The role of the optometrist in dyslexia

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PLAN

INTRODUCTION

CONVENTIONAL OPTOMETRIC CORRELATES

MAGNO (TRANSIENT) VISUAL DEFICIT

BEHAVIORAL OPTOMETRY

MEARES-IRLEN SYNDROME & VISUAL STRESS

CONCLUSIONS

Disclosure

- Funding for lectures, KOL/product feedback, research:
- Lecture content always my own
- I.O.O. Sales Ltd
- Markets IFS orthoptic exercises, which the speaker designed, and for which he receives a small royalty
- Community optometric practice in Brentwood, Essex

Background

- Polarised views on vision & dyslexia
  - Zealots: middle view
  - Deniers
    - Visual factors cause dyslexia
    - Vision irrelevant to dyslexia
    - Maybe visual problems can co-occur with dyslexia
    - Visual stress major cause of RD
    - Visual stress does not exist
    - Maybe visual stress can co-occur with dyslexia
  - Evans et al. (1994)
    - Dyslexic children are significantly more likely to report transient blurring (20% of 9%) & slightly more likely to report doubling (23% of 7%)
    - N.B., most dyslexics don’t have visual symptoms
    - Only concluded visual factors are “not a major cause of the dyslexia”
  - Eliminating any visual symptoms is likely to be helpful

Handout from www.bruce-evans.co.uk for regular tweets on optometric research

Role of visual factors in dyslexia

- Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling (Rose, 2009).
- Characteristic features of dyslexia are difficulties in phonological awareness, verbal memory & verbal processing speed (Rose, 2009).
- Visual problems are not "the cause" of dyslexia.
- The term "visual dyslexia" is a misnomer.
- Visual problems may contribute to reading difficulties.
  - In these cases, visual treatments may help.

Optometric correlates of reading difficulties: binocular instability

**SYMPTOMS:** blur, double vision, visual perceptual distortions, eye strain & headaches

**SIGNS:** low fusional reserves, unstable heterophoria


Optometric correlates of dyslexia: accommodative anomalies

**SYMPTOMS:** blur, eye strain & headaches

**SIGNS:** low amplitude of accommodation, high accommodative lag, poor accommodative facility

**TREATMENT:** accommodative exercises (if appropriate), refractive correction

**EVIDENCE:** weak for correlate; very weak for cause


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Dyslexia: linking the visual deficits (a)

- Magno visual deficit is correlated with binocular instability (Evans et al., 1996)

Behavioral optometry

- Detailed symptomatology
- Holistic approach
- Good orthoptic assessment & treatment
- Eye movement assessment & treatment
- Perceptual-motor and gross co-ordination exercises
- "learning lenses"
- Photo-syntonics

Weak evidence

Jennings (2000)
Barrett (2008)

"Tracking" & dyslexia

- Saccades are not unique to reading
- Most studies have not found a saccadic eye movement deficit in dyslexia
- Dyslexia influences saccadic "search for meaning"
- ADD influences saccades
- The DEM test does not measure eye movements (Ayton et al., 2009; Webber et al., 2011)
- Poor DEM scores do not mean that reading difficulties result from poor eye movements (Webber et al., 2011)
- Treatments based on training saccadic or pursuit eye movements are controversial.

Behavioral optometry

- As many therapies as there are practitioners
- "no randomised controlled trials" (Jennings, 2000)
- "a large majority of behavioral management therapies are not evidence-based" (Barrett, 2008)

Voltaire: "Practical therapeutics is the art of keeping the patient entertained until nature effects a cure"
"I do not agree with what you have to say, but I'll defend to the death your right to say it."

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Visual Stress = symptoms + benefit from colour

a.k.a. Scotopic Sensitivity syndrome, Irlen syndrome

Meares-Irlen Syndrome / Visual Stress (MISViS)

Precision Tinted Lenses (PTL)

Precision Tinted Lenses (PTL)
Key research on MISVIS

- PTL may alleviate symptoms when reading
  - Wilkins, Evans, Busby et al. (1994)
- Overlays can improve speed of reading
  - Wilkins, Evans, Busby et al. (1999)
- Overlays may improve visual performance
- Binocular & accommodative anomalies need to be detected
  - Scheiman et al., 1990)
- MISVIS appears to be about 2-3x more common in dyslexic children than non-dyslexic
  - [c. 20% of dyslexics]
- The benefit from PTL is linked to pattern glare

Key research on MISVIS (cont)

- >80% of people prescribed PTL report still using after one year
  - Evans, Patel, Wilkins et al. (1999)
- Overlay colour cannot be used to predict lens colour
  - Lightstone, Wilkins (1999)
- MISVIS appears to be about 2-3x more common in dyslexic children than non-dyslexic
  - [20% of dyslexics]

Pitfalls in researching MISVIS

- Research the target condition
- Mitchell et al. (2008) did not study people with MISVIS
- Bouldoukian et al. (2002) studied participants who "reported relief from overlays"
- Ritchie et al. (2011) used an Irlen diagnostic process which found MISVIS in 77% of poor readers
- Use precision in prescribing colour
  - Menacker et al. (1993) & Ritchie et al. (2011) used limited range of colours
- Use appropriate outcome measures
  - Ritchie et al. (2011) used repeated WRRT test
- Systematic reviews with inappropriate selection criteria will reach negative conclusions (e.g., Griffiths et al., 2016)
- BUT, in part owing to these issues, MISVIS is still controversial

Conservative clinical practice

- Should PTL be prescribed to every child with dyslexia?
- Should PTL be prescribed to every child who likes an overlay?
- Should PTL be prescribed before eye exam?
- Listen to symptoms but don't over-treat
  - This applies to VS & conventional optometric anomalies
- Beware referral bias:
  - VS probably less common than zealots think
  - VS probably more common than deniers think
- Beware favourite colour & gender effects
Representation of colour in macaque area V2

- Used optical recording & confirmed with electrode recording
- Identified "colour-prefering" modules
- Did not overlap with "orientation-prefering" modules
- Each contour illustrates the cortical region giving the maximal response to each tested colour
- But different colours produce different response magnitudes

DO NOT VIEW THIS IF YOU HAVE EPILEPSY OR MIGRAINE

Pattern glare

- High prevalence in:
  - Visual stress
  - Migraine
  - Photosensitive epilepsy
  - Autism
- cortical hyperexcitability (manifested as pattern glare) is believed to be involved in visual stress

Plan

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Conventional optometric correlates

Magnno (transient) visual deficit

Behavioral optometry

Meares-Irlen syndrome & Visual stress

Conclusions

- A minority of patients with reading difficulties report visual symptoms
  - Does text start clear & then move or blur?
- If symptoms, suspect:
  - Visual stress, binocular instability, accommodative insufficiency
  - Treatment may help symptoms but will not cure dyslexia
- People with reading difficulties & symptoms can be referred to interested ECPs via www.s4clp.org

Conclusions

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Some famous people who were dyslexic: