

Name: _____

MAX PULSE CERTIFICATION STUDY SHEET



Before Taking This test watch the videos on: <https://longlifecardio.com/max-pulse-training-videos/> Password: LLC2023

How The Max Pulse test Works

The Max Pulse test is non-invasive and uses a photoelectric clip on the fingertip. By measuring the blood at the fingertip, the Max Pulse can graph the heartbeat as it moves through systolic and diastolic. When a person's arteries are flexible, the pressure at the fingertip has specific deviations as the arteries flex. If the person's arteries are very stiff, the graph becomes very tight and regular. The machine performs an analysis of the arterial pulse wave by using a very sophisticated algorithm to track variations in the graph that are not visible to the naked eye and then interprets those results against a large body of research. The result is an assessment of arterial hardening that is very accurate.

Arterial Health Score: The **1-7 scoring system** gives a very accurate assessment of arterial hardening. The final report can also indicate instances where the patient has early congestive heart failure or heart weakening. This test allows you can detect arterial hardening or heart weakening long before the patient becomes symptomatic. This is crucial in diabetic patients and for patients with high blood pressure or elevated lipids.

Autonomic Balance Test: The machine also does a very accurate heart rate variability test and prints an autonomic nervous system analysis, showing if the person is overstressed and the sympathetic nervous system is dominant, or in some cases showing that the person is fatigued or the sympathetic is suppressed and the parasympathetic system is dominant. It also shows how well the patient is dealing with their stress levels and assigns a stress score.

Max Pulse Test – Detailed Reports

The Arterial Stiffness Report

The Max Pulse Test generates one report for arterial stiffness and another report showing patient stress levels. Max Pulse Test reports can be printed or saved to PDF.

The following report is generated by the Max Pulse to show arterial aging.

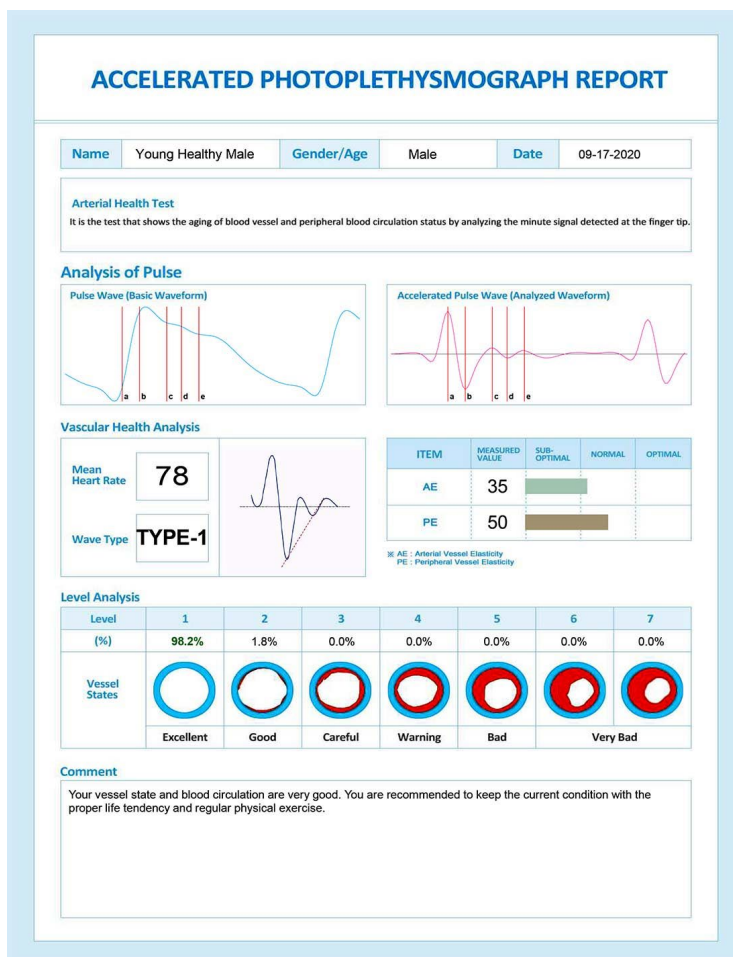
Analysis of Pulse Section

The first graph (left side of the report) shows the arterial pulse wave as the heart moves through systolic and diastolic. The amount of blood in the fingertip increases, then begins to decrease. There is a “bump” in the graph as the aortic valve closes and the diastolic completed.

The second graph (right side of the report) shows the same graph that has been mathematically accelerated. This graph is very sensitive, and this is what the software analyzes to score the patients arterial hardness.

Vascular Health Analysis Section

Here the report shows Mean Heart Rate and then the most important metric – Wave type.



This “wave type” refers to the accelerated pulse wave mentioned above.

This accelerated pulse wave was found to fall into 7 distinct types which are numbered 1 to 7 with 1 being a healthy heart and 7 being a heart and vascular system in the poorest condition.

Then there are 3 metrics which have a bar graph to show if they are in range or not.

AE = Artery

Elasticity: Represents the elasticity of the wall of the large arteries by the contraction power from the heart.

PE = Peripheral

Elasticity: Represents the elasticity of the small arteries at the periphery of the body.

Level Analysis: This shows what percentage of the total heartbeats fell into which wave type. This gives a more in depth look. The report shown has almost all heartbeats as type 1 – a close to perfect score.

The Max Pulse Autonomic Balance and Stress Report

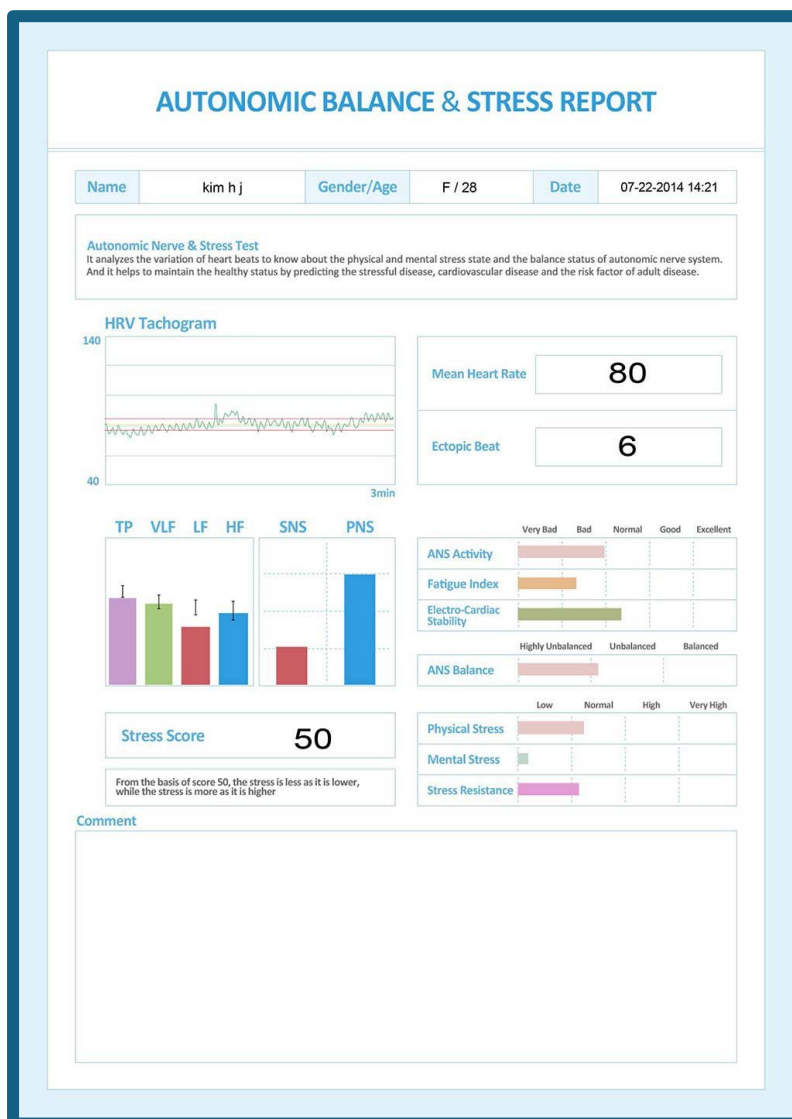
(The Max Pulse Test measures Heart Rate Variability and gives an analysis)

The HRV tachogram shows each heartbeat during the test period. To the right you will see mean heart rate and the number of ectopic beats.

TP VLF LF HF Section (Total Power / Very Low Frequency / Low Frequency / High Frequency)

These bar graphs reflect levels of Sympathetic and Parasympathetic activity and their balance.

Power in 4 frequency bands analyzed: Total Power / Very Low Frequency / Low Frequency / High Frequency



SNS PNS Bar Graphs

SNS/PNS Balance – SNS (sympathetic nervous system) & PNS (parasympathetic) Balance. SNS and PNS ratio is normal at around 6:4.

Higher SNS can show up as nervous, anxiety, agitation, excitement, increasing blood pressure, headache, etc.

The Frequency Bars – TP (total power), VLF (very low frequency), LF (low frequency) and HF (high frequency).

These bars show non-optimum when they are low.

Reduced TP: Decreased ANS function, decrease in bodies regulatory ability and a decrease in the ability

to cope with environmental change.

Reduction of VLF: Decrease in the bodies ability to regulate body temperature and hormone levels.

Reduction of LF: Loss of energy, fatigue, too little sleep, tiredness and lethargy.

Reduction of HF: Chronic stress, aging, reduced electrical stability of the heart.

There is more, that is covered in the training.

But it is worth mentioning the **Stress Resistance** Score – the last bar graph. The Max Pulse has this unique aspect of HRV where it shows stress/fatigue, but it also scores how well the person is holding up under their stress- a kind of “stress gas tank”. This is great to show people the importance of caring for themselves. People can go charging along with terrible HRV scores for quite a while and feel fine. But when the Stress Resistance (“stress gas tank”) runs out, you get sudden collapses that can be serious and take a long time to recover from. This one score is very important and can avert poor patient outcomes by giving the early warning that the person can probably feel – but is ignoring.

Performing the Test



The Max Pulse test is easy to perform and can be done in as little as one minute. Here are simple instructions that will help you to get accurate results. Click to see an overview of the [Max Pulse](#).

1. Do not perform the test until 2 hours after the patient has taken caffeine. Do not let the patient smoke before the test. For most accurate results, the test should be

done on an empty stomach or mostly empty stomach (digestion can cause the body to tighten outer arteries and push blood to the internal organs).

2. Have the test performed in a quiet room. Make sure there are no noises, vibrations or bright lighting that might disturb the patient during the short test.
3. Have the patient relax for a few minutes before getting started. Anxiousness, tension, and stress affect the test. The test should be taken with the patient in a resting state since the pulse wave is affected by blood pressure, blood flow etc.
4. The temperature of a room should be comfortable. If the clinic is kept cold or the climate is cold, then pay attention to make sure that the patient is warmed up before the test and does not have cold hands. Keep in mind that the device is using the volume of blood at the fingertip to track the heart and arteries. **If the hands are cold, circulation to the fingertips can be too low for an accurate reading.** (Disposable hand warmers can kept available in case of cold hands).
5. Attach the finger clip lightly to the left index finger, making sure the clip is fully seated onto the finger. Make sure the finger clip is not being squeezed. There should be no pressure on the clip. For example, a person who tucks their hands under their thighs will get an inaccurate reading. The hand should be approximately at heart level.
6. Acrylic nails (false nails) can block the Max Pulse sensor in some cases, especially if they are long and won't allow the sensor to be seated deeply on the finger. In this instance retest the patient when this has been removed. Always ensure the finger clip is seated properly on the finger.
7. The patient should not move or talk and should keep their eyes open during the test. The patient should breathe normally during the test. The patient should not meditate or try to influence the test.

Important: Invalid Tests

If you see any of these while the test is running, the test is invalid and the patient must be checked for A-C below and retested.

- A coarse or irregular heartbeat graph
- no heartbeat graph at all
- heart rate impossibly high or impossibly low

All these things indicate that the finger clip cannot read the patient's finger. Most often these come from cold hands. Warm up the hands and any of these issues that are present will disappear.

IMPORTANT

INVALID AND INACCURATE TEST RESULTS

It is very important for both practitioners and those who are performing the test to be able to see when a Max Pulse test result is invalid.

There are three main reasons that results are invalid.

A. The most common cause of **invalid test results** is poor circulation in the patient's hands, caused by cold hands or on rare occasions by Reynauds Disease (which is characterized by poor peripheral circulation). Because of this we recommend keep disposable hand warmers with the machine (available from most CVS, Walgreens etc) . The person doing the test should always feel the patient hands before starting the test to confirm they have a natural warmth.

B. The second most common cause is the patient doing something other than sitting quietly and waiting for the test to complete. If the patient moves, talks, closes their eyes, or alters their breathing or in any way makes an effort to influence the results, the test should be retaken.

C. Testing on a full or mostly full stomach. After eating, the body will constrict and relax main arteries to push blood into the digestive tract and balance it once there. This can alter the results and in fact results taken during the digestion period can be different one to the next, as the body adjusts for digestion.

Type 5 through 7 scores should be referred to a specialist (see documentation for what each of these scores represents). Before referral it can be a good idea to retest a person taking care that one of the above factors was not missed by the person doing the test.

Recognizing A Completely Invalid Test: Tests can be inaccurate because of reasons A-C above. They can appear a bit worse or better than they really are. But in some cases, the result can be completely invalid and meaningless. You will see these invalid tests immediately because they show the patient scoring in three or more categories and often none of the scores are over 50%. Any test where the patient scores significant percentages in three different categories is invalid.

- **Arterial type score of less than 50% is showing as the dominant type.** (Dominant arterial type is always more than 50% of the heart beats in accurate tests).
- **3 Way score.** If the patient shows up with at least 5 percent of heart beats in 3 or more categories, the test is invalid. Check for cold hands and re-test being strict with no moving and no talking during the test. All three-way scores are invalid.

Patients With Arrhythmia: Once you have checked A B and C above and are confident that the test is running properly, there is only one last factor that can be a problem – a patient with a severe Arrhythmia. Arrhythmia can often be cooled off by getting a patient to stop taking stimulants of any kind (including caffeine in any form). If you are getting strange results on the 1-minute arterial and have checked the that the test guidelines are being followed, we recommend you run the 3-minute Stress Test. Irregular heart beats are marked on the report as Ectopic Beats. You should not have more than 2 or 3. Normally it should be zero. More than 5 ectopic beats during the test period indicates the patient has an arrhythmia and this must be addressed first. The first step for that patient is cutting out stimulants and getting their heartbeat calmed down and regular so they can be tested. If the person is not taking stimulants, then the reason for the Arrhythmia should be discovered as quickly as possible

ADDITIONAL INFORMATION FOR ANYONE READING TEST RESULTS

Sometimes tests are taken incorrectly, for example the patient is allowed to move around or talk during the test. When the test comes to you its not possible to see what the patients was doing but is it very quick to see that the test you are looking at is invalid.

Recognizing A Completely Invalid Test: We recommend when reading tests to look at the percentage of heartbeats that fall into each category. This is because 2-way splits are common. All human heart beats are a little different and quite often you will see a person with some heartbeats in Type 1 and some heartbeats in Type 2. But you will see invalid tests immediately because they show the patient scoring in three or more categories and often none of the scores are over 50%. Any test where the patient scores significant percentages in three different categories is invalid and must be retaken.

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Patients With Arrhythmia: If a test is retaken with appropriate care to warm hands, patient not moving or talking and the other rules followed, then you might still get an invalid test. If you are confident that the test is being done properly, there is only one last factor that can be a problem – a patient with a severe Arrhythmia. If you are getting strange results on the 1 minute arterial and have checked the that the test guidelines are being followed, we recommend you run the 3-minute Stress Test. Irregular heart beats are marked on the report as “Ectopic Beats”. You should not have more than 2 or 3. Normally it should be zero. More than 5 ectopic beats during the test period indicates the patient has an arrhythmia and this must be addressed first. The first step for that patient is cutting out stimulants and getting their heartbeat calmed down and regular so they can be tested. Arrhythmia can often be cooled off by getting a patient to stop taking stimulants of any kind (including caffeine in any form). If the person is not taking stimulants, then the reason for the Arrhythmia should be discovered as quickly as possible.

Raynaud’s Disease: In Raynaud’s disease, smaller arteries that supply blood to the skin narrow. If severe and present in the fingertips, this can be a contra-indication for a Max Pulse test. The pulse ox finger attachment needs to be able to detect blood flow in the fingertip. Raynaud’s Disease can sometimes be seen visually with white blotches on the hands.