The Effects of Stress Reduction and Stress Inducing Techniques on the Visual System

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Abstract

Using stress reduction and stress inducing techniques, we measured the results that these techniques have on the visual system. We determined the ability to see objects further in the distance using these two techniques. Three groups were included in the program. The groups included a relaxed group, in which their technique would move an individual further from the object, A stress group, in which their technique would move an individual closer to the object, and a control group whose technique would not create any shift in distance. A total number of 12 participants were used in the study with the mean age at test being twenty four years. A total of fifteen mean readings were recorded over three months. Subjective refractions of individuals were also recorded before and after the program. The results from all three groups was proved in the study. However not much change in the refractive error after the program.

Introduction

Skeffington (1) viewed visual stress as resulting from "a centered task which provokes an avoidance reaction that becomes a drive to center nearer in space". Refractive problems or ocular defects were seen specifically as being the end result of adaptation to visual stress. Further extensions of this model led to the ability to extrapolate from a set of examination findings, information as to whether an individual has been exposed to persistent visual stress, how that stress had affected him and how he had coped with it, approximately how long this coping had gone on and how performance might have been affected. Forrest (2)

The subject of stress has become popular in all aspects of life. There are increasing number of books, articles and television presentations on the subject. An increasing number of individuals and disciplines have become involved in the area of stress and stress reduction.

People who react more strongly to stress have more persistent sympathetic and parasympathetic conditioned responses. They can often lead to diseases of adaptations including many diverse conditions, such as respiratory disorders, skin disorders, immune system disorders, visual disorders such as functional myopia, accommodative and convergence breakdowns.Forrest (2)

Therefore visual stress is not a topic that can be separated from the general stress theory. The visual process is a dominant function of a person in terms of operating in the world and getting meaning from it and thus reflects the actions of the body and mind in specific ways.

The approach of stress reduction and its relevance in terms of optometric diagnosis and therapy is what caught our interest and attention and led us to explore this subject more deeply. Procedures to reduce stress activation may be very useful to optometric therapy. The use of the breath as one technique, is a physiological effect that can be felt in every part of the body. Breathing in brings air into the lungs where oxygen is extracted from it to be used by all the cells of the body as part of its energy producing mechanism. Therefore breathing in can be likened to an influx of energy and breathing out as a withdrawal into restfulness. Flemming(3)

Another regular practice is meditation which leads one to be more aware of the inner verbalization. Individuals who are intense, rigid and analytical tend to engage in a task with strong concentration and drive for achievement. Such individuals tend to emphasize focal (central) vision with decreased peripheral awareness. Excluding periphery this tends to facilitate concentration and reasoning, but is associated with increased attentional energy. Hence increased focal attention with decreased peripheral awareness increases the stress. Birnbaum(4)

Meditation, diaphragmatic breathing and progressive relaxation are procedures commonly used to teach relaxation and stress reduction. Many techniques involve the visual system, including visualization. Dusky (5)

Our study focuses on the relaxation technique founded by the Art of Living. The Art of living course, involves the use of Sudarshan Kriya. Developed by Sri Sri Ravi Shankar, founder of the Art of Living, the Sudarshan Kriya is a special breathing technique which eliminates stress and brings one into the present moment. It is one of the most powerful practices which has a profound effect on the mind, body and spirit. By learning its special pattern of breathing, one can rid the system of the accumulated stress and toxins. (6)

The purpose of the present study, using the Art of Living relaxation technique, was to see if there was any improvement in the ability to see the objects further in the distance. This was associated with a stress technique which involved an exercise program. The exercise routine was carried out for ten minutes. This technique was carried out in the same manner as the relaxation technique, to see the effect of stress on the visual system and how it affects ability to see objects further in the distance. A control group was included and no relaxation or exercise routine was presented to them.

Methods

Subjects

The sample for this study included 12 participants. The mean age at test was 24 years (range = 16-36 years). Participants were included into the study if they met all the following criteria: 1) ametropia, which included only myopia, 2) a visual acuity of 20/20 or better, 3) subjects who performed the basic Art of Living course, 4) Subjects who performed their Kriya everyday for 3 months without any break in-between.

Techniques

For all groups the visual task included a visual acuity chart which was posted on a wall. For the relaxed group, Sudarshan Kriya, was the technique that was performed. The Sudarshan Kriya had to be performed daily. For the stressed group an exercise routine formed part of their technique. No technique was given for the control group. However the exercise routine was not subjected to only one form of exercise routine. They were allowed to do any form of intense routine. This could include running for ten minutes, jogging on the spot for ten minutes, or using the exercise bicycle for ten minutes. The subjects were instructed to choose two days in the week to perform their techniques and record their findings, and were also encouraged to keep these two days consistent for the three months. The times the techniques were performed was also encouraged to be remain consistent for the three months. A total number of fifteen readings (5 readings with each individual reading) were taken over the three months.

Procedure

All groups had to perform this basic procedure (BP). The subjects had to put up a visual acuity chart on the wall and look at the 20/20 row of letters and wearing their glasses or contact lenses they would slowly move back until they could no longer see the letters on the wall, that is, the letters were totally blurred. This distance was measured and kept consistent throughout the program (also known as the starting distance (SD)). Thereafter subjects were asked to move forward slowly until they could just barely make out the letters, even though they were blurred. They were to record the distance at which this was seen. A total number of five individual readings were to be recorded using this BP technique.

The relaxed group would perform the BP and the perform their Sudarshan Kriya which took an average of 30 minutes. They would return to record their results but this time there would be a slight change to the procedure. At the SD they would tighten both fists very hard, lean forward at the waist and blink rapidly. Thereafter would do as before by moving forward until they could just barely make the letters out. They would take deep Ujjayi breadths before recording each of the five readings. Refer to Appendix A for the average values before and after the relaxation technique.

The stressed would perform the BP. Thereafter they would perform their exercise program for ten minutes and would return once again, to perform the BP. Refer to Appendix A for the average values before and after the stress technique.

The control would also perform the BP and thereafter wait for ten minutes. However in these ten minutes, they were not given any task to do. After the ten minutes they would return and follow the BP. Refer to Appendix A for average values before and after the technique. This procedure was reported in the Dusky and Kavner, pp. 232. A similar procedure was reported in Birnbaum (7) 1993, pp. 374-375. However here the technique was performed without the use of glasses or contact lenses to improve acuity. This was performed by Bates who indicated that when one attends to a task individuals tend to stare and blink less frequently and more tensely. Breathing becomes more shallow, and individuals tend to hold their breadth for many seconds at a time. Attention narrows and patients tend to hold their eye steady with reduced eye movements. Deep breathing and frequent blinking develops the ability to see without strain.

Results

A total of fifteen were conducted over three months for all three groups. During each session an average of five readings were recorded. These readings are plotted against the x-axis. The shift in distance from the original starting distance (SD) is plotted against the y-axis. Two graphs from each group are reflected below.

Relaxed Group (A and D)

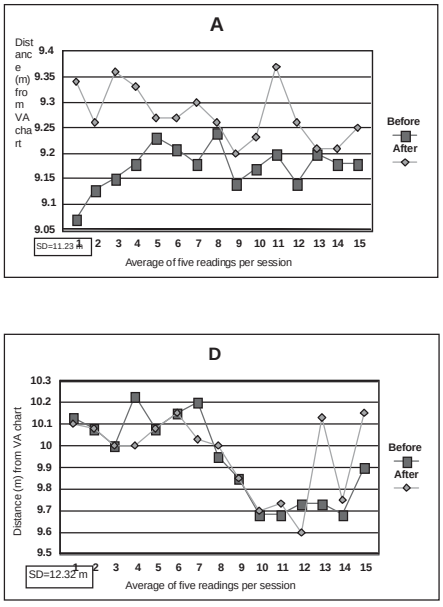


Figure 1

Figure 1 represents the graphs of the two subjects (A and D) who participated in the relaxation technique. Values plotted on each of the graphs are represented with profiles, before and after the relaxation technique. Distance (m) of each graph has been set according to the individual results, therefore variation in results should not be misunderstood due to the different scale configurations scales. With Subject A there is an improvement after the relaxation technique. Mean value before technique is 9.17 ±0.043 and after technique it is 9.27±0.54. A mean improvement of 010m. The profile for this subject started with a great difference, but from the fifth session, much more consistent resultants were found between the before and after techniques, however with only one great variation of reading 11, also being the highest average reading achieved in her entire program Subject D did show a mean

improvement of 0.16m. Only a big fluctuation with the first reading. A very consistent graph was also achieved. As can be seen, there is an improvement in all subjects which suggests that by doing the Art of Living techniques, that you can see at further distances when you and your body are relaxed.

Stressed Group (E and F)

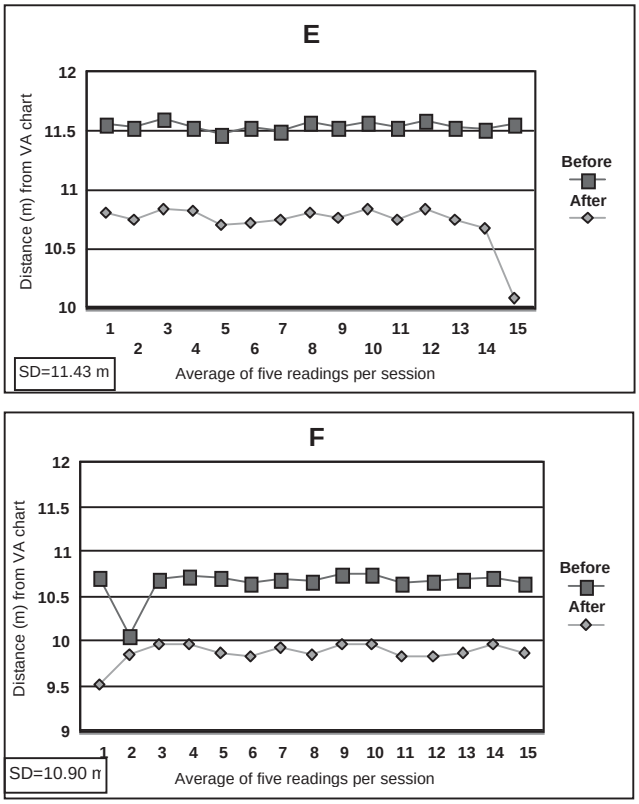
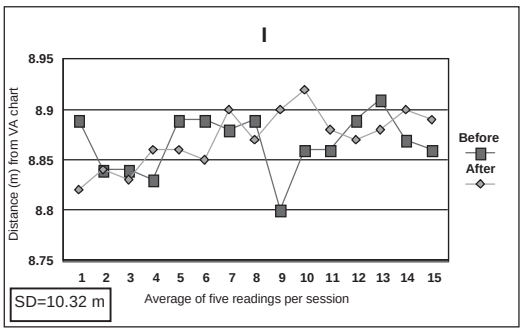
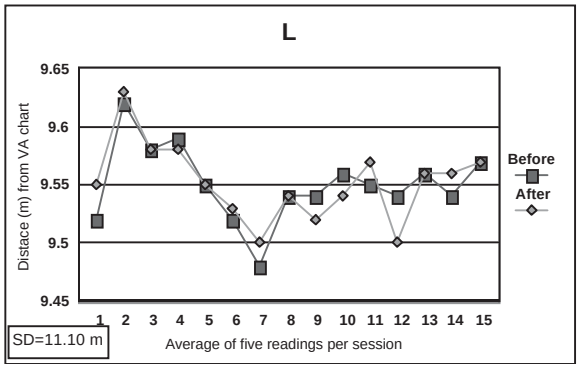


FIGURE 2

Figure 2 represents the graphs of the two subjects who participated in the stress related technique. As can be seen with Subject E, there is a decrease in the overall distance achieved. The distance moving closer by 0.83m. The values seemed very consistent throughout the program, with only reading 15 dropping considerably after technique. Subject F also shows an average decrease in distance by 0.78m. The mean before technique being 10.66± 0.166 and after technique being 9.88±0.031.





Control Group (I and L)

FIGURE 3

Figure 3 represents the control group. With the two subjects the

mean value did not change before technique and after technique. Subject I and L showed no change in standard

deviation before and after technique. Overall, there is no change in readings before and after technique, which supports the fact that when no stimulus was given to the two subjects distances, did not change during the program.

Discussion

With all three groups this study has proven the effect of these techniques on the visual system. Given the fact that this is an independent, subjective response there should be variations between values between different individuals. Since the subjects did show a mean improvement , this does suggest that this type of relaxation technique over a longer period of time would greatly influence the visual system. However the stress group has indicated how greatly influenced the visual system is by stress, showing immediate decreases in distances by large amounts, which enforces one to reexamine their stressful lifestyle and look for approaches to relieve the stress on the visual system, one way would be by following the powerful Art of Living technique. The reliability that we have shown with our program needs to be further expanded by taking contributing factors which include the time factor and the sample size. Our study was conducted in the limited three months and consisted of a total population of twelve people. A larger sample size would without any doubt, show greater effects of the techniques on the visual system.

Conclusion

In the above study, the relaxation and stress induced technique provided us with information regarding the visual system. Stress reduction techniques may be used to improve the ability to see objects further in the distance and reduce physiological stress activation during every day activities. Further investigation is required to provide a more objective analysis of how to interpret these effects on the visual system.

References

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Appendix A

Average Readings (m) of Figures 1,2 & 3 before and after technique

RELAX GROUP - FIGURE 1 Session - S1 to S15

A -	Before	After	D -	Before	After
S1	9.07	9.34		10.13	10.1
S2	9.13	9.26		10.08	10.08
S3	9.15	9.36		10	10
S4	9.18	9.33		10.23	10
S5	9.23	9.27		10.08	10.08
S6	9.21	9.27		10.15	10.15
S7	9.18	9.3		10.2	10.03
S8	9.24	9.26		9.95	10
S9	9.14	9.2		9.85	9.85
S10	9.17	9.23		9.68	9.7
S11	9.2	9.37		9.68	9.73
S12	9.14	9.26		9.73	9.6
S13	9.2	9.21		9.73	10.13
S14	9.18	9.21		9.68	9.75
S15	9.18	9.25		9.9	10.15
MEAN (m)	9.17 (m)	9.27 (m)		9.94 (m)	9 . 9 6
STD	0.043	0.054		0.203	0.182

STRESS GROUP - FIGURE 2

E -	Before	After	F -	Before	After
S1	11.57	10.81		10.72	9.51
S2	11.54	10.75		10.07	9.85
S3	11.61	10.84		10.70	9.97
S4	11.53	10.83		10.74	9.97
S5	11.48	10.70		10.71	9.88
S6	11.54	10.71		10.66	9.83
S7	11.50	10.76		10.70	9.93
S8	11.58	10.80		10.68	9.85
S9	11.54	10.76		10.75	9.98
S10	11.58	10.83		10.75	9.96
S11	11.53	10.75		10.66	9.84
S12	11.60	10.84		10.68	9.84
S13	11.53	10.75		10.69	9.88
S14	11.52	10.67		10.72	9.98
S15	11.56	10.08		10.66	9.87
MEAN (m)	11.55 (m)	10.72 (m)		10.66 (m)	9 . 8 8
STD	0.035	0.185		0.166	0.116

CONTROL GROUP - FIGURE 3

I -	Before	After	L -	Before	After
S1	8.89	8.82		9.52	9.55
S2	8.84	8.84		9.62	9.63
S3	8.84	8.83		9.58	9.58
S4	8.83	8.86		9.59	9.58
S5	8.89	8.86		9.55	9.55
S6	8.89	8.85		9.52	9.53
S7	8.88	8.9		9.48	9.5
S8	8.89	8.87		9.54	9.54
S9	8.8	8.9		9.54	9.52
S10	8.86	8.92		9.56	9.54
S11	8.86	8.88		9.55	9.57
S12	8.89	8.87		9.54	9.5
S13	8.91	8.88		9.56	9.56
S14	8.87	8.9		9.54	9.56
S15	8.86	8.89		9.57	9.57
MEAN (m)	8.87 (m)	8.87 (m)		9.55 (m)	9 . 5 5
STD		0.029	0.029		0.033

0.033

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