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PRODUCT TESTING REPORT

BY MEASURING PHYSIOLOGICAL PARAMETERS

QHRS Biopyramid

Testing client:

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1. INTRODUCTION

This report aimed to determine the mechanism of the chip in the product "QHR Biopyramid" on half of the rest of the tested subjects. While in the sitting position on a comfortable wooden chair, a large number of the physiological parameters were monitored (muscle activity - EMG, cardiac activity - ECG, respiratory rate, temperature and skin conductivity). Applying different statistical methods, we compared and estimated the values of the abovementioned parameters while sitting above the pyramid with a chip (hereinafter abbreviated as "chip") and without it (hereinafter "control").

In case the top of the pyramid, that contains the chip, is directed at a person (while the tested individuals were positioned on a wooden chair with the pyramid below), according to the manufacturer, it demonstrates a refreshing and stimulating effect.

It is expected that the tested individuals, sitting above the pyramid with a chip, are going to change the following physiological parameters in contrast to the control group (without the chip): skin conduction, breathing depth, heart rhythm variation and pulse. Depending on the previous results, we expect a decrease in skin conduct and an increase in heart rate variation.

2.MATERIAL AND METHODS

2.1.TESTING PROTOCOL

Testing of the "QHRS Biopyramid" product was performed in a period between October 6 and 9, 2014 in the premises of the Bion Institute on ten subjects aged between 25 and 75, of which 8 were female and 2 male population. Before testing, participants were instructed not to eat large meals at least 1 hour before the testing date, as well as not to drink alcohol, coffee, or energy drinks for at least 3 hours prior. Measurements on each subject were performed at two different times in the same part of the day so that the effects of other daily activities were eliminated as much as possible (for example that the subject was tired after the end of the 8th working day). The individuals were positioned on a comfortable wooden chair under which a pyramid was placed for half an hour in both terms. In one period, each had a pyramid with a chip under the chair (Figure 1, centre), and in the other, a pyramid without a chip (control; Figure 1, right), the order of which was determined randomly.

A double-blind test was performed so that neither the subject nor the experimenter was acquainted with whether the chip was present at the time. Measurements were performed on the subjects with a modern device for simultaneous measurement of several physiological parameters. Muscle activity (EMG), cardiac activity (ECG), respiratory rate, skin temperature and conductivity were measured, and several other parameters were calculated from limited parameters (heart rate, intervals between individual beats, heart rate variability, number of breaths per minute and respiratory depth). All electrodes were placed on the hands, and in case of inadequate heart rate detection, one of the three electrodes is placed on the leg so that the software can detect it. Simultaneously, before the beginning and after the measurement, each examinee was photographed with a GDV camera. The results of these measurements are presented in a special report. After completion of the necessary measurements, the collected data were exported to an Excel file with a sampling frequency of 1 s. The data are graphically presented and statistically processed in the Gnumeric and RKVard programs. For each person separately, the mean value of 30 s was calculated and normalized the data to the mean value of the first minute.

Before testing, we decided to statistically evaluate the following parameters based on the product performance description (Chapter 1): skin conductivity, heart rate variations, and the frequency and relative depth of respiration. Furthermore, 30 minutes of measurements were divided into 2 periods of 15 minutes each, within which we analyzed for statistically significant differences (Wilcoxon test of predicted ranks). The statistical test was therefore performed on 30 data (each representing a median for 30 s of measurements for each parameter). Following the same procedure, we performed Leven's test for equality of variance to check whether the pyramid affected the data scattering. Following the application of several different parameters, it is necessary to correct the value of p in the Wilcoxon test. Holm-Bonferroni correction was used for the majority of primates (Holm, 1979) a): skin conduction, heart rate and frequency variations, and breathing depth. According to the statement, skin conduction and respiration rate are expected to decrease, while respiration depth and heart rate variation will increase.

Picture 1. the subject of testing was the QHRS Biopyramid with a chipset (middle image). The left image shows the QHRS Biopyramid closed, (external appearance of the Biopyramid with chip-tested and without chip-control do not differ), and the latter right image shows the control Biopyramid (without the chip)

2.2 MEASUREMENT OF PHYSIOLOGICAL PARAMETERS– DATA METHOD

The measurement of physiological parameters allows us to monitor in real-time the changes that occur in the body, to monitor the condition of the subject throughout the experiment. The device enables the measurement of electrocardiograms (ECG) with 3 electrodes, which allows us to detect heart rhythm and observe changes in it.

An electromyogram (EMG) was measured on the forearm of the hand, which allowed us to monitor the activity of the muscles on the outside of the hand. With the tern, we translated artefacts that may appear on the ECG due to hand movements. Skin conductivity and temperature were checked on the fingertips of the left hand, where the conductivity should have changed the most.

Monitoring the conductivity of the skin is also used to detect lies because the secretion of sweat and blood circulation is affected by the parasympathetic nervous system, which belongs to the autonomic nervous system, so it does not function under the influence of consciousness. In general, skin conduction increases under stress (increased sweating and increased blood flow), but the results can be much more complex.

The respiratory pattern was monitored using a special stretchable tape, which measures the distension of the abdomen, from which the software can calculate the number of breaths per minute.

3. RESULTS AND CONCLUSION

Table 1: P-values of statistical analysis (Wilcoxon test of predicted ranks and Leven test) and percentage of effect. Analyzes were performed based on 30 s normalized medians calculated for each parameter in ten subjects. Wilcoxon's test of predicted ranks examines the differences in values between two groups of data, while Leven's test checks whether data groups have different dispersion (variability). Values in the Wilcoxon test were corrected by Holm-Bonferroni correction for multiple comparisons (Holm, 1979). The data were divided into 2 periods (up to 15 minutes and 15 to 30 minutes) to check whether the subjects reacted to the pyramid immediately or only after a certain time. Cells were stained with a green background, where the differences between the control and the chip were statistically significantly different ($p < 0.05$).

test	Period	Skin conductance	Heart rhythm variation	Relative Respiratory Frequency	Breathing depth
Wilcoxon test of predicted rows	0-15 min	0,001	0,002	0,000	0,029
	15-30 min	0,000	0,000	0,000	0,001

Leven's test	0-15 min	0,849	0,245	0,209	0,105
	15-30 min	0,000	0,016	0,039	0,619
% effect	0-15 min	-4%	18%	-5%	3%
	15-30 min	-13%	33%	-10%	15%

On average, the chip had a statistically significantly different effect ($p < 0.05$; Wilcoxon test of predicted ranks, Table 1) on all selected parameters (skin conductivity, heart rate variations, frequency and relative depth of respiration). In all of them, the values of p in the second half of the measurement (from the 15th to the 30th minute) further decreased compared to the first half, so the effect of the chip increased with time compared to the control. This difference is expected from the point of view of the reaction of the human body to various environmental factors because the body usually requires a few glasses to respond properly. Despite the turnaround, subjects responded surprisingly promptly to chip performance, as differences in control were quite statistically significant after the first 15 minutes.

Similar tendencies of the Wilcoxon test are observed in the Leven test, in which there are no statistically significant differences in the scattering of data between the chip and the control in the first fifteen minutes. Differences in skin conduction, heart rate variations, and respiratory rhythm appeared only 15 to 30 minutes, while the chip did not affect data dispersion at relative breathing depth.

The gradual response of the subjects is also visible in the impact assessment (Table 1; % effect), where the values of all selected parameters in the second half of the measurement are increased. The effect is significant in all parameters, especially in variations in heart rate, wherein in the second period the variations in 10 subjects were more than 30% higher in Chip than in controls. The difference is also clearly visible from the graph, where the vast majority of glasses have significantly higher heart rate variability in the chip than in the control (Figure 3). Variability is important in heart rhythm, too low values may indicate cardiovascular disease (Brosschot J. F., 2007). Sufficient heart rate variability is important because it indicates the body's ability to respond to unexpected circumstances (Rajendra Acharya et al., 2006).

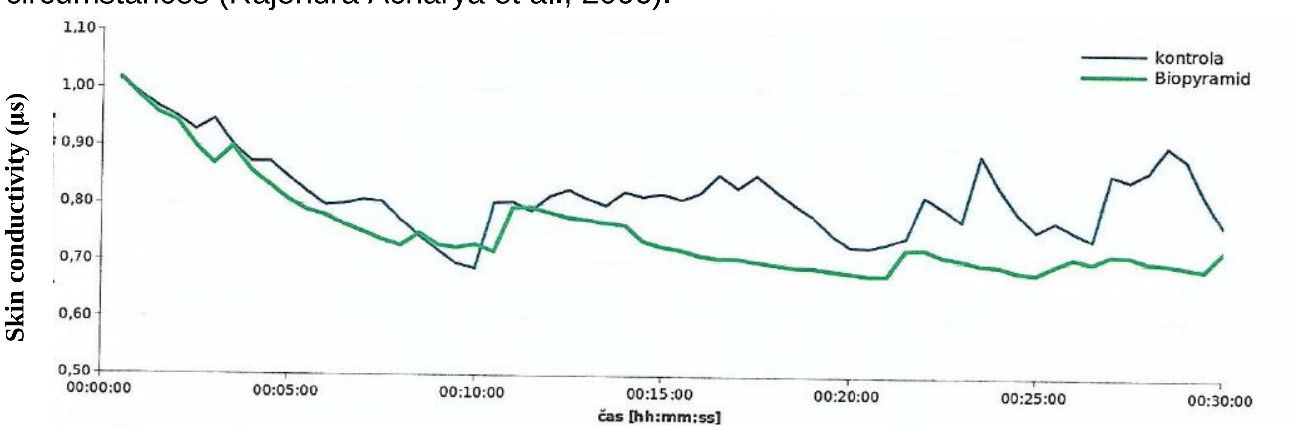

Figure 2. The progress of normalized skin conductivity in QHRS Biopyramid with chip (green) and control (blue). Values are calculated based on measurements in ten subjects, normalized to the first minute of measurement.

The difference between the chip and the control is also visible in the conductivity of the skin (Figure 2), most glasses have a lower conductivity of the skin in the chip than in the control. It is clear from the graph that in the second part of the measurement (between 15 and 30 minutes) the difference between the pyramid and the control are increased in relation to the first part. On average, the difference ranged from 4% in the first part to approximately 13% in the second (Table 1).

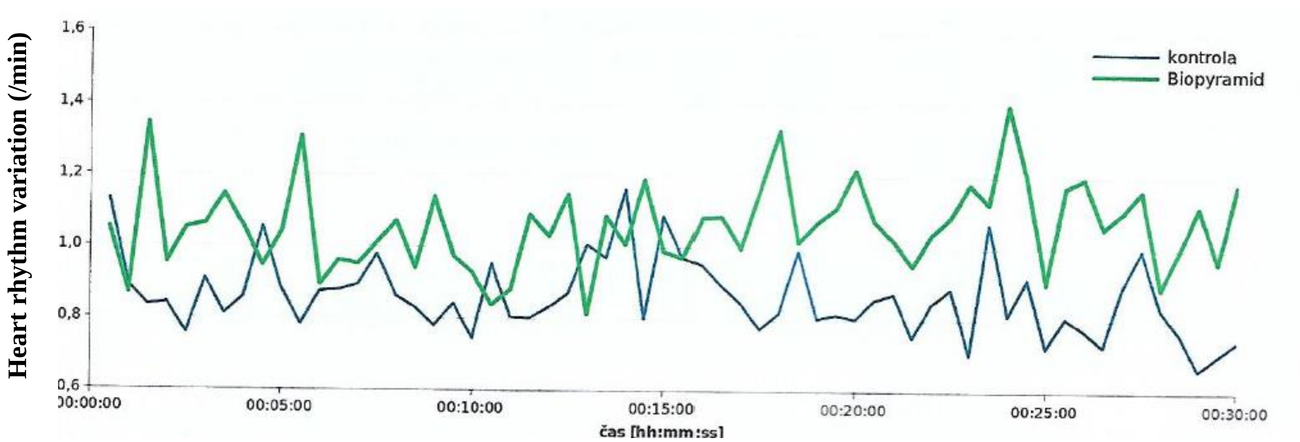

Figure 3: Flow of normalized mean heart rate variations in PKSD Biopyramid with chip (green) and control (blue). Values are calculated based on measurements in ten subjects, normalized to the first minute of measurement.

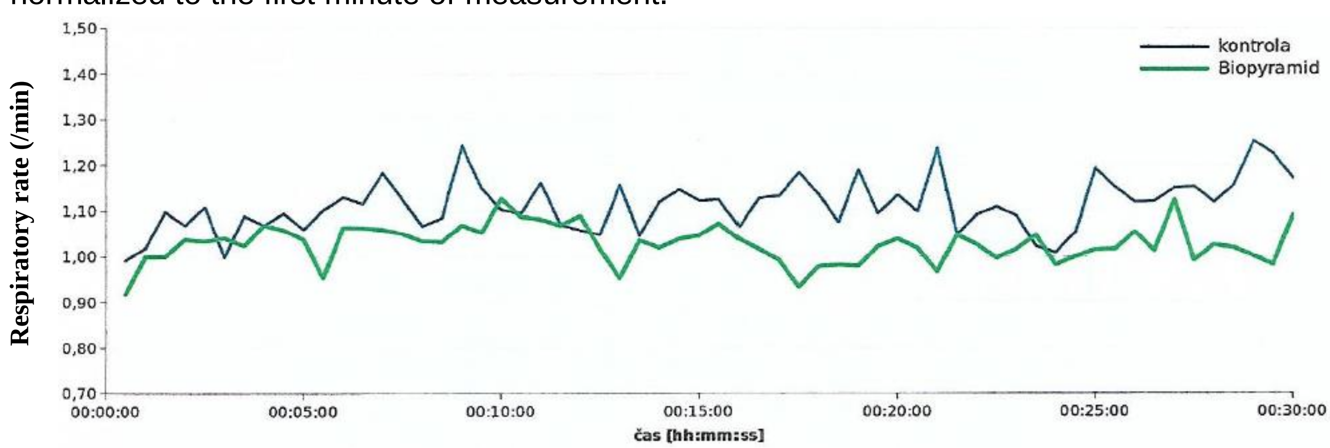

Figure 4: Flow of normalized mean respiratory frequency in PKSD Biopyramid with chip (green) and control (blue). Values are calculated based on measurements in ten subjects, normalized to the first minute of measurement.

There is a clear difference between the chip and the control shown in the respiration pattern (Figures 4 and 5). The respiration rate of the chip was on average up to 10% lower, while the depth of respiration was up to 15% higher (Table 1). Thus, the subjects had a slower and deeper respiratory pattern in the presence of a chip indicating sedation. This result is in the accordance with the conductivity of the skin, which also indicates the sedation-calming effect.

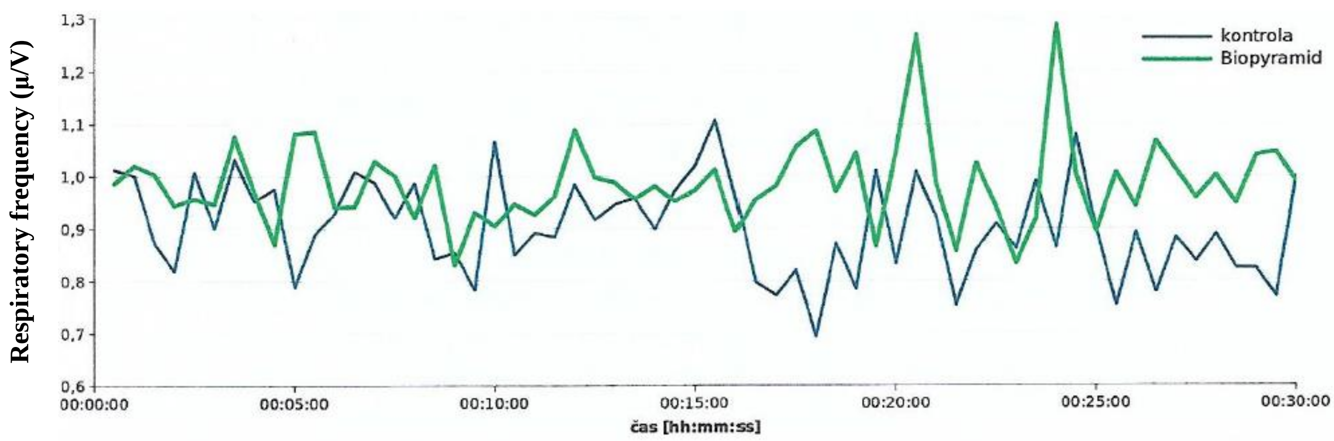

Figure 5: Flow of normalized mean relative depth of respiration in PKSD Biopyramid with chip (green) and control (blue). Values are calculated based on measurements in ten subjects, normalized to the first minute of measurement.

There are noted statistically significant differences in the parameters that were not previously selected for analysis and are therefore not presented in the summary of the statistical analysis (Table 1). The most important is the pulse, which showed statistically significant differences in both the first and second half of the measurement. The heart rate of the chip was higher in both periods (up to 15 minutes and from 15 to 30 minutes) than in the control period, which at first glance was contrary to expectations.

If the graphs are observed more in detail (Figure 6), we can note that the heart rate gradually decreases during the control session, while the chip at approximately the same level or sessions were gradually decreasing. Thus, the pulse indicates that the subjects from the test group (pyramid with a chip) were visibly more refreshed and strengthened, because they maintained the level of activity despite sitting, while the people from the control group became less and less active (somnolent).

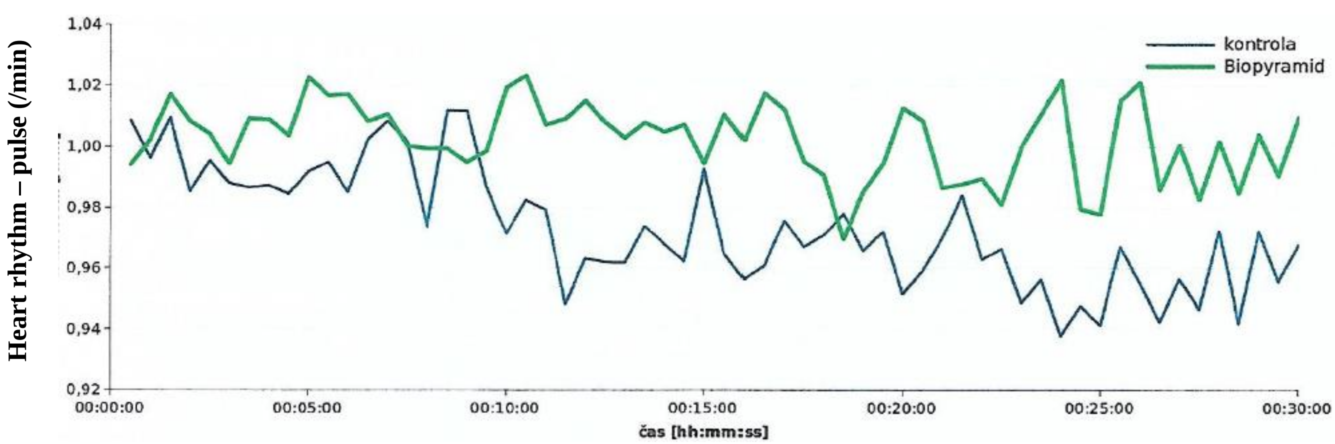

Figure 6: Flow of normalized mean heart rate in PKSD Biopyramid with chip (green) and control (blue). Values are calculated based on measurements in ten subjects, normalized to the first minute of measurement.

4. CONCLUSION

According to the results of measurements and statistical analysis of selected physiological parameters, we can conclude that the product QHRS Biopyramid with the current chip affects individuals in the form of calming, refreshing and revitalization effect. This is supported by different physiological parameters, which were statistically significantly different from the control ones (pyramids without a built-in chip). Differences were observed in all selected parameters (skin conduction, heart rate variations, respiratory rate and relative breathing depth) and in some that were not previously selected and therefore not included in the statistical analysis (particularly heart rate).

Decreased skin conduction and respiration rate, while increased relative breathing depth indicate that individuals have calmed down in the presence of a chip while maintaining heart and respiratory rate variable suggesting regeneration and refreshment (both parameters are time-averaged). This indicates less activity while sitting. According to all selected parameters, the effect slowly increases over time and despite the turn, the subjects reacted promptly to the chip (during the first 15 minutes).

According to the results of all measurements performed, the product «QHRS Biopyramid« is awarded a CERTIFICATE on the quality of energy impact.

5. **Literature**:

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5.3 Rajendra Acharya U., Paul Joseph K., Kannathal N., Lim C. M., Suri J. S., 2006. Heart rate variability: a review. Med. Biol. Eng. Comput., 44, 12: 1031-51