

Training eccentric fixation for reading:
The implementation of a community based service – a pilot study.

Summary

Aims

To teach eccentric fixation for reading to people with central vision loss who retain a degree of peripheral vision (mainly but not exclusively, people with age related macular degeneration) and who wish to regain some functional reading ability.

Methods

21 subjects with central vision loss and with both absolute and relative scotomas were given a low vision assessment which identified the preferred eye for reading, determined the preferred retinal locus for viewing and provided optimal magnification. Subjects were then provided with training material and the required amount of training, which was provided by Visibility (formerly Glasgow and the West of Scotland Society for the Blind). Subjects were asked to practice every day at home for a maximum of 20 minutes and to try short reading tasks whenever they needed to.

Results

Results similar to previous studies were obtained consistent with a mean reading speed of 70 words per minute at 13.5 point Microsoft word Ariel font and a comprehension of 89% were achievable for most subjects. Some subjects were able to achieve a significantly higher performance score (up to 106 WPM) and could also read smaller font sizes for short periods but with a decrease in comprehension. Overall, subjects were happy with their results and expressed an increased sense of independence and confidence along with regained ability to perform many everyday-reading tasks. again.

Conclusion

This pilot study group consisted in the main of well-motivated individuals. Evident motivation was a strong indicator of being able to master the technique.

Training in eccentric fixation for reading is a useful tool for the low vision therapist. If these early indications of success prove to be predictable and reproducible, then debate will be warranted on how and when this training should be made generally available.

Introduction

What is ARMD

Age related macular degeneration is the commonest cause of registration for visual impairment in the West of Scotland **(1)**. In most cases treatment is ineffective and the resultant bilateral central retinal scarring causes loss of central vision with preservation of the surrounding visual field. The consequent visual impairment causes disability and frustration both on account of poor visual acuity and because of the innate mechanism of central fixation of the object of interest, which leads to the object of interest disappearing into the central scotoma.

What do we mean by eccentric viewing?

The concept of training patients to employ functioning retina adjacent to the scotoma has been espoused for a number of years **(2)** but the method has yet to gain widespread acceptance. Recently, convincing objective evidence has emerged which shows that training in eccentric viewing can prove effective because a new discreet focus of fixation which utilises intact retina adjacent to the retinal pathology can be established by training. The underlying principles of training comprise the following stages **(3)**:

- Identification of the preferred eye for reading
- Determination of the preferred retinal locus for viewing
- Determination and provision of optimal magnification
- Provision of training material which allows the subject to view the reading material at the chosen location and eccentricity from the visual axis
- Provision of the required amount of training

Proof that eccentric viewing allows a new fixation locus to be created

Scanning laser ophthalmoscopy affords simultaneous viewing of text superimposed on a subject's retina while the subject reads. By this means it has been shown that prior to training the preferred retinal locus is commonly to the left of the retinal lesion, corresponding to a location to the left of the central scotoma **(4)**. These authors have shown that it is possible to train patients to read using a retinal locus above, (or occasionally below) the retinal lesion. Following a mean training period of 5.2 hours eighteen out of twenty subjects were able to master the technique, and by using high magnification, (mean 14.3x) the mean reading speed was increased from 9.0 +/- 5.8 words per minute to 68.3 +/- 19.4 words / minute. Scanning laser ophthalmoscopy was used to observe the pattern of fixation during reading, before and after training. Subjects who mastered the technique, adopted a new fixation locus above or below the central retinal lesion. In two previous studies by the same team very similar success rates have been attained **(5)**.

The effect of training in Eccentric Viewing on reading rates in subjects with age related macular degeneration

A pilot study aimed at repeating the above results has been carried out by Visibility (formerly Glasgow and West of Scotland Society for the Blind), under the auspices of a grant from Glasgow City Council. The low vision aids employed comprised unocular hyperocular spectacle mounted lenses prescribed by the low vision service at the Tennent Institute of Ophthalmology, Gartnavel Hospital, Glasgow.

Subjects

The study group comprised 21 subjects (15 female, 6 male). Subjects were referred in the main by the Glasgow branch of the Macular Disease Society (16 subjects) with 5 from other sources. The mean age of subjects was 70 (range was 20-90). 16 subjects had absolute central scotomas. 5 had relative scotomas. 18 had age related macular degeneration, 2 had Leber's optic neuropathy and one had macular dystrophy 17 subjects were able to eccentrically fixate to some degree prior to training and 4 could not. All subjects had a preliminary low vision assessment to assess the extent of scotoma (using an Amsler grid), to identify the preferred retinal locus, and to prescribe the appropriate hyperocular. Training times were flexible and arranged to meet the needs of the subject. All training took place at Visibility, 2 Queens Crescent, Glasgow G4 9BW.

Methods

As a charitable organisation, Visibility's aim is "listening and responding to people affected by sight loss in the west of Scotland". With strong working links to people with visual impairment, local authorities and health service providers, we were well positioned to develop this community-based model of training. From the outset, the training was designed to be accessible and based on realistic outcomes for the individual. Great care was taken to keep expectations at an attainable level. The tutor has experience of adult education and training and in working with people with visual impairment.

Training consisted of a number of weekly one to one sessions with the tutor/trainer; the mean number of sessions was 4.9 (range: 2-9 sessions). Training methods were devised using established adult education methodology. Subjects took part in a pre-training discussion with the tutor and developed an agreed individual learning plan. Success for individuals was measured by improvement in reading skills and by reported qualitative improvement in any or all of the following areas:

- Personal life
- Community life
- Family life
- Working life

Regular review of progress towards goals took place throughout training.

At the first lesson, subjects were issued with their hyperocular (low vision aid), experimentation to find the best text in terms of font size, contrast and spacing was carried out, and the basics of eccentric fixation technique were the taught. Namely:

- What eccentric fixation is and how it works
- How to locate and use the preferred retinal locus
- Steady eye strategy
- Moving text from right to left
- The importance of suitable task lighting when reading

When the subject was able to eccentrically fixate successfully, they were given a simple reading assessment. This assessment used texts from “Ace Reader Pro” which were graded in incremental levels of complexity and measured:

- The text size they were able to read
- Reading speed expressed in words per minute
- Number of errors
- Duration of assessment
- Comprehension of material read

They were then given homework tasks to be practiced daily until the next lesson for a maximum of 20 minutes per day. As well as the homework task, subjects were encouraged to try as many reading tasks around the house as they could find and also to keep a diary or other record of what they had achieved. The priority here was to empower the subject to take control of the learning process and encourage them to practice the techniques regularly.

At each lesson, subjects were presented with a range of prepared texts representing everyday reading tasks such as mail, food packaging etc. Texts were offered in a variety of font sizes and contrasts and presented using printed material. Fixation lines were required and specialist software packages including Zoomtext and Ace Reader Pro were employed.. Throughout the training, subjects were encouraged to view success as relative to their own needs rather than having to achieve the fastest reading speed or achieving the smallest text size.

Subsequent lessons repeated the reading assessments and subjects were asked to read prepared texts and also to read their own choice of reading material. Throughout, the tutor observed reading technique, offering suggestions for improvement as appropriate. The emphasis on the training was that it be fun and functional. As by making it an enjoyable experience anxiety is reduced, confidence is built and satisfaction at having mastered the technique is promoted.

Results

Prior to training, the subjects had considerable difficulty in reading. Most only read using a hand held magnifier and expressed dissatisfaction with this method. After an initial explanation of the eccentric reading technique and using appropriate magnification, an initial assessment showed a mean reading speed of 45.5 words per minute (range: 13 – 104 wpm). Following training (mean 6.4 hours, range: 2.5-12.5 hours) a final assessment showed that reading speed increased to 69.5 wpm (range: 26-106) and at these speeds, subjects could comfortably read text at a mean of 13.5 point Microsoft word Ariel font (range: 10-22). Significantly, most subjects could read text well below their “comfortable” level for short periods which allowed for reading of food packaging, medication etc. Although accuracy and comprehension fell with reduced font size. The need to understand what is read is central to the reading process. At each assessment, comprehension was measured by asking a series of prepared questions based on the text. Questions became more complex as the texts became more demanding on the reader. At first assessment, the mean comprehension was 75% (range: 25%-100%) and this rose after training to a mean of 89% (range: 50% -100%). Duration of reading was not measured during assessments but subjects were asked to record the maximum period they could read for at home. On completion of training, a mean of 14 minutes (range: 1-20 minutes) was achieved.

In addition to the above, subjects were asked to complete an exit questionnaire aimed at assessing their satisfaction with the technique and the learning process and also to give any other information they found to be relevant.

Discussion

This pilot study has shown that reading speed can be increased for the majority of trainees. Our exit questionnaire clearly showed that it was not the ability to read large quantities of text which people missed the most. Rather, it was the inability to perform everyday tasks such as reading the mail, looking up a telephone number, and doing crosswords etc. In effect, the small functional pieces of reading, which most people take for granted. By learning the technique of eccentric fixation for reading, subjects can perform many of these small reading tasks for themselves, boosting confidence and self-esteem and reducing reliance on others.

18 subjects expressed satisfaction with the technique were accepting of it's limitations (short reading distance, single eye technique) and stated that they would continue to read this way, all preferred the technique to reading with a hand held magnifiers and all would encourage others to learn the technique. The informality of the training and the opportunity to do something for themselves were rated highly among reasons for enjoying the training.

3 subjects expressed dissatisfaction with the technique and further enquiry showed that one was experiencing visual hallucinations (probably on account of the Charles Bonnet syndrome) which was distracting and made concentration difficult. He was however very keen to participate and wishes to try again if and when the hallucinations stopped. A second subject had cataracts in both eyes in addition to ARMD and even with magnification; adequate acuity could not be achieved. The third subject did not practice

between the first 2 sessions and expressed the opinion that there was not much point in continuing, as he never read much anyway. Interestingly he had achieved a reading speed of 56 wpm at 14-point font size with indications that this could be improved on.

All the subjects who successfully mastered the technique appeared well motivated and willing to try anything that would help them overcome the negative side of their visual impairment. Next to the physical ability to learn the skills, it is likely that strong motivation is the single biggest indicator of a successful outcome. This may act as a limiting factor in selecting subjects for training. Interestingly, age did not seem to be a serious limiting factor in attaining some reading skill, as the oldest subject (90 years) was able to reach a reading speed only 11 wpm slower than the youngest (20 years)

These results have significant implications. The technique of eccentric viewing without magnification can enhance daily living skills. In general, our study mirrors that of previous research with broadly similar results **(6)**. Variations in results such as a slightly higher mean training time are probably due to factors such as the need to complete individual learning plans with some subjects. However, the reading benefits resulting from training in eccentric viewing need to be quantified.

Furthermore, it is thought that additional benefits such as regained ability to recognise faces, facial expressions and pictorial material, may also be produced. **(7)**.

If training is effective in restoring the ability to read it should become a routinely available resource. However, studies are required to determine the success rates of such training for different methodologies and for different patient groups as well as on the most appropriate time for an individual to be taught. Moreover, it is important to know whether this technique can be taught while the central vision loss is progressing or whether it is appropriate to wait until the condition is stable.

Conclusion

Training in eccentric fixation technique for reading has been shown to provide demonstrable benefits for individual subjects and it can be a useful tool for the low vision therapist. Our work is funded until March 2006 at Visibility. Hopefully we will continue to improve our training technique and allow other organisations and professionals the opportunity to study the methodology. If these early indications of success prove to be predictable and reproducible, then perhaps debate will be stimulated on how and when this training can be made generally available.

References:

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