estimating the degree of vascular compliance.

Test screen

- **HRV graph**: It shows the progress of heart rate variability as a graph.
- **Measurement time and pulse rate display**: It displays test process time and pulse rate per minute.
- **Vascular age test graph**: While measuring stress, the vascular age is also measured during the first 1 minute.
- **Waveform of pulse wave tested**: It shows the waveform of pulse wave tested.
- **Test-related control buttons**: It controls the stress test.
  - Start the stress test.
  - Stop the stress test.
  - Select the stress test results file.
  - Return to the main page after completion of stress test.
Vascular age/accumulated stress self-measurement system test method

What is the test for vascular health status?
It is a self-diagnosis system for vascular health status, which can be the cause of cardiovascular diseases, one of representing chronic diseases in Korea, without going to the hospital, through the automatic analysis of blood circulation status including vascular compliance and rigidity by measuring APG for 1 minute using a portable uBioClip of our company.

Effects of self-measurement for vascular health status
- You can check your vascular health status whenever and wherever possible without visiting a hospital.
- You can go to a hospital at the early stage of abnormality by the self-test results.
- You can manage the medical history of your vascular health status by test results.

Applicable areas
- Early screening of atherosclerosis.
- Evaluation of arterial vascular structure and dysfunction.
- Diagnosis of cardiovascular diseases.
- Monitoring of various treatment effects of drugs.

Vascular health status test procedures
- Connect a portable uBioClip to a computer USB.
- Press ‘Vascular Health Test’ on the main menu and the test screen will be popped up.
- Insert your finger in the uBioClip and press the ‘Start’ button to test the vascular health status.
mind-body relaxation test (relax-measure)

While your mind-body relaxation is induced through music or picture for mind-body relaxation, the induced state is measured with a portable uBioClip, which then can confirm the progress of mind-body relaxation and increase the concentration state of mind-body relaxation.

Mind-body relaxation test main screen & mind-body relaxation test procedures

- Connect a portable uBioClip to a computer USB.
- Press ‘Mind-body Relaxation Program’ on the main menu and the test screen will be popped up.
- When necessary, select background screen and music of your choice.
- Insert your finger in the uBioClip and press the ‘Start’ button to test the vascular health status.

Mind-body relaxation is a program that induces psychological stability while watching the graph on the screen with no time limits. If in a state of anxiety or worries or emotionally unstable, the blue curve of the graph stays mostly under 80. If a person tries to remember happy memories or to have peaceful mind through meditation or prayer, the graph is gradually drawn into the blue area over 80. If the graph stays in the area over 80 for more than 1 minute, then the mind is sufficiently calm and peaceful.

Wear the finger sensor and take a deep breath, and then click the ‘start’ button if you are ready.

The graph is not drawn for the first 1 minute and 15 seconds because it is the time for collecting data for analysis. Then concentrate on the graph drawn afterward and try to practice to have stable mind.
Description of pop-up menu on the main careen for mind-body relaxation test

- **Sound ON/OFF display**
  - It controls the sound on/off generated during the wave motion progress of pulse wave
  - Press once to turn ‘ON’, and then press again to turn ‘OFF’

- **Set up a button for background music**
  - It controls the play of background music file

- **Select background music file**
  - It selects a music file which will be used during the mind-body relaxation test

- **Select background picture**
  - It selects a background picture which will be used during the mind-body relaxation test

- **Concentration index graph**
  - It shows the progress of concentration index as a graph

- **Test process time and pulse rate display**
  - It displays test process time and average pulse rate per minute

- **Waveform of pulse wave tested**
  - It shows the waveform of pulse wave tested.

- **Test-related control buttons**
  - It controls the mind-body relaxation test

How to look at the concentration index graph

- The concentration index is presented as a score out of 100 points and if the state of over 80 points is maintained for more than 1 minute, it can be interpreted as the subject is psychologically concentrated in something.

- As shown in the above picture, the graph should be stayed longer in the sky blue colored area.
Vascular age / accumulated stress self-measurement system result screen & report

When vascular age/accumulated stress self-measurement is completed, the results are drawn as the following screens and reports for your reference for health management.

Test result of vascular age

- Screen result report

  Results of vascular health age test

  Types of vascular health age | Illustration of vascular condition | Accelerated Pletthysmograph

  It can be observed when the circulation becomes slightly bad but is a generally good state. It is widely observed in people in their 30s and healthy 50s.

  Vascular health age by types

  **A**: Very good
  - Under 20s: It is observed in the healthy population under 20s who has excellent blood circulation
  - 30s to early 50s: It can be observed when the circulation becomes slightly bad but it is a generally good state. It is widely observed in people in their 30s and healthy 50s.

  **B**: So-so
  - 40s to 50s: It is observed when the circulation is bad, often in people in their 40s-50s, along with symptoms such as forgetfulness and the heaviness in the head.

  **C**: Slightly bad
  - 50s to 60s: It is observed when the circulation is quite bad, and also in cases of hypertension and hyperlipidemia.

  **D**: Bad
  - 60s to 70s: It is observed when the circulation is very bad, and is often seen with the risk of senile diseases such as hypertension, atherosclerosis, and circulation dysfunction.

  **E**: Extremely bad
  - 70s to 80s: It is observed when the circulation is extremely bad, and is often seen in older people around 80s.

  **G**: Extremely bad
  - Over 80s: It is observed when the circulation is extremely bad, and is often seen in older people around 80s.

Test result of accumulated stress measurement

- Screen & output report

  Heart rate change analysis screen
  - Frequency domain analysis screen
  - Time domain analysis screen
  - Autonomic nerve balance analysis screen