

EQUIPMENT AND METHODS OF VISUAL SENSOR SYSTEM REHABILITATION

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INTRODUCTION: The visual sensor system is very important in life and sport activities. Its fatigue and overstrain cause myopia. The purpose of this investigation was to devise effective means of influencing myopia of the visual sensor system, in order to prevent or correct it.

METHODS: According to Bates (1968), myopia is caused by excessive strain on the external oblique eye muscles. To remove the above effect it is necessary to design a special exerciser that would allow control of muscles moving the eyes. A program of rehabilitation was therefore devised that included an exerciser which allowed subjects to move their eyes in a defined direction for warming-up and biomechanical muscle stimulation. Warming-up time is 1–2 minutes. The exerciser consists of electronic units and an indicator board. The exerciser is used for light indication based on a running light effect. This allows one to move the eye in a definite direction: a) along the circumference; b) from the right to the left, from the left to the right, from the top to the bottom, from the bottom to the top; from the top right corner to the bottom left corner; from the top left corner to the bottom right corner; c) semi-circumference at the top and bottom; d) divergent and coincident motion along a circumference, horizontal and vertical lines can be also performed. The speed of running light can be regulated. After warming up a short biomechanical stimulation starts. We have measured brain blood flow in 13 hospital patients in supine and sitting positions by means of reoencephalogram. Optimum biomechanical stimulation leads 1) to an increase of venous return by 25% in supine and by 31% in sitting individuals; 2) to improvement of arterial blood flow to brain vessels due to increased tonus of large and middle-size brain vessels by 26% in supine and by 25% in sitting positions. The investigation showed that after a long biomechanical stimulation venous return decreased by 82% in supine and by 34% in sitting positions. As a rule acupuncture of not more than four points followed biomechanical stimulation (Figure 1). Biomechanical stimulation was effected by a designed stimulator in order to stimulate face mimic muscle fibers and biological active points. Forty-five shooters of the National Belarus Shooting team were tested and their visual acuity determined by means of Accomodometer with Astoptometer AKA-01 (test objects 3 and 1 were applied for long and short distances, respectively).

RESULTS AND DISCUSSION: Twenty-two shooters of various qualifications took part in the experiment, their visual acuity being reduced in one or both eyes. (At first 45 individuals were tested and as there were volunteers among them and their vision was quite good, there were only 22 individuals left). If we consider the basic level of visual acuity to be 1, the gain in visual acuity was in the range from 1.2 to

2.1. The average gain by the end of the 4th experimental day amounted to 1.5 for the right and 1.7 for the left eye, respectively, compared with the initial value. The application of the devised methods led to an average delta gain of 0.35 ± 0.16 ; 0.24 ± 0.16 in the right and the left eye, respectively ($t=3.85$) (Figure 2). Statistical analysis proved that the results were valid with a validity index of 99%.

CONCLUSIONS: The equipment and methods used in the present study contributed to an increase in accommodation volume and visual depth. The equipment and methods can also be used to relax visual tension in microscheme fitters, and it can be successfully used for IBM operators working on displays.

REFERENCES:

Bates, W. H. (1968). The Bates Method for Better Eyesight without Glasses. New York: H. Holt and Company.

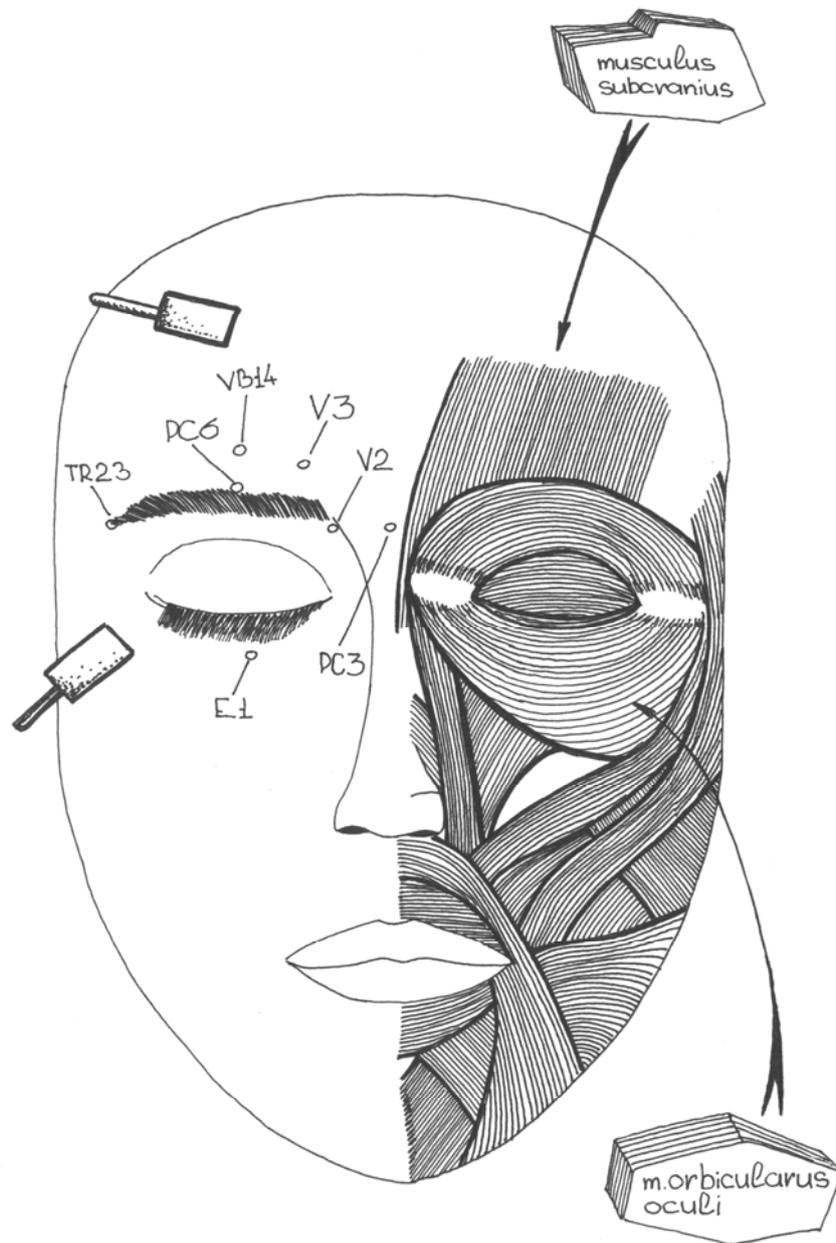


Figure 1 Mimic face muscles and biologically active points (acupuncture points) used at biomechanical stimulation.

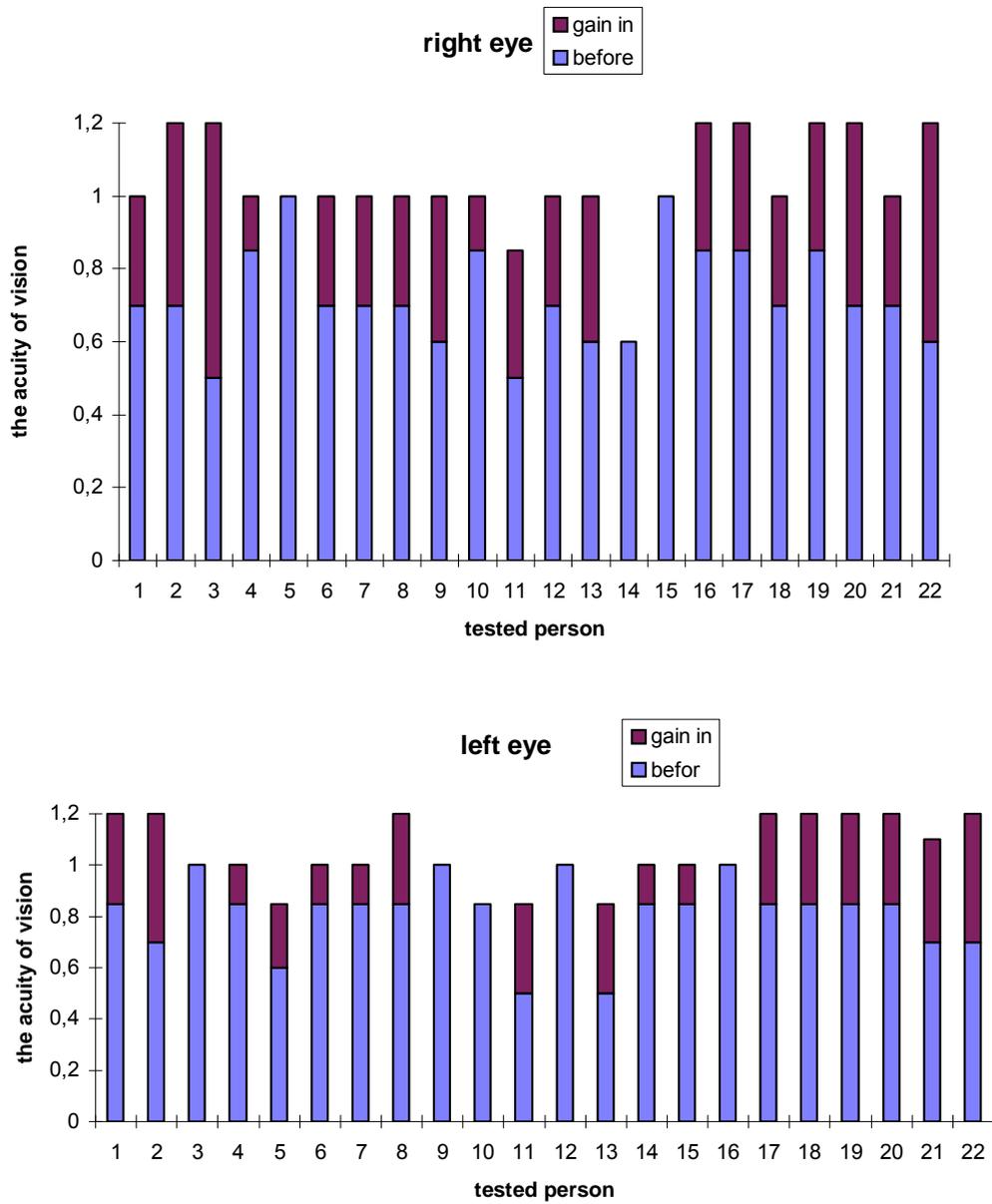


Figure 2 The Effect of Devised Method on the Acuity of Vision in Shooters