

AN OPHTHALMOLOGIST REVIEWS LEARNING DISABILITIES

D. J. Stark, F.R.A.C.O., F.R.C.S. (Edin.)

Senior Ophthalmologist, Mater Children's Hospital, South Brisbane.

Address for Reprints:— Dr. D. J. Stark, 40 Annerley Road, Woolloongabba, Brisbane, 4102

Abstract

There is a fascinating mixture of fact and fiction in the confusing claims and counter claims of those managing patients with learning disabilities requires some elucidation.

Recent electrophysiological evidence shows that patients with specific developmental dyslexia have definite evidence of brain damage. This will perhaps alter acceptance of reported abilities to improve reading with visual training or orthoptic procedures. Statistical reappraisal of some claims should be made before they can be accepted.

Key Words

Specific learning dyslexia, learning disabilities, visual training.

INTRODUCTION

Ophthalmic literature has largely ignored this subject. Most ophthalmologists have considered the problem of learning disabilities to be a problem for remedial teachers. This hiatus in the literature has been filled by other authors so that by today many claims have been made concerning the efficiency of forms of therapy (e.g. visual training, exercises, spectacles, occlusion) without scientific evidence. Few rebuttals have appeared concerning these various claims. This has given an air of respectability to authors whose theories have been published as proven fact. These authors have gained further respectability by the "greybeard" rule and frequently claim that proof of their theory appeared in a previous article.

CLASSIFICATION OF LEARNING DISABILITIES

The failure of authors to classify fully the problem of learning disabilities has led to confusion on a grand scale. For those who require a simple, practical classification the Florida classification of Cassin¹ which Shayne Brown² introduced to the Australian literature can be recommended viz.

1. Specific developmental dyslexia
2. Minimal brain damage
3. Brain damaged
4. Environment
5. Cultural
6. Mixed

Each of these classes requires a different method of therapy. The role of any form of visual therapy in these groups of patients is difficult to defend. The role of "visual therapy" will be considered in more detail.

1. Role of Vision in Learning Disability

Goldberg³ states "There is no relationship between peripheral visual ability and reading problems". Poor vision may give slow reading because of difficulty identifying details but it will not give reversals. The presence of a visual defect does not mean that visual inefficiency has caused the reading problem.

"Even small refractive errors may need correction" — Dunlop⁴.

"Glasses were prescribed for 65% of the patients, 47% for reading" — Swanson⁵.

No evidence is given in either article that the prescription of spectacles is of benefit. Indeed there is no evidence to be found that the prescription of spectacles is of benefit in these cases. Spectacles may give a false sense of security for correction will not improve perception. There is no peripheral ocular defect which produces dyslexia and associated learning disabilities. In particular ocular defects do not cause reversals of letters, words or numbers.

2. Ocular Movements

Cassin¹ & Brown² have found the incidence of

strabismus in learning disabilities to be similar to that of the normal population. This is in concurrence with other authors.

The finding of increased incidence of convergence insufficiency in children with learning disabilities may well be the effect of and not the cause of the learning disability.

Tracings of eye movements in cases of learning disabilities are popular. Faltering saccades and frequent reversals are related purely to comprehension which produces the movement and not the reverse.

3. Visual Training Techniques

The following peripheral visual abilities are claimed to be susceptible to training.

1. Ability to follow smoothly and accurately
2. Ability to fixate quickly and accurately with both eyes on series of fixed objects
3. Ability to change focus quickly, near to far and far to near
4. Ability to maintain prolonged near point activity. i.e. fixation, fusion, stereopsis, binocularity and mobility patterns.

No doubt many children can perform appropriate ocular gymnastics after prolonged bouts of training. Hand-eye co-ordination exercises may well improve hand-eye co-ordination but do not appear to improve reading or learning abilities.

Carlson & Greenspoor⁶ — "We have studied much of the material provided by the optometrical developmental training approach and find it outdated, unsubstantiated, exoteric and pseudo scientific".

Goldberg⁷ — "Those who advocate visual training for the treatment of learning disabilities have performed a questionable service to child educator and parent."

It bears repeating that peripheral factors are not causative in reading disability. i.e. refractive error, ocular muscle imbalance, binocularity or fusion are not causative.

4. Perception

Visual perception is the interpretation of the visual stimulus in light of previous experience. This act is performed at the angular gyrus. The frontal lobe understands the function of the object thereby developing the concept.

Recent investigation using electrophysiological techniques,^{8,9} (V.E.P.) have demonstrated evidence of cortical dysfunction over the parietal region in patients with specific learning disability.

Further investigation should prove the presence of brain damage. Impaired visual perception is not a cause of their reading problem but merely a symptom of impaired learning mechanism.

5. The Role of Dominance

Disturbance of right temporo-parietal region causes disturbance of spatial perception, loss of body awareness, loss of spatial relationship.

Disturbance of left temporo-parietal region causes disruption of language and associate thought processes.

It is interesting to note that injury to the left hemisphere in right handed persons causes aphasia in 97%.

Injury to right hemisphere in left handed persons — 59% aphasia. i.e. 41% have crossed laterality.

Note also that the transfer of dominance is rare after the age of 8 as evidenced by lack of improvement of aphasia.

The great majority of children with poor lateralisation do not have brain damage. Theories have abounded that poor lateralisation is a cause of reading disability. Instead it is a concomitant symptom of brain damage.

Brain¹⁰ — "Failure to establish a dominant hemisphere is the result and not the cause of congenital abnormalities of brain function expressed in disabilities of speech, reading and writing."

Much has been written concerning therapy to reverse crossed correspondence. But these articles (e.g. by Benton¹¹, Dunlop¹² etc) do not recognise that crossed correspondence is a symptom and not the disease.

The articles by Benton (dominant eye test) and Dunlop (the reference eye test) both claim marked improvement on reading ability with occlusion of the dominant or reference eye (Benton — greater than 75%.) Benton then treated a further series without patching and obtained 75% cure rate. Dunlop has not attempted a controlled trial. To date these articles have shown an "association" between crossed correspondence and reading difficulties but no "cause and effect" has been demonstrated. Any claims to improve reading say: "Occlusion plus remedial teaching plus psychological value of this study gives improvement". No study has shown that occlusion therapy is of value without combined remedial teaching. The number of patients treated with occlusion in Newcastle is of the order of many hundreds. Population show that these patients must include many of the

other categories of learning disability disorders besides true dyslexia. Yet occlusion could scarcely be suitable therapy for these. How can occlusion assist in cases of brain damage, environmental or cultural deficits.

EARLY DIAGNOSIS

Remediation is more effective if begun by the age of 3 years. The ophthalmologist and all other physicians should be aware of this. Attempted early diagnosis must be recommended to all physicians. Perhaps electrophysiological investigations may make this possible at an even earlier date.

CONCLUSION

This area is an excellent one for the charlatan. We must therefore take care to protect the public from prolonged expensive delaying therapies which may well result in postponement of beneficial remedial teaching. It is a field in which ophthalmologists must maintain a "watching brief" to prevent exploitation of children and parents because the issue of learning disabilities is a very emotional subject.

All ophthalmic personnel should read "Combined Statement of the American Academy of Paediatrics, Academy of Ophthalmology and Otolaryngology and American Association of Ophthalmology"^{1 3} which is summarised:—

1. Learning difficulty requires a multidisciplinary approach.
2. No peripheral eye defect will produce dyslexia and associated learning difficulties.

3. Visual training or neurological organisational training including laterality and perceptual training is not supported with scientific evidence.
4. Glasses (except where normally clinically indicated) will not assist.
5. Dyslexia and learning difficulties are a problem of educational science.

REFERENCES

1. CASSIN. Amer. Orthop. J. Vol. 25 1975 p. 38-45.
2. BROWN., Aust. J. of Orthop. Vol. 16 (1978) p. 25-29.
3. GOLDBERG *et al.*, 1972 Dyslexia — Problems of Reading Disabilities, Pub. Grune & Stratton, New York & London.
4. DUNLOP., British J. of Orthop. 1979 Vol. 36 p. 25.
5. SWANSON, J., of Learning Disabilities Vol. 5 No. 5 1972, p. 37-42.
6. CARLSON & GREENSPOOR. Amer. J. Optom. 45: 161-169, 1968.
7. GOLDBERG, H. *et al.*, Dyslexia — Problems of Reading Disabilities, Pub. Grune & Stratton, New York & London.
8. LUX., Detection of Learning Difficulties — Using the V.E.C.P. Journal Paed. Ophthalmic Vol. 14, No. 4, p. 248-253.
9. HOYT, C., The Importance of Higher Visual Centres Neuro-ophthalmology Symposium, Brisbane, 1980.
10. BRAIN., Clinical Neurology 5th Ed. Revised by Sir Roger Bannister Oxford Uni. Press 1978.
11. BENTON, T., The Eye & Learning Disabilities J. of Learning Disabilities Vol. 6, No. 5, 1973 p. 66-65.
12. DUNLOP, D. B., Aust. J. Ophthal. Vol. 2 No. 3, 1974.
13. The Eye and Learning Disabilities, Joint Statement of the American Academy of Paediatrics, the American Academy of Ophthalmology and Otolaryngology, and the American Association of Ophthalmology. Sight Sav Review 41: 183-184, 1971.