

Petri Lehtikoinen:

## VIBRO-ACOUSTIC TREATMENT TO REDUCE STRESS

### WHAT IS VIBRO-ACOUSTICS

**The Vibro-acoustic method and equipment were developed and patented in Norway by Olav Skille in the 70's and 80's.** The equipment consists of a vibration unit, and audio unit and soft-ware. In this experiment the vibration unit was a bed model. Chair model is also available. As an audio unit we used a set of ear phones. The soft-ware was produced by Vibro-Soft Inc. This consisted of several types of compositions combined with low sinus tone frequencies varying from 40 Hz to 86 Hz. The effect of pure sinus tone and low frequencies has been known for thousands of years. In several primitive cultures methods and instruments have been developed to treat different psychosomatic disorders or develop an optimum balance between soma and psyche. For example in the singing technique of Tuvas the effect of the sinus tones in human voice was known. In the shamanistic music the physical vibrations were commonly used. In the past five years several projects in Finland and in Norway have been carried out to survey the possibilities of electronic sinus tones and equipment to produce the same effects, which were known in shamanistic tradition. Now we already know that Vibro-acoustic treatment has been effective in the treatment of stress, insomnia, muscle pains and tensions, rheumatic pains, menstrual pains, reduced blood circulation and neck, shoulder and back pains. Medical research on new application and the control of the counter indications is continued.

### THE IDEA OF THIS PROJECT

This experiment was carried out in one of the large insurance companies in Helsinki "Kansa Ltd". We had found that there are certain factors, which increase stress among office workers and that this stress can be reduced by organizing the work in a new and better way and by giving a proper educational support to develop a better professional identity. In this experiment we wanted to compare if Vibro-acoustic treatment would also be an effective method to decrease stress in working life.

### THE RESEARCH GROUP

The project group consisted of three persons. Raimo Vainio was director of the educational department of the Kansa Group and represented the company. Hannu Naukkarinen as specialized psychiatrist represented the Psychiatric clinic of the Helsinki University. He was responsible for the stress and hormonal tests. Petri Lehtikoinen as a clinical psychologist and music therapist was responsible for the practical realization of the Vibro-acoustic treatment and educational applications. All directors, health officers

and the trade union people in the company were thoroughly informed about all the details before the start of the project.

**THE DESIGN OF THE EXPERIMENT.** 32 volunteer office workers were selected for the project so that it was possible to divide them into two comparable groups according to their age and type of work. Group one was called an educational group. They attended once a week a training session. In these sessions they received information about the psychological factors on the professional identity and tried to improve their skills in human communication and emotional control. The sessions lasted 60 minutes. Group two was called a relaxation group. They received Vibro-acoustic treatment twice a week for 25 - 30 minutes at a time. Both programs continues three months ( 15.2. - 15.5. -87 ). The following methods were used to evaluate the results: 1. The normal physical examination 2. Psychiatric interview 3. Spielberger 4. Hamilton 5. Stresshormone analysis (adrenaline, nor-adrenaline, cortisol) The test subjects were tested both in the beginning and at the end of the research period. The stress hormone changes were measured only from four test subjects because of the cost of this kind of test. The research group was able to get the test results from 13 (out of 15) test subjects in the educational group and from 15 (out of 17) in the relaxation group.

## THE RESULTS OF THE PROJECT

The hypothesis in this project was as follows:

1. Certain type of education is able to help the workers to stand the stress situations and strengthen the professional identity.
2. Certain type of physical relaxation treatment is able to reduce the situational stress.

The results support both the parts of the research hypothesis. In the educational group the stress level was reduced on the average of 5,54 points. The level of anxiety was reduced 3,38 points, depression by 2,38, Hamilton anxiety 13,346 and panics 6,36 points per a person.

In the relaxation group the same figures were: Stress level decreased by 5,07, anxiety 2,53, depression increased by 1,47, Hamilton anxiety decreased 6,87 and the panic anxiety decreased 2,93. The decreasing detail in almost all the tests is obvious. The interesting detail in the very slight increase of the depression in the relaxation group. This probably is occasional, but if it appears to be a constant phenomena it possibly could be interpreted so that Vibro-acoustic treatment as a fairly mechanical relaxation method is not very effective to change the constructive features of life situation.

The results of the stress hormone analysis show that also the endocrinological functions follow the vibration stimulation. The tests were- however - too few to lead to further conclusions. More measurements are needed. The primary interest was in the psychological factors, but in the interviews of several persons reported also about the somatic results. Two test persons had a chronic head ache which disappeared during the research period. Several persons reported about the decrease of back and shoulder pains.

All the test subjects in the relaxation group were satisfied with the treatment and hoped to be able to take part in a new project as soon as possible.

The test subjects in the educational group reported, that the training had helped them in the four following areas:

1. Knowledge and understanding of own work - to some extent.
2. Understanding of the colleagues - too some extent.
3. Improvement of the working skills - to some extent
4. Knowing and controlling stress factors at work - to remarkable extent.

All the participants in the educational group reported their willingness to also receive the Vibro-acoustic treatment.

### ASSESSMENT OF THE RESULTS OF INDIVIDUAL TEST SUBJECTS

In this pretest the changes in each test subject during the project are analyzed individually. On the following tables points are given in measured factors to each test subject before and after the project. Estimates were made by Hannu Naukkarinen, Licentiate in Medicine, and they follow the international standards. The measured factors were stress, anxiety, Hamilton-anxiety (psychosomatic), and depression. The increase, decrease and stability of a factor and the range of change were estimated.

### CHANGES IN STRESS FACTORS OF EACH TEST SUBJECT.

Test subject Relaxation group Educational group  
1 8 - 8 6 - 8 2 4 - 2 8 - 5 3 4 - 2 7 - 6 4 7  
- 9 8 - 9 5 8 - 7 - - 8 6 7 - 4 7 - 7 7 8 - 8 3 - 2 8 4 - 4 7 - 3 9 5 - 8 3 - 6 10 5 - 3 5 - 8 11 7 -  
6 5 - 4 12 5 - 5 3 - 6 13 2 - 1 4 - 3 14 6 - 3 8 - 5 15 4 - 6 - - 6

Unchanged 27% 8 % Increased 20% mean 2,3 46% mean 2,2 Decreased 53% mean 1,9  
46% mean 2,0

In decreasing stress factor the difference between relaxation group and educational group is not big, but noticeable ( in relaxation group 53% - in educational group 46% ). But if the number of test subjects reporting unchanged or decreased stress level are added up in both groups and then compared. the difference is remarkable ( in relaxation group 80% - in educational group 54% ).

CHANGES IN THE ANXIETY FACTOR OF EACH TEST SUBJECT Test subject  
Relaxation group Educational group  
1 0 - 0 1 - 3 2 4 - 0 9 - 3 3 4 - 2 4 - 4 4 4 - 8 8 - 7 5 0  
- 4 - - 7 6 6 - 4 7 - 5 7 8 - 3 2 - 1 8 1 - 1 4 - 2 9 3 - 8 2 - 1 10 0 - 0 2 - 5 11 7 - 4 2 - 1 12 0  
- 0 2 - 6 13 2 - 0 4 - 3 14 1 - 0 0 - 0 15 4 - 5 - - 5

Unchanged 33% 15% Increased 20% mean 3,0 23% mean 2,0 Decreased 47% mean 2,7  
62% mean 1,8 The anxiety level decreased in both groups. 62% of test subjects in the educational group felt decrease of anxiety, which is much more than in the relaxation group. But if the test subjects reporting unchanged or decreased levels of anxiety are

added up in both groups, the result is 80% in the relaxation group and 77% in the educational group. So education seems to have at least as much effect as the Vibro-acoustic method.

HAMILTON - ANXIETY Test subject Relaxation group Educational group  
1 9 - 2 7 - 9  
2 9 - 6 26 - 9 3 8 - 1 22 -20 4 22 -21 20 -12 5 10 -11 - -18 6 9 - 7 12 -16 7 8 - 4 1 - 5 8 5 -  
7 16 -11 9 18 -15 23 - 9 10 1 - 1 12 -18 11 6 - 8 30 -22 12 9 - 9 5 -19 13 5 - 0 22 -17 14  
15 - 4 14 - 7 15 7 - 7 - - 5 Unchanged 20% 00% Increased 13% mean 2,0 38% mean 6,0  
(4,0) Decreased 67% mean 5,4 62% mean 8,3

The difference in decrease is not so clear ( in relaxation group 67% of test subjects while in educational group 62% ). But in the educational group there were quite many reports of increase ( 38% ). The percentage of test subjects reporting unchanged or decreased values were 87% in the relaxation group and 62% in the educational group.

CHANGES IN THE DEPRESSION FACTOR OF EACH TEST SUBJECT Test subject  
Relaxation group Educational group  
1 3 - 3 2 - 0 2 0 - 0 9 - 3 3 0 - 0 2 - 2 4 4 - 7 3 - 2 5 0  
- 0 - - 6 6 4 - 4 7 - 3 7 0 - 0 1 - 1 8 0 - 2 3 - 1 9 0 - 0 4 - 0 10 0 - 0 2 - 4 11 6 - 4 4 - 8 12 0  
- 0 2 - 2 13 0 - 0 4 - 3 14 1 - 0 4 - 2 15 3 - 2 4 - - 2

Unchanged 67% 23% Increased 13% mean 2,5 15% mean 3,0 Decreased 20% mean 5,4  
462% mean 2,5

When this table is studied, attention is drawn to many zeroes in the start values of test subjects in the relaxation group. It could just be a whim of chance, but can also be explained so that the test subjects in relaxation group expected something new and unique and because of that they had a positive attitude. Many in the educational group thought that they were going to take part in conventional in-service training, which is given by the company otherwise and were therefore disappointed. It is worth noticing the decrease of depression factor also in this group.

**(Remark by Olav Skille: Using the same additions as in the preceding tables, we find 87% of the test subjects in the relaxation group when unchanged or decreased are added up, while in the education group the corresponding value is 85%)**

CONCLUSIONS MADE THROUGH THE OBSERVATIONS OF INDIVIDUAL TEST SUBJECTS. According to the results it seems that in both groups a positive progress was made, but consistently the relaxation group achieved better results. If this trend is also shown in further research projects, it would be reasonable to develop the Vibro-acoustic method to utilize it in working life to reduce stress. In this research the results are not absolutely reliable because of the small number of subjects. Anyhow, the results are promising and encouraging for further research.

ESTIMATING THE PROJECT

In the project relaxation and education were found useful. Some problems and pressure were caused by the times. Sometimes it was impossible for a test subject to withdraw from work, especially the educational group had problems because of the group work and because the program they had was meant to be fixed and systematically advancing. In the relaxation group there was more chance for flexibility because the times were fixed individually. But still all test subjects in this group missed a couple of treatments. In the future we aim at such a system, in which workers could arrange the times by themselves. The equipment should also be near enough so no too much time would be wasted on the way. Besides the bed model there is a chair model which can be placed in any ordinary office. This chair model is also quite soundproof so it could be used without disturbing other workers. Still the Vibro-acoustic treatment should be in medical control to ease research work and because treatment without control might not be regular. It would be a good idea to develop both the Vibro-acoustic method and the education and utilize them together. The results might be considerably better.

## DISCUSSION

This experiment was a first attempt to apply the Vibro-acoustic method in working life. It is quite obvious that there are very many uncontrolled factors in this kind of applied research. Working people cannot take part in project carried out in laboratory conditions. In a business organization like the Kansa-Group, this kind of experiment is also unique. The experiences were primarily positive and the company is ready to continue to develop the method for to better fulfil the expectations of the organization. There is also much to do to find the best follow-up systems. The hormone tests are a fairly expensive and complicated method for everyday use, but for collecting data for basic research they are necessary. For everyday use the measuring of pulse, blood pressure and EMG should be sufficient. From the acoustical-physical point of view one maybe important finding was made. When we went through the sinus tone frequencies, which test subjects felt most positive and pleasant, we noticed that they fairly often were related to the overtone series of the Index of Schumann. This is the pulsation of the electromagnetic field of Earth ( 8 Hz ). Some examples of these positive frequencies :  $40 \text{ Hz} = 5 \times 8 \text{ Hz}$ ,  $56 \text{ Hz} = 7 \times 8 \text{ Hz}$ ,  $72 \text{ Hz} = 9 \times 8 \text{ Hz}$  etc. We have also noticed that in every day life surroundings we have a lot of harmful vibrations coming from the traffic and several electronic equipment. It is even possible that the pulsation of electricity, 50 Hz in Europe and 60 Hz in America, are not the best possible ones. But here we come to a totally different area - the cosmology of music. This may be a very important research field in the future.

English translation: Perttu Lehtikoinen.