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RETRAINING OF CENTRAL FIXATION IN THE PARTIALLY BLIND DUE TO DEMYELINATING DISEASES OR OTHER ORGANIC LESIONS

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Abstract
Methods of visual retraining are described for patients suffering loss of central vision and impairment of spatial orientation due to a demyelinating disease.

Key Words
Multiple sclerosis, demyelinating disease, visual retraining, spatial reorientation.

Demyelinating diseases such as multiple sclerosis can cause various symptoms involving the eyes. One is ocular deviation causing diplopia, which is treated with prisms in all our orthoptic centres. One orthoptic school does more than this. MS can also cause loss of central vision, a loss which not only affects the reading ability of the patient, but also impairs his orientation in space. Thus the patient is severely handicapped in addition to other symptoms caused by MS. For more than 15 years Professor Otto and his orthoptists in St. Gallen have been treating patients with loss of central vision due to organic lesions. Their methods are described in various publications[1],[2] and have been adopted in several countries. I would like to outline the main points in this systematic training course.

Therapy has to be carried out as if there were no damage to the macula. The exercises have to be as realistic as possible so that the patient realizes that he can actually see better in daily life through use of the tiny islands in the macula which retain some vision.

1. Exercises with the aid of the sense of touch

The aim is to direct the eye accurately in every visual meridian. Indirect gaze (a sort of eccentric viewing) gives way to central fixation, and separation difficulties grow less when smaller targets are used.

Firstly the palm of the examiner's hand must be localised correctly with the periphery of the retina, at a distance of 25 to 30 cm. the patient is asked to cover the hand of the examiner with his own in all visual directions with increasing speed and without searching movements.

Then the examiner forms a ring with his thumb and forefinger. The patient is told to fixate the middle of this ring and then to pierce it with his forefinger without touching the ring. The examiner constantly watches the patient's eye, and may have to demand immediate action the moment the eye is seen to be correctly adjusted. Central fixation is also challenged when the patient is asked to touch a single small object as quickly as possible, again in constantly changing visual directions, or when he is asked to touch the fingertips of the examiner's hand in changing order. At first the hand is held still, then it is presented with slow sweeping movements. It is all-important that the eye should be directed accurately before touching.

2. Exercises without the sense of touch

Here the patient is asked to achieve central fixation while the object is shown at increasing distances. We use cards 15 cm square, with thin black frames. Each shows a single optotype at the centre, in sizes from 0.1 to 1.5 for 5 metres (5/50 to 5/7.5), the frame of each card making it easier to find the optotype at the centre. Successively smaller optotypes are presented at a distance of 50 cm, so that gradually more central parts of the retina are called for. Then the cards are shown in different directions of gaze.

After a while the examiner moves away in steps of about 25 cm, thus increasing the distance at which optotypes are to be read. The aim is to maintain central adjustment of the eye when more and more of the surroundings crowd into the field of vision. The optotypes are steadily reduced in size. If the patient shows insecurity or loss of central adjustment by moving his head he is at once told to close his eyes, then to look at a bigger area (ceiling, floor, etc.) and then to adjust his eye to the middle of the card while consciously keeping his head motionless. If he fails, the exercise has to start again at 50 cm so that the false localisation will not prevail.

For near vision training, dice of different sizes (height varying from 0.5 cm to 5 cm) and different colours (white, black, blue, and red with black or white spots) are used. The patient picks out the dice he can see best – usually a white one with black spots. After reading the number of spots he is asked to find other numbers of spots on the dice. Through this excerise the patient has another psychologically important experience: as a consequence of the damage to the macula the coloured dice are perceived in various shades of grey. With more and more frequent use of the macula centre, colour perception will return, and this in turn stimulates the patient to know better whether he is using the centre or not.

3. Exercises to train reading ability

The main aim of all the exercises mentioned so far is to recover reading ability. There are two further requirements:

– to recover reading movements in combination with
– discrimination of fine detail.

First sheets are used with horizontal lines of different lengths, at the end of which numbers are printed. With these, following and localising movements are elicited. At first the numbers are rather big, in order to stimulate pursuit movements; gradually the numbers get smaller, requiring differentiation of finer detail. We also use sheets on which numbers are typed with one, two or three digits. A black mask is put over the numbers so that only one at a time is visible in the middle. The hole in the mask is moved evenly over the numbers; the patient has to decipher each one as it appears. Next, he is shown a whole row of numbers, with a black strip of paper above and below. He is told to read the whole row one number after another, and is not allowed to leave any out.

The next step is to children's books with big letters. Again the examiner puts black slips above and below the line to be read and at first frames every word with his fingers so that only one at a time is visible to the patient. It is essential that he should perceive the first letter of the word, not to pass over it. Long words will scare the patient at first, and should be read out to him. It is important that the examiner reads out words that are not recognised as soon as the patient shows any hesitation, so that there will be no stagnation in the reading movement. The print is made smaller and smaller. There also exist sample texts with print which steadily decreases in size.

Even when reading ability is regained it is important to explain to the patient that because of his disease he will be no longer able to take in the face of the text at a glance or to fixate at will any letter with its surroundings, but that he must consciously carry his eye along from one fixated point to the next, unconcerned by the lack of perception to the right and left. It is understandable that the patient can read small type better than big print. Big print will not wholly fit into the remaining islands of the damaged macular area so that searching movements are apt to start, disrupting the physiological central adjustment of the eye.

It may sound very easy to carry out all these exercises. From my own experience with this therapy I can assure you that treating patients with organic lesions is an extremely difficult task. It not only involves tremendous concentration on the patient's eye, but also some psychological skill in encouraging those patients who are disheartened and timorous in spirit because of their disease. However if a patient regains orientation in daily life and perhaps even reading ability, it is certainly worth the effort.

Summary

In patients with loss of central vision due to organic lesions, spatial orientation is impaired as a result of a vicious circle of indistinct vision, eccentric fixation and suppression of foveal perception. By systematic training, the normal sense of direction and thereby good orientation may be restored, and by reactivation of suppressed macular functions some reading ability may be regained. The training course is described on the basis of 15 years' experience.

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