

Live Control of Meditation State with Television Vibraimage System

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Abstract

It was shown that using the television vibraimage system it was possible with the facial control to investigate a difference between regular, quiet, emotional states of the person and also to register a degree of change of this state during imbedding into a meditation. The investigations performed have shown that the state of meditation differs a lot from usual, daily state and results in changes of number of psycho/emotional parameters. In a state of meditation the space configuration, chromaticity, frequency allocation and statistical parameters of vibraimage essentially varied. At the same time, for each examinee, while preserving the common trend of characteristics changes, the individual deviations of some parameters were observed which correlated with the meditation experience of the person, psycho/emotional type, sex and current health. It was done same examples of vibraimage and the results of statistical processing.

Keywords: computer science, television methods, vibraimage, emotions

1. Introduction

Control of a pulse rate is well-known. It is enough to press slightly fingers a place where any large artery approaches close to a surface of a body, and it is possible to feel pushes when heart is reduced and pushes blood on an artery. Sometimes the pulsing of a surface of a skin above a place of passing of an artery manages to be observed visually. Pulsing of stream of blood in veins are appreciable much less though and there they necessarily are present and also appear in vibration of an integument. It is one of reasons of appearance of mechanical vibrations of a surface of the skin, which have the frequency equal to a pulse rate 1-2 Hz. In fine capillaries the amplitude of such vibrations is small, not visible for a human eye and can be registered only by precision instruments. (It is possible to speak about micro vibrations, having in view both amplitude, and their localization on a surface of a skin).

Measurement of pulse parameters underlies many modern methods of human state monitoring – from banal measurement of arterial pressure up to rather refined methods used in

"lie detectors". In most cases measurement standard "norm" is accepted, which is defined by statistics (experience), by presence of other tags of disease and, in many respects, intuition of the doctor. We cannot speak in such cases about individual approach, as your individual "norm" and character of its change in reply to "attack" of an environment is unknown. And still the medicine has saved up huge experience in diagnostics of pathological states with usage of pulse parameters measurements, and mistakes (on the average) are not too frequent.

Second, not less informative reason of occurrence of micro vibrations is related to operation of nervously-muscular system and, in particular, the vestibular system of the person. This system works as the system with feedback and practically permanently. Frequencies of micro vibrations of this type are defined by speed of passing of direct and return nervous impulses on neural chains and makes, as it is known, 4-7 Hz depending on a nervous-emotional state of the person.

There are many factors (the emotional, mental and physiological), which have an influence on a state of the person (including the pulse), and the influence is very individual. So it is very hard to give the verbal description of a picture of this "norm" without usage simple, vivid and effective methods of monitoring of a human state. Well-known, those images and their changes are most easy remembered. Therefore in this case television images or video are out of competition, especially during operation on improvement of individual "norm".

Thus, if the task of daily spiritual-moral self-development is put, the task to learn to be guided in mutual relations primarily by the qualities of the soul – love, tolerance, mercy and kindness, it is desirable not only to notice these positive changes at a level of sensations, but also to register the changes using some tool. Self-improvement demands also self-verification, including objective. It is especially important at the initial stage.

So, micro vibrations are formed under effect of both above mentioned reasons and their intensity and localization on the surface of a skin actually reflect accuracy of "tuning" of all main systems of a human body which is defined by a state of the soul. Until recently registration of maps of micro vibrations of a human body was impossible. Now the modern science gives us a simple, very mobile and visual teaching method (Viktor Minkin, Alexander Shtam, 2004) [1] to register dynamic images of alive objects, with allocation of micro vibrations, and thus to control the psycho/emotional state (Elsys Corp., 2008) [2]. Measurements of micro vibrations parameters of skin surface are put in the basis of this method. It is done remotely by means of simple digital television camera in on-line mode. We have already mentioned, that the range of these vibrations is very small (within 10-500 micrometers), but they are actually "adhered" to the location of each capillary and a muscular fiber. The eye, certainly, does not catch such small oscillations, but television camera, permitting to summarize signals from each pixel of the

observable map for some hundred frames in a computer memory with the subsequent processing with the help of the special program, allows to observe distinctly these oscillations on the image of the person (in general, on the image of any site of a body). The program allows either to observe the allocation of such oscillations over the observable image or "to lay out" them on peripherals of the image, for example face, as a halo. In this case the appearance of such halo reminds the form of "aura". The program allows to make also the amplitude and frequency analysis of observable oscillations, to build histograms of their allocation over frequencies, to calculate average values and standard deviations for the obtained histograms. On the basis of a plenty measurements carried out for the frequencies of oscillations it was possible to compare (Elsys Corp., 2008) [2] main emotional states of the person (activity, aggression, depression, fear, steadiness, peace, etc.) and to assign predefined colors to these states (from red up to dark blue, accordingly). Now such an image has begun to remind "aura" even more, and the unit has received name Aura-Vibraimage or simply Vibraimage. The physical and thermodynamics models of vibraimage are discussed in article V. Minkin, L. Tims (2008) [3]. With the help of this unit, together with Elsys Corp. which has developed Vibraimage, we have carried out researches of meditation influence on psycho-emotional state among group of the students of Brahma Kumaris World Spiritual University (BKWSU). A feature of meditation, used in BKWSU, is that the eyes stay open. Therefore external the state of meditation is difficult for distinguishing from a usual state; the person can fulfill any operations being in a state of meditation. Thus it is possible to avoid also the significant changes of an alpha – rhythm (N. Bogdanov, 2006) [4], related to the organ of sight turn off state, and probable influence of these changes on results of measurements.

2 Goals and a technique of tests

2.1. The goals of tests: Obtaining of face video recording with the imposed individual "aura" picture from the group of examinees at the three states of each examinee. One of states – regular, realized during daily activity. The second state is meditation. The third state is directly after meditation. The points of research are the distinctions in "aura" images in these three states for each examinee and appearance of these distinctions in different instants during meditation. During the initial stage of the tests it would be enough to detect the indicated distinctions visually in the "aura" pictures, and further to reveal the details performing digital image processing using the software developed by Elsys Corp.

2.2. Method

The method used in Vibraimage unit is remote sensing, not invasive, not applying any external radiation or low/high frequency electromagnetic fields on the person being tested. The amplitude/frequency spectrum and spatial allocation of micro vibrations on an open surface of alive object (person), related to changes of nervous-muscular clonuses at various emotional states were registered. The results of measurements are represented in this work as characteristic color "aura" on peripherals of the face. Usage of statistical processing of results of measurements (the analysis of a frequency spectrum, definition of the law of allocation of micro vibrations, definition of expectation and standard deviation) have allowed to receive numerical values of characteristics of emotional states of the person. At present the software (SW) is mainly meant for revealing of the hidden stressful, nervousness and aggressive states. Using the results of the measurements, obtained during the described tests, it is expected that the SW will be updated to include an ability to provide numerical characteristics describing tranquility state during meditation.

2.3. Details of tests technique

Examinees (9 persons) were randomly selected from among constant students of St. Petersburg Centre BKWSU. The examinee sat facing the meditation hall and his face was evenly lit by a ceiling light of the hall. The television camera of Vibraimage unit was focused on the face of the examinee. The operator was allocated opposite to the examinee so that the screen of the PC monitor has not been seen by the examinee. During the configuration phase the optimal amplification factor of the electronic channel of the equipment was set and further was constant during the test. Tests were carried out sequentially with each examinee. At the beginning the video recording was taken during a usual state of the examinee, then they were offered to meditate during 5-7 minutes and some more recordings were taken. Then the recording was taken after the meditation during 2-3 minutes. This concluded the main part of the tests.

3. Results of tests

The registration of the "aura" built using the vibraimage method, which is outlined above, before meditation, during the meditation and after the meditation for 9 examinees was performed. The results of measurements are represented here with the three images for each examinee.

Common duration of measurements of the states for each person did not exceed 10 minutes (about 2-3 minutes for a natural, usual state, 5-7 minutes for meditation and 2-3 minutes for transition from meditation into usual state).

Though for each examinee the block of video recording with the frame frequency 25 Hz registered practically continuously and the PC memory for each examinee contains video containing about 15000 frames, here we have shown only three images of "aura" (before meditation (1), during meditation (2), and after meditation (3)) and related double histograms of allocation of vibraimage frequency for the faces. Each of these double histograms shows allocations of frequencies of vibrations measured during a time interval of 20 seconds, therefore the diagrams related to the same state differ from each other.

As shown in [1] (Viktor Minkin, Alexander Shtam, 2004), histograms can be characterized by the three parameters:

- M1-average arithmetic value of frequency of micro vibrations on allocation, (Hz);
- M2-value of micro vibration frequency, (Hz), related to the maximum of allocation;
- S-standard deviation of allocation of micro vibration frequencies, (Hz).

Thus, stability of mathematical parameters of the vibraimage histogram over time characterizes stability of the psycho/emotional status of the person, both in the given state and in different states. Vibraimage for cases of the expressed anxiety or aggression are provided [2] (Elsys Corp., 2008) for comparison.

In our case, apparently for three states, practically all the examinees have shown high stability of parameters during each separate state, an essential difference between states before meditation and during meditation and less significant difference between states during meditation and right after the meditation. It is, in our opinion, the main output from the results of the research.

Fig. 1-3 shows vibraimages obtained in our researches for three examinees. Detail photos for every examinee published (V. Minkin, 2007) [5].

Besides, our researches have shown that influence of meditation on state of each examinee has distinctly expressed individual features. It is obvious from the Table 1 represented below (In the Table 1 the column "Change 1-2" means distinction at transition from a state before meditation into the state of meditation, 2-3 distinction at transition from the state of meditation into a state after the meditation, expressed in percentage in relation to an initial state).

Table 1. Individual results of vibraimage statistical processing

The examinee №	Parameters States 1	Parameters States 2	Parameters States 3	Changes 1-2 (percent)	Changes 2-3 (percent)
1	M1=1,95 S=0,61 M2=1,5	2,1 0,9 1,25	1,61 0,53 1,5	+3 +47 - 16	-23 -41 +20
2	M1=1,47 S=0,53 M2=1,5	2,2 0,8 1,5	1,13 0,5 1,5	+49 +51 0	-94 -37 0
3	M1=1,9 S=0,7 M2=1,5	1,2 0,53 1,1	1,8 0,64 1,5	-58 -32 -27	+50 +20 +27
4	M1=2,3 S=0,72 M2=2,7	3,0 0,35 3,1	2,9 0,49 2,75	+13 -51 +15	-3 +17 -11
5	M1=2,1 S=0,64 M2=2,1	2,6 0,7 2,45	1,81 0,6 1,7	+24 +9 +17	-30 -14 -30
6	M1=2,2 S=0,85 M2=1,25	2,6 0,6 2,75	1,9 0,81 1,25	+14 -29 +120	-27 +35 -54
7	M1=1,8 S=0,97 M2=1,7	2,05 0,81 1,5	2,2 0,84 1,65	+14 -16 -12	+7 +4 +10
8	M1=1,9 S=0,9 M2=1,5	1,2 0,53 0,9	1,1 0,46 1,25	-37 -41 -40	-8 -13 +40
9	M1=1,96 S=0,77 M2=2,15	2,02 0,76 2,15	1,5 0,69 1,65	+3 -1 0	-26 -9 -23

Efficiency of meditation can be described by the value of decrease of standard deviation (S) since narrowing of the histogram of micro vibrations frequencies allocation is related to a state of concentration. It is evident from the table, this decrease distinctly appears for all examinees, but in some cases occurs not during meditation, but right after the meditation, as if it is a result of "aftereffect" of meditation (and in these cases standard deviation during meditation even increases).

Increase of amplitude of frequencies of micro vibrations (M1), during meditation and after meditation, shows the increase in common energy of an organism, and decrease M1 shows the lowering of energy, transition into quieter state. Both types of changes were observed (№№ 2, 5, 6, 7 – increase in energy, №№ 3, 8 – lowering of energy). It is possible to assume, that everyone had obtained from the meditation what they needed. The increase or decrease of M2 value, i.e. displacement of the frequency corresponding to the allocation maximum, in red or in a

dark blue color zone is related to increase or lowering of nervously – mental energy, thirst of activity, availability for overcoming the difficult situations. The best condition for success in overcoming such a difficult situation, apparently, will be coincidence of M1 and M2 values. In other words, when there is a desire to overcome difficulty and there is sufficient energy for this purpose accumulated. The examinees №№ 4, 5, 8, 9 were nearest to this condition.

4. Conclusions

1. Using the Vibraimage system it was possible to detect and register a difference not only between aggressive (abnormally excited) and a regular, quiet emotional states of the person but also to register a degree of change of this state towards more quiet and silent during imbedding into a meditation.

2. The investigations performed have shown that the state of meditation differs a lot from usual, daily state and results in changes of number of psycho\emotional parameters. In a state of meditation for all examinees the space configuration, chromaticity, frequency allocation and statistical parameters of vibraimage essentially varied. In aggregate to these tags apparently it is possible easily, fast and visually to inspect a degree of change of a state of the person while imbedding in a meditation.

3. At the same time, for each examinee, while preserving the common trend of characteristics changes, the individual deviations of some individual parameters were observed which correlated with the raja-yoga experience of the person, psycho\emotional type, sex and current health.

References

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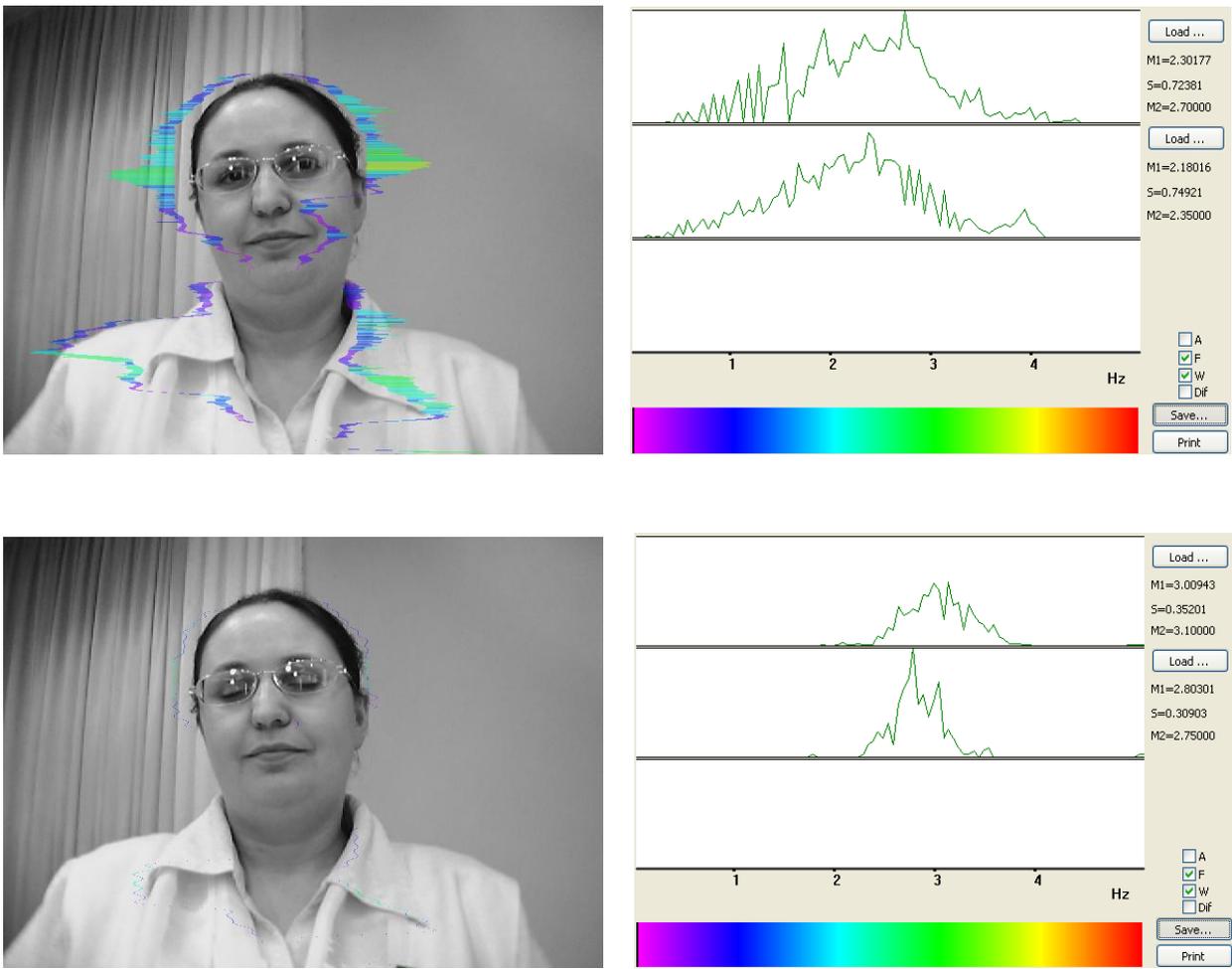


Fig 1. The examinee No 4 (above image is in a common state and lower is a meditation state). Histograms allocations of vibrations frequencies are showed to the right of the images.

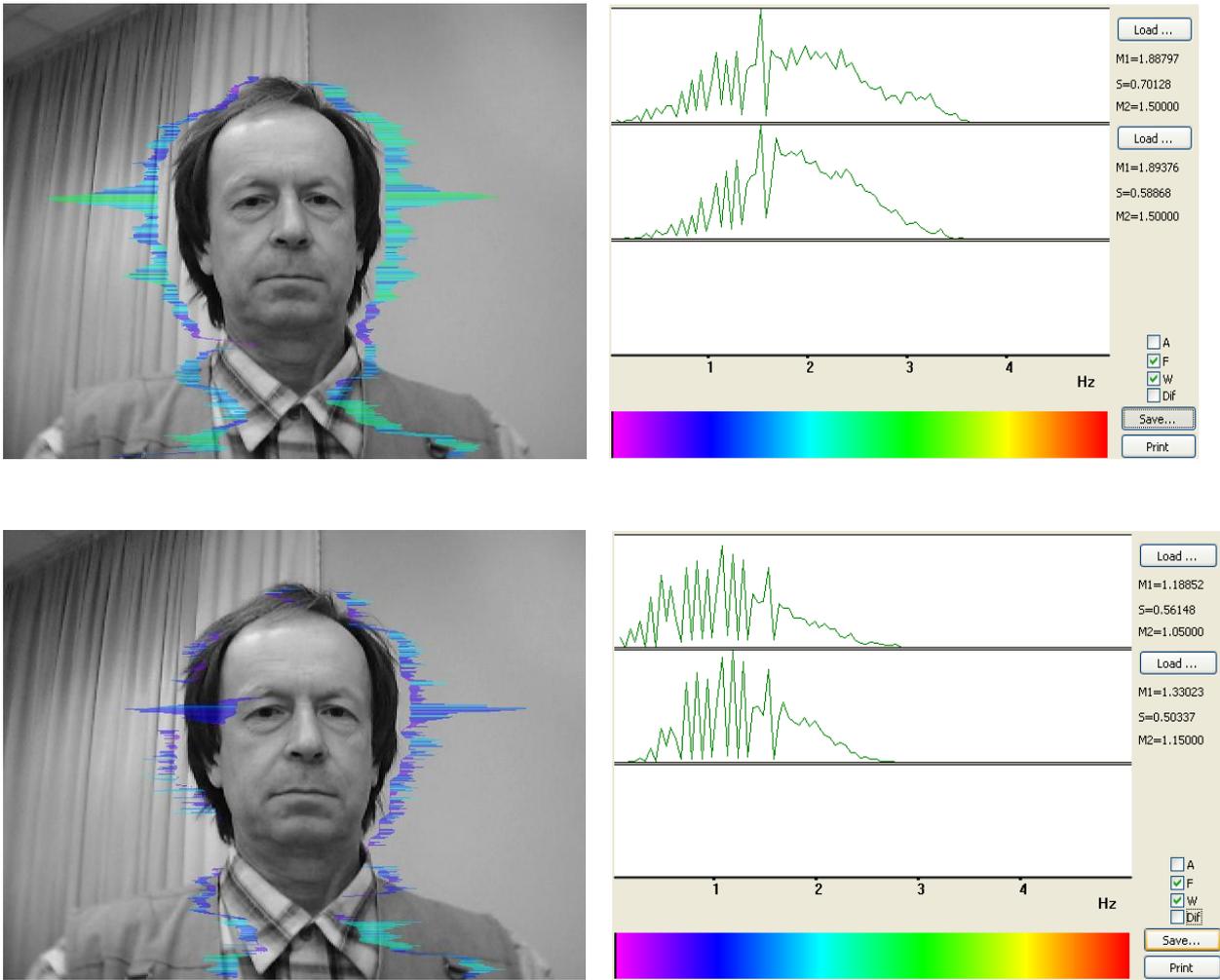


Fig 2. The examinee No 3 (image above is in a common state and lower is a meditation state). Histograms allocations of vibrations frequencies are showed to the right of the images.

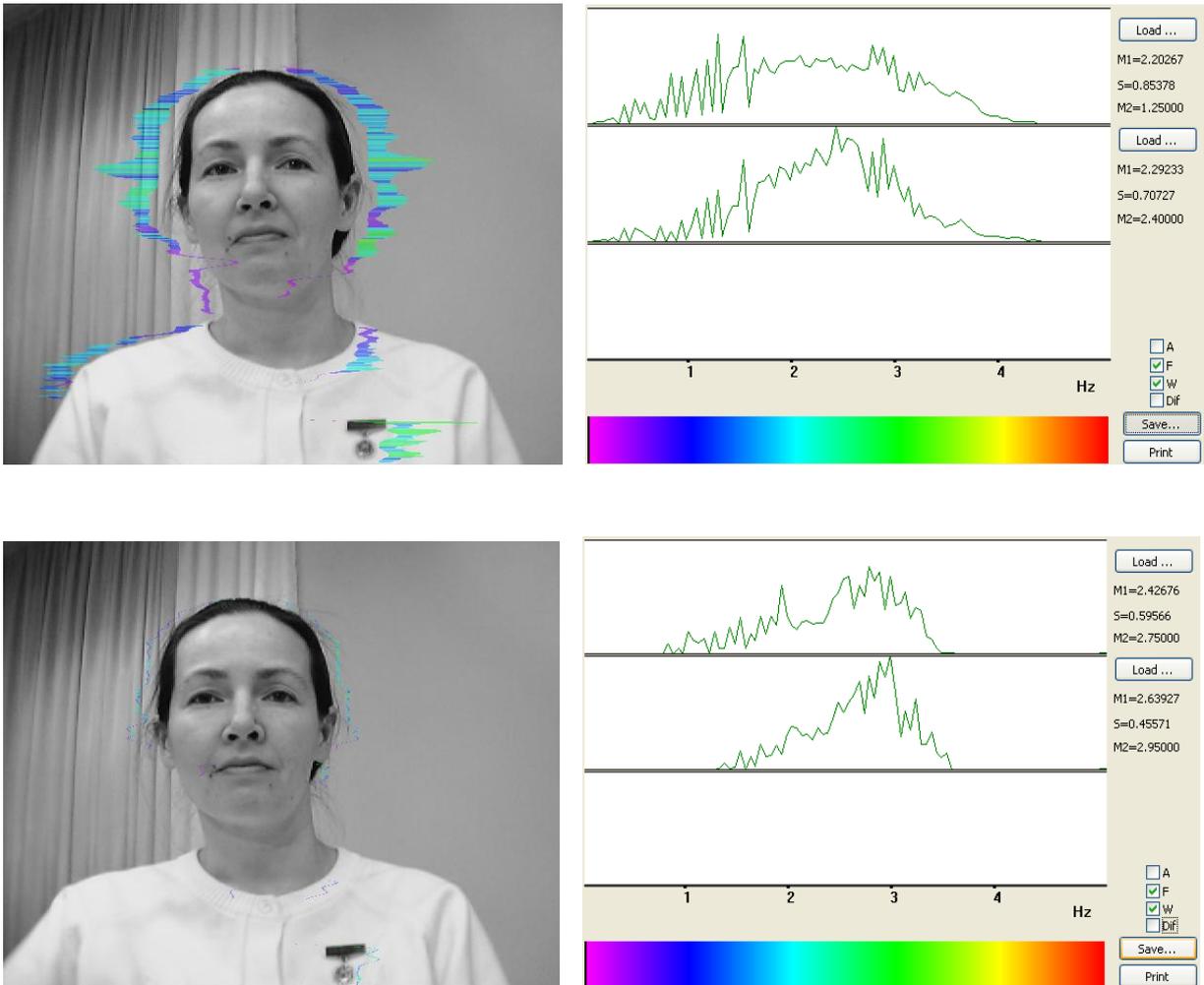


Fig 3. The examinee No 6 (image above is in a common state and lower is a meditation state). Histograms allocations of vibrations frequencies are showed to the right of the images.