Orthoptics for the busy optometrist

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PLAN
INTRODUCTION
INVESTIGATION OF INCOMITANCY
INVESTIGATION OF HETEROPHORIA
INVESTIGATION OF HETEROTROPIA
TREATMENT
CONCLUSIONS

Full handout of slides from www.bruce-evans.co.uk

Optometry & orthoptics

>5% of patients seeing community optometrists have BV problems
83-100% of eye exams by community optometrists include an orthoptic assessment

OVERVIEW: CAVEAT

Always look for pathology:
- Neuro-optometric checks
  - Pupils, discs, fields, strabismus, incomitancy, accommodation
- Check these things regularly
- Don’t forget refraction
- Change management if not improving significantly
- Refer if still not improving
- Appropriate re-exam intervals (frequent)
Motility test

- Use reliable pen torch
- Check nose not occluding
- Really, three tests, so do three times:
  1) Observe corneal reflexes
  2) Cover test in peripheral gaze
  3) Ask about diplopia
- Beware of reports of diplopia
  - May break down (in view of target, distance, fus. res.)
  - May be variable
  - May be confused
- Know the muscle actions (RADSIN)

SO palsy

- Usually:
  - Hyper-deviation of affected eye, worse in down-gaze
  - Under-action of affected eye when looking down and in
  - More likely to have symptoms with reading than with distance
- But, may have secondary sequelae
- Avoid fitting multifocal spectacles or monovision

Incomitancies: conclusions

- Some incomitancies are difficult to detect
  - If symptoms are suspicious, do cover testing in peripheral gaze
  - Testing for cyclo-deviations detects SO palsies
  - Refer new or changing incomitancies
  - In some long-standing cases, prescribing the prism required in the primary position may help
KEY SIGNS OF DECOMP. PHORIA

- Symptoms
- Poor cover test recovery
- Aligning prism (FD test)
- Low fusional reserve opposing phoria
  - Sheard’s criterion
  - Particularly useful for exophorias
- For esophorias, size and imbalanced fusional reserves are relevant
- For hyperphorias, size matters

ALIGNING PRISM: Mallett Unit

- Maintain normal binocular vision
  - Increase lighting, full field of view
  - Use hand held loose prisms
  - Minimum prism for alignment
  - Re-normalise BV between prisms
  - Prism dioptre steps: 0.5, 1.0, 2.0, 4.0

Signs of decompensated phoria

- Symptoms
- Poor cover test recovery
  - Some information can be obtained from recovery movement, but
  - No data on sensitivity & specificity of this
  - Cover test dynamics are complex (Barnard & Thomson, 1995)

- Aligning prism
  - Mallett Unit
  - Good foveal and peripheral fusion lock
  - Question set is important
  - Ask if a line ever moves
    - Karanis & Evans (2006)
  - For symptomatic phoria:
    - Sensitivity 75%
    - Specificity 78%
    - Jenkins, Pickwell, & Yekta (1989)

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CONVERGENCE INSUFFICIENCY: INTRODUCTION
- "An inability to obtain or to maintain sufficient convergence for comfortable binocular vision at near"
- can be conceptualized as a decompensated exophoria at an usually close working distance

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Strabismus: the bottom line for the busy optometrist
TREATMENT OF AMBLYOPIA (a)
- Flow chart based on review of recent RCTs in Evans et al. (2011; OPO)
  - Many cases of amblyopia can be cured by refractive correction alone;
    - 20% don’t need occlusion (Gibson, 1955; Pickwell, 1984; Stewart et al., 2004; West & Williams, 2011)
    - Contact lenses are likely to be best in anisometropia (Evans, 2006)
- Many cases never require full-time occlusion
  - If 6/9 to 6/25, 2h occl. ≡ 6h
  - If ≤ 6/30, 6h > 2h
- Avoid full time occlusion for orthotropic anisometropia
- Timings approximate
  - See patients frequently during the treatment of amblyopia, to begin with every 4-6 weeks

Flow chart based on review of recent RCTs in Evans et al. (2011; OPO)

MOTOR DEVIATION:
REFRACTIVE CORRECTION
- Overview
  - Mandatory in accommodative esotropia
  - Also possible to treat exo-deviations with negative lenses & convergence excess with multifocals
  - Limited by 4 factors
    - Angle of deviation
    - Refractive error
    - Accommodation
    - AC/A ratio

- Specifics
  - Determine sphere that eliminates strabismus (no diplopia)
    - Eliminates FD on Mallett Unit
  - Prescribe, try to reduce approx. every 3-6/12
    - Negative adds (Chen et al., 2016) and bifocals/varifocals can work well

- Myths
  - Negative adds might cause myopia
    - Overminus lenses do not induce clinically significant myopic changes (Rutstein et al., 1989; Paula et al., 2009)
  - Patient likely to adapt to the over-correction
    - If abnormal BV, tend not to adapt (North & Henson, 1985)
  - Bifocals might reduce children’s ability to accommodate
    - Smooth muscle; 14D-3D=11D
    - BF don’t reduce amplitude of accommodation (Fresina et al, 2010)
  - Accommodative (hyperopic) esotropia will not need glasses in later life
    - After 10 yrs, 97% still need Rx (Rutstein & Marsh-Tootle, 1998)

Case study: D1542
- 11/5/96, female, age 8y, 1 headache a fortnight
  - Wearing full cyclo plus (c. +2.00, R=L)
  - Cover test: D: 8Δ SOP 10Δ RSOT
  - With +2.00 add: N 4Δ RSOT with +2.50 add: N ortho
MOTOR DEVIATION: PRISMATIC CORRECTION

OVERVIEW

- preferred treatment in small/moderate vertical deviations
- may also help in small/moderate horizontal deviations if not amenable to refractive modification or exercises
- limited by angle of deviation / cosmesis of prism

SPECIFICS

- determine prism that
  - eliminates strabismus (no diplopia)
  - eliminates FD on Mallett Unit

MYTH

- patient might “eat up prisms”
  - prism adaptation usually abnormal in orthoptic anomalies (North & Henson, 1981)
  - exceptions can occur
  - e.g., myopes with decompensated esophoria
  - MKH Polatest method criticized for leading to “excessive amounts of prisms” (Lang, 1994)

FUSIONAL RESERVE EXERCISES

OVERVIEW

- preferred treatment in small/moderate horizontal deviations, if px co-operative
- Work well in those aged 11-19y, even if strabismic (Pickwell & Jenkins, 1982)
- in exo-deviations improve ability to converge
- in eso-deviations improve ability to diverge
- try to assess progress using a method different to the treatment technique
- there is some supporting evidence from RCTs
  - Ciuffreda & Tannen (1995)
  - Scheiman & Gwiazda (2011)

DEVELOPMENT OF IFS

Primary goal

- To maintain the patient in an over-converged posture for 10-20 mins a day without them becoming bored
- To provide a variety of stimuli to help any benefit translate into everyday life
- Declaration of interest

Card 1

- Teaches physiological diplopia & introduces 3-D perception
  - Card 1 - Looking through a double-finned fan in the sun
  - Card 2 - “The apples are swimming” - don’t look at the apples
  - Card 3 - “I am a rock”
  - Card 4 - “Mom, it is too loud”

Declaration of interest
DEVELOPMENT OF IFS: Card 2

- Builds fusional reserves (step & ramp)
- Controls for & treats suppression

FREE SPACE STEREOGRAMS
Card 2: Improving 3-D Vision

Card 3: Now to Magic!

Unlike Cards 1 and 2, Card 3 should be turned on its side to be viewed, as the heading is at the top. When you look at Card 3, you will probably not be able to see a lot, except for a few eyes looking out at you from near the top of the picture. Before it is out, when you can do this exercise, you will have to work out the position of the eyes among the dots. When you have found the eyes, you can turn the card around again, and you will probably see some more patterns, blocks, and lines before you see the heading. It may be that you have already experimented with these images, and you may or may not have managed to see them in 3-D.

With this type of picture there are in fact 2 ways of seeing the image in 3-D. The way most people use is to under-converge the eyes. Because your eyes naturally under-converge, this method will be easiest for you. If you can already see 3-D images in this type of picture then it is almost certainly because you use the under-convergence method. However, the under-convergence method will not help your eye problem. The stages described below will teach you a new way to see the 3-D images, by over-convergence. This method is similar to that used on sheets 1 and 2 and will help your eyes to become better at working together.

OPEN TRIAL: Fusional reserves & NPC (N=20)

- Divergent reserves (control) did not change significantly (p=0.6)
- Convergent reserves improved significantly (p=0.004)
- Mean NPC improved from 6 to 4 cm (p=0.015)

Evans (2000)

OPEN TRIAL: Effect of treatment on compensation

Evans (2000)

Specific problems with displays

- 3-D displays dissociate convergence & accommodation
- Loss of spatial resolution (may help) OR Loss of temporal resolution
- Unusual degrees of stereopsis
- Possible mismatch between depth cues
- People with mild BV problems have more symptoms & worse performance with 3-D displays
- 48% find 3-D TV uncomfortable & 64% would watch more if they found it comfortable

Lambert, Foster, Noseworthy, Evans, Hayhoe (2011)

For regular tweets on optometric research:

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SYMPTOMS
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CONCLUSIONS

- Always be on the lookout for pathology
  - refer if no significant improvement
  - BUT pathology is very rare
- It is possible to treat amblyopia in optometric practice
  - patients will need good instructions & regular checks
- Many comitant ocular motor anomalies are treatable
  - plus for eso, minus for exo, & prisms are under-used treatments
- Vision therapy for convergence insufficiency is evidence-based, but there is a need for more research for other forms of vision therapy

Are you doctorate material?

- In 2008 the Institute of Optometry launched Doctor of Optometry degree in collaboration with London South Bank University
- 5 year part time professional doctorate
  - Year 1 has 13 taught days & 2 assignments
  - Year 2 has 8 taught days & 2 assignments
  - Years 3-5 are supervised doctoral research
    - Research most likely to be clinical, in practice
- Also Prof Doc available from Aston University

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