

Non-invasive eye acupuncture on visual accommodation

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Abstract—Non-invasive eye acupuncture uses magnetic patches to stick to the Jingming and Sizhukong acupoints on the left and right eyes of the subjects, and the Fengchi acupoints on the back of the neck to achieve a similar effect of finger massage. After adhering the magnet sticks for 56 hours, 25 subjects increased the blood circulation, and the visual accommodation capability increased by 10%-14%. According to the brain wave test data of distance vision chart, meditation is greater than attention. In the above two tests, the above phenomena of elders were more significant than young people. Therefore, the application of magnet stick on acupoints can provide an innovative method to improve the visual fatigue and the capability of visual accommodation.

Keywords—accommodation, meditation, magnetic stick

I. INTRODUCTION

The mechanism of the treatment of the magnetic field acting on acupoint is to produce biological effect by the influence of magnetic field on the distribution of biological current. Since the magnetic field is not blocked by the skin and absorbed by the cytoplasm, it is easy to penetrate into biological tissues. It has different effects on the biological molecules, cells, nerves, organs and all levels of the body. Figure 1 shows the acupoints on the human face and back neck.

With the progress of the rapid development of science and technology, the popularity of 3C products has increased. In addition to the impact of the epidemic this year, many countries use distance courses and distance work. Apart from sleeping, modern people are living along with smart phones or computers 24 hours a day, so the eyes are in a state of fatigue. Research on the use of physical methods to reduce eye fatigue, to achieve pressure relief, is the main topic of optometry practitioners now days. The loss of any visual stimulation in preschool children may lead to strabismus, myopia, amblyopia or abnormal retinal correspondence, thus damaging binocular vision. At present, ophthalmologists often use a variety of tools and devices for vision training, so that children can develop normal binocular vision skills and control myopia diopter. In this study, an innovative method was developed by using the magnet patch to the eye acupoints of the subjects with visual fatigue. The mechanism is to produce biological effect and therapeutic effect through the influence of the magnetic field on the distribution of biological current. Magnet may penetrate 4cm into skin, dredge the meridians, promote blood circulation, slow eye fatigue and eliminate black eyes, improve visual quality, and maintain eye health. [1-3]

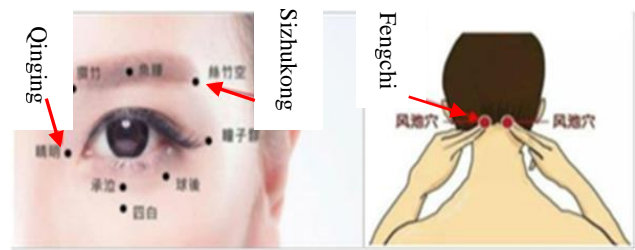


Fig.1 Face: Jingming and Sizhu acupoints ; Back neck: Fengchi acupoints

II. SYSTEM STRUCTURE

(A) Accommodation capacity and flipper lens

The accommodation capacity is examined with a $\pm 2.00D$ flipper lens to measure the number of flips per minute in cpm (cycle per minute), which represents visual accommodation, speed and durability. Flipper lens structure is with hyperopia + 2.00D on one side and myopia - 2.00D on the other side. The normal value of flipper lens test was 12 cpm in one eye and 8-10 cpm in both eyes.

Use the $\pm 2.00D$ flipper lens to read out the numbers or text on the accommodation card, the expectations of the accommodation capacity are as follows: children at age 6 about $3.0\text{cpm} \pm 2.5\text{cpm}$, 7 years old about $3.0\text{cpm} \pm 2.5\text{cpm}$ and 8 years old about $3.0\text{cpm} \pm 2.5\text{cpm}$, adults about $10.0\text{cpm} \pm 5.0\text{cpm}$. In the accommodation capacity test, when the visual card is clear, the number of flips per minute in one eye is higher than 12 cpm, and in both eyes is 8-10 cpm, which means that the accommodation capacity of the eye muscle and the elasticity of the lens are good, and it is not easy to produce myopia. After pasting the magnet patch for a period of time, the cpm of the flip lens will generally increase after the test of the flip lens. The increase of the frequency can be calculated by formula (1).

Increasing rate of flipper lens (P%) = $\frac{\text{number of flips without flipper lens}}{\text{number of flips with flipper lens attached}} \times 100\%$ (1)



Fig.2 flipper lens

(B) System layout

The system architecture is shown in Figure 3. When the subjects read the visual acuity card before and after pasting the magnet stick, the flipper lens, was used to measure the number of flips, and the change of accommodation capacity was known. At the same time, the monopole brain wave device was used to capture the visual signals of brain waves, so as to obtain the changes of the attention and meditation curves of the subjects when the vision was stimulated. The related components and their uses are described as follows:

(a)Magnet stick: it was pasted on Qingming acupoints, Sizhu acupoints and Fengchi acupoints of the back neck to produce magnetic effect to eliminate visual fatigue and black eyeball.

(b)Single pole brain wave device: measure the brain wave meditation before and after sticking the magnet patch to confirm the visual relaxation state.

(c)Computer: the data captured by the single pole brain wave device is drawn into a function graph.

(d)Flipper lens: the flipper lens was used to measure the number of flips (cpm) of subjects before and after pasting the magnet patch, and analyze the effect of magnetic force to improve the visual adjustment.

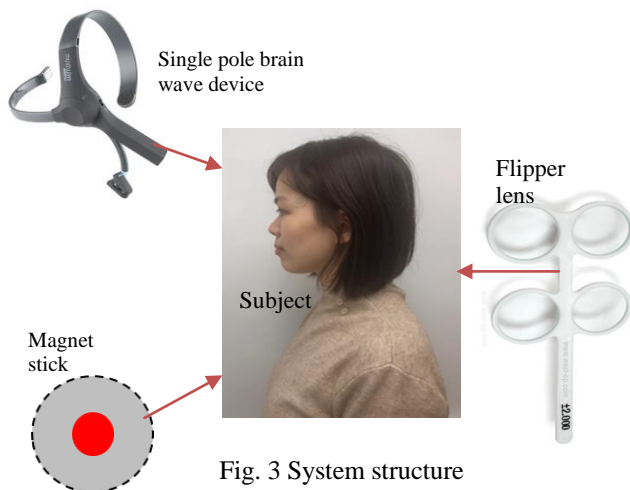


Fig. 3 System structure

III. EXPERIMENTS AND RESULTS

The subjects were mainly healthy eyes, excluding eye diseases and eyes after laser surgery. Before using brain wave signal acquisition equipment, the body and mind of the subjects must be relaxed, and the test value will be closer to the real brain wave curve. The subjects were 25 people with different working styles. Group A was 20-40 years old and group B was 41-60 years old. The magnet sticks were applied for 56 hours. During the brain wave test, the subjects sit on the optometric chair, lean their body against the back of the chair, and keep their brain as still as possible, so as not to interfere with the measurement signal of the single pole brain wave device. According to age, 20-40 years old was group A, 41-60 years old was group B. At the beginning of the experiment, the visual acuity was measured and the best diopter was obtained. The group B over 40 years old added the near distance diopter, that is, the diopter of Presbyopia. Before and after the application of the magnet patch, the subjects need to have a full rest to reduce the external interference. After 56 hours of the application of the

magnet patch, the brain waves and the flipper lens were measured.

The EEG was measured under the condition of 500 lux and 6 m E type-chart in the indoor environment. The following is the measurement results of attention and meditation of EEG of subjects in group A and group B pasted with magnet sticks. Figure 4 shows the curve of attention and meditation of brain wave before, during attached and after the removal of the magnet patch in a 25-year-old female subject. The attention curve of the subjects with magnet patch was higher than that without magnet patch. The curve of attention and meditation of brain wave during attached and after removal of the magnet patch in 57 year old female subjects. The attention curve of the subjects with magnet patch was higher than that without magnet patch.

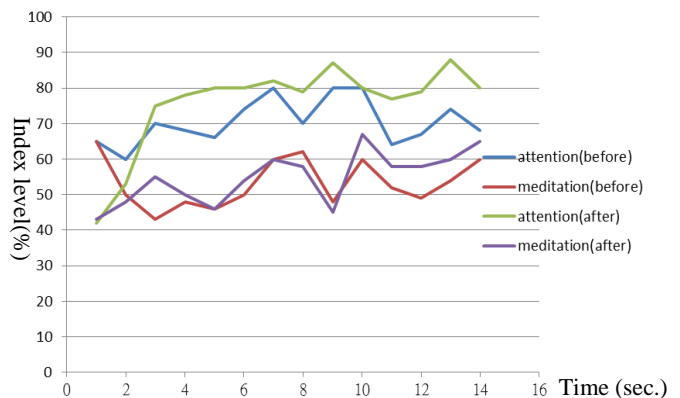


Fig. 4 The attention and meditation curve of brain wave for 25-year-old subjects

IV. CONCLUSION

The combination of magnetic field generated by magnet patch and acupoint medicine principle of traditional Chinese medicine is a new technology to improve visual fatigue and concentration. The 2000 Gauss negative magnetic energy generated by the magnet patch penetrates into the subcutaneous tissue to improve human visual fatigue and enhance the concentration and comfort of reading. It has the characteristics of no drug, no residue, no burden, environmental protection and practicability. In the future, different components of magnetite will produce different effects, which will have new and different curative effects on medicine. After using the magnet patch, the brain waves of the subjects with visual fatigue in this experiment changed from attention to meditation, and the eye adjustment ability was improved. Therefore, it is an innovative method to improve visual fatigue and accommodation by sticking magnetic stone sticks on acupoints.

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