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TECHNIQUES USED FOR IMPROVING VISUAL EFFICIENCY

ROBERT ALLBAUGH AND CHARLES MILLER

INTRODUCTION

During the war a great many claims were made for methods of increasing visual acuity, decreasing astigmatism, correcting eye-muscle balance and even to overcoming color blindness. A veritable wave of cures has arisen to aid young men with borderline vision who desire to enlist in the air corps or other branches of the service requiring nearly perfect vision. The civilian population will probably feel the effects of these remedies which are causing some concern in optical circles. The present authors are attempting to attack the problem experimentally and this paper is presented as a survey of the field as it has been expressed by various writers.

STATUS OF THE GENERAL PROBLEM

Methods of improving visual efficiency through physical exercise and other means are not new. The Helmholtz theory of vision postulates that lens relaxation is brought about by ciliary muscle action balanced against the natural elasticity of the lens. This implies the possibility of correction of certain visual defects by corrective physiological processes.

Dr. W. H. Bates, principal exponent of natural methods of eye treatment, holds that focus is obtained through the action of the muscles of the eyeball. Bates method of visual improvement appears to have the largest following among general practitioners in the profession.

Varied studies have been conducted on natural methods of curing defective vision. The three chief methods are physical exercise, proper relaxation, and proper diet. According to Corbett (1936) the Bates method is the most widely-known and accepted system of physical exercises for visual improvement and many other systems or methods are based upon it.

No miraculous cures were claimed for his system but perseverance, patience, and work are said to have brought normal sight to many persons. Organically caused visual disorders sometimes need treatment by surgery and other therapeutical methods, but there are many advantages to treating an eye defect by natural means. Exponents of the various systems of eye exercise maintain that glasses are artificial and should be considered as a last resort for correction. The chief advantage is in neutralizing the effects of faulty vision but not in actually curing the causes.

Bates expounds the principle that much eye trouble is largely the result of strain, so prevalent in our present work-a-day world. This effect is probably most deleterious to the functioning of the six muscles that turn and focus the eye. According to Bates, adjustment of focus in the eye is attained solely through the action of these muscles of the whole eyeball.

Pursuing this theory further the Bates method stresses the importance of relieving muscular nervous strain through proper exercise and relaxation. Three of the most beneficial are:

1. Blinking.
2. Central Fixation.
3. Shifting.

Blinking relaxes the eye through the cleansing action of the tears and other eye fluids with its attendant property of washing away irritating foreign matter. Lymphatic fluid circulation around the eye is stimulated while the muscles governing the pupil size have a chance for momentary relaxation. This spreading of fluid over the eye assists in maintaining a constant temperature through its evaporating action.

Central fixation means using only the macula lutea. The latter covers an area approximately the size of a pin head in the center of the retina, and is the only spot of perfectly clear vision. An attempt to see more than the image falling on this small area results in strain which is directly proportional to the distance from the macula lutea. Looking at each and every letter separately on an eye chart while putting the others in the visual background will aid in developing macular vision. Looking through a 15 mm. hole in a 30 mm. square piece of cardboard will train the eyes to focus on one small spot until such a procedure becomes a habit. This is at least the theory of visual improvement by the central fixation method.

It is thus known that clarity of vision is proportional to the distance of any given point from the macula lutea. The use of any other spot of the eye for sight will force strain with resultant eye-trouble.

Shifting at first glance appears to contradict the last rule for good vision but, although the clear vision of the macula lutea must be utilized, lack of shifting creates staring which is a most destructive form of eye-strain. Reading with conscious focusing and shifting on each word conditions the habit of involuntary shifting.

One of the most useful exercises for eye treatment is said to be the "long swing", which relaxes neck, shoulder, and back muscles while such movement forces the eyes to shift. The feet are placed six inches apart and the whole body is continuously rotated in a half-circle about eighteen times per minute.

Mental and physical relaxation may be utilized in "palming" to relax the eyes. In this operation the hands are cupped and placed on the edges around (not on) the eyes with fingers overlapped and resting on the bridge of the nose. This is said to keep out light and gives the eyes opportunity for necessary relaxation.

Swaying furnishes rhythmical physical exercise with resultant soothed and relaxed nerves. With the body bending in a nine to twelve inch arc, side sway is instituted, each sway taking two or three seconds.

The Snellen chart assists focusing when placed ten to twenty feet away and read over several times in succession. Blinking after each letter prevents strain.

Ability of focus may be increased by looking at any object a few inches from the eye and then quickly focusing on a point in the distance. Another simple exercise consists of moving the eyes to their extreme limits in both a vertical and horizontal plane followed by a period of relaxation.

Steenback and his co-workers at the University of Wisconsin discovered that carotene is intimately related to vitamin A. This provitamin A (carotene) is necessary for the formation of visual purple, which in turn must be present in the retina for proper night vision. Liver, cod-liver oil, and other foods containing vitamin A may be used for treating night blindness. Jeans and Fentmire (1936) administered vitamin A to eighty-one children with subnormal dark adaptation. All but three developed normal adaptation.

Good posture, pleasant thoughts, and an occasional deep breath are said to be habits which furnish the eyes with a more plentiful oxygen supply.

Sleep, in itself, is no guarantee of adequate rest. If eyes are continually strained during the day, tension remains throughout sleep and fosters a worn-out feeling of the eyes in the morning. "Palming" and the "long swing" appear to be two excellent exercises for pre-sleep relaxation.

External pressure places undue strain on eyes. Consequently under-water swimming and eye baths are considered harmful. Splashing water upon the eyes should serve to relieve the irritation without producing pressure. Lymphatic vessels and capillaries are relieved of stasis through massage around, not upon, the eyes.

Color-blindness is said to be aided by association exercises and tests as well as by relaxation in the form of "palming", swaying, the "long swing". Macular vision exercises are also claimed to aid in reducing color-blindness. The present authors are very dubious of these claims.

Glare sensitivity is said to be overcome to some degree through sensible exposure to the sun. Physiotherapeutical devices, such as, ultra-violet, infra-red, and radiant heat lamps, are beneficial only when operated by experts. Sunlight is said to be the most healthy and natural way to condition the eyes and may be utilized by facing the sun and rotating the head back and forth in a one hundred and eighty degree arc. The eyes are opened when facing sideways and each time gradually work the point of opening nearest to the exact direction of the sun. Prolonged exercises of this type are very harmful.

Proper procedure in reading may relieve much strain in our modern technical world yet periods of convalescence are utilized by many persons for intense eyework. This effect seems comparable to that produced by engaging in strenuous activity with a high fever on one's body. Good illumination is essential but any glare tends to attract visual attention and the physical effort exerted by the eye muscles in overcoming this distraction produces strain. Frequent rest and blinking serves to forestall visual fatigue while occasional changes of focus allow the eye muscles some necessary relaxation.

Hyperopia is present whenever light rays are focused back of the retina. Peppard (1940) asserts that such eye-strain cases may be treated by blinking, shifting, "palming," "long swing," and reading from a distance of ten or eleven inches. These exercises tend to relax and balance the extrinsic muscles.

Myopia is present when light rays are focused before reaching the retina. Blinking, shifting, focusing on one point, long swing, central fixation, and Snellen chart exercises are said to be very beneficial in myopia treatment.

Peppard maintains that the instability-change of both degree and axis of error of astigmatism created a doubt in his mind concerning the infallibility of Helmholtz's theory of sight. According to the same authority, unequal tension of the extrinsic muscles is responsible for astigmatism and relaxation may reduce or even eliminate this error. The standard relaxation exercises of blinking, shifting, "swaying," "long swing," and Snellen chart are most beneficial for this purpose.

Crossed-eyes or convergent strabismus as well as divergent strabismus is merely inability of the two eyes to focus on the same point at the same time. The tendency toward this condition is called heterophoria. Treatment of the two conditions are similar.

Inability of extrinsic eye muscles to keep the eyes directed at the same point, simultaneously, will produce cross-eyes. A very young child's crossed-eyes may be corrected through the use of a patch over the properly functioning eye. This forces the "crossed" or weaker eye muscles to learn to focus properly. Adults may use the exercise for far-sightedness, unless one eye is near-sighted.

Cataract, according to Peppard, does not consist of a growth as is the common conception. Loss of lens lymphatic fluid allows the lens to become dry and hard. When drying becomes so acute the lens layers separate, the lens itself becomes opaque, stopping or impeding the light from reaching the retina. Rest, "long swing," blinking, central fixation, shifting, should be utilized and the physician's services should be sought. Generally lowered muscle tone causes presbyopia which results in blurred vision at the near point for persons 40-45 and older. Standard relaxation exercises, Snellen chart exercises, central fixation, and focusing improve eye muscle tone and tend to alleviate this condition.

Internal fluid pressure, or glaucoma, interferes with accommoda-

tion, consequently all relaxing exercises, especially the long swing, are most valuable.

Pinched nostrils during nose-blowing will force mucous matter into delicate upper mucous passages with resulting infection and contamination, subsequently affecting the eyes. Ears should be free from wax, and any tooth or throat infection may become destructive to vision through their common lymphatic system. Steady and rhythmic breathing habits should be acquired for a plentiful oxygen supply. This is said to be important to good vision.

Silver (1943 unpublished) in Washington, D. C., has produced some startling results in improvement of vision by utilization of the after-image of movement by producing illusory enlargement of letters. He also uses other devices for improving vision.

Ninety-three percent of the Royal Air Force Orthoptic Clinic's patients returned to their squadron after three weeks treatment for defective visual judgment, mainly through corrective exercise and relaxation. The staff of thirty-four orthoptists who obtained this very significant result do not claim to restore sight but do assert proper orthoptic treatment may correct certain eye-strain and visual judgment defects. Thus it appears that some beneficial results seem to have been procured by such treatment for visual defects and we may safely make the following tentative conclusions.

CONCLUSIONS

1. Insufficient experimentation and research leaves this field shrouded in generalities.
2. Lack of valid data on results places any judgment of the validity of visual exercises on an unscientific basis.
3. The Royal Air Force Orthoptic Clinic showed that expert treatment may alleviate a high percentage of certain types of visual defects but the number of cases appears too small for reliable conclusions.
4. No claim is made for curing all types of defective vision by advocates of improvement techniques.
5. Defects of psychological origin and cases of eye strain are usually helped if not cured, through physical exercises and development of proper visual habits but advice from a competent specialist is to be recommended before resorting to visual treatments of any type.

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REFERENCES

1. Orthoptists Work With The Royal Air Force in England. *American Journal of Optometry and Archives of American Academy of Optometry*, 20, No. 5, 181-183, May, 1943.
2. Callow, A. Barbara: *Food and Health*, 48-50 Oxford University Press, 1938.

3. Corbett, Margaret Darst: *How To Improve Your Eyes*, Willing Publishing Company, Los Angeles, 1938.
4. Jeans, P. C. and Zentmire, F.: *Journal of American Medical Association*, 106,996. 1936.
5. Peppard, Harold M.: *Sight Without Glasses*, Blue Ribbon Books, Inc., Garden City, New York, 1940.
6. Price, C. S.: *The Improvement of Sight by Natural Methods*, Sherwood Press, Cleveland, Ohio, 1936.
7. Squibb, E. R. and Sons: *Physicians Vitamin Reference Book*, 9-11 E. R. Squibb and Sons, New York, 1940.
8. Silver, E. H., (Unpublished Report), 1943.