Orthoptics for the busy optometrist

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

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For regular tweets on optometric research:

OVERVIEW: CAVEAT

>5% of patients seeing community optometrists have BV problems
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)

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CAUSES OF INCOMITANCIES

VASCULAR
- Diabetes
- Hypertension
- Stroke
- Aneurysms
- Temporal arthritis

NEUROLOGICAL
- Tumours
- Multiple sclerosis
- Myasthenia gravis
- Migraine

OTHER
- Trauma
- Thyrotoxicosis
- Toxic
- Iatrogenic
- Idiopathic

Underlined = more likely in elderly
Drugs and diplopia

- Suspect drug interaction if diplopia occurs shortly after starting new drug

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)
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

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)
    - Evans (2007) Pickwell’s Binocular Vision Anomalies
      - Particularly useful for exophorias
      - For esophorias, size and imbalanced fusional reserves are relevant
      - For hyperphorias, size matters

Aligning prism: Mallett Unit

- aligning prisms/spheres to eliminate FD
- good foveal and peripheral fusion lock
- question set is important
  - ask if a line ever moves
    - Karania & Evans (2006)
  - for symptomatic phoria:
    - sensitivity 75%
    - specificity 78%
    - Jenkins, Pickwell, & Yekta (1989)
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 dioptr steps: 0.5, 1.0, 2.0, 4.0

KEY SIGNS OF DECOMP. PHORIA

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

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DISASSOCIATED HETEROphoria

fusional reserves

motor fusion → sensory fusion → fusion lock

NOT COMPENSATED

STRABISMUS

PLAN

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Strabismus: the bottom line for the busy optometrist

**Is it new or changing?**

**Yes**

**e.g., Rx**

**No**

**REFER**

**Can I correct it?**

**Yes**

**e.g., hypermetropia**

**No**

**REFER**

**Do I know the cause?**

**Yes**

**Any treatment needed?**

**(probably not)**

**No**

**REFER**

**Is it new or changing?**

**Plan**

**Introduction**

Investigation of incomitancy

Investigation of heterophoria

Investigation of heterotropia

Treatment

Conclusions

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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, 1995; 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

TREATMENT OF AMBLYOPIA (b)

- RCTs show that occlusion is unsuccessful in 17-37% (Simons, 2005)
  - If treatment fails, re-evaluate your diagnosis (Evans, 2007)
  - Treated amblyopic eyes on average 2 lines below fellow (Repka et al., 2005)
- Remember that the child may be partially sighted during occlusion:
  - It is not always better to do something than nothing at all (Jennings, 2005)
- Record informed consent
- Penalisation is a viable alternative to occlusion
  - West & Williams (2011)
- There is a dose-response relationship in patching (Stewart et al., 2004)
- Eye patch is best but compliance poor & they will cheat!

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
MOTOR DEVIATION: REFRACTIVE CORRECTION: 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

MOTOR DEVIATION: REFRACTIVE CORRECTION: 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)

MOTOR DEVIATION: REFRACTIVE CORRECTION: 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: 8 \( \Delta \) SOP
  – with +2.00 add: N 4 \( \Delta \) RSOT
  – with +2.50 add: N ortho

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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

MOTOR DEVIATION: PRISMATIC CORRECTION: SPECIFICS
• determine prism that
  – eliminates strabismus (no diplopia)
  – eliminates FD on Mallett Unit

MOTOR DEVIATION: PRISMATIC CORRECTION: 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)
MOTOR DEVIATION:
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 eso-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
  - Cufners & Tannen (1990)
  - Scheiman & Gwiazda (2011)

CONVERGENCE INSUFFICIENCY: SPECIFICS

- Treatments (in order of increasing complexity)
  - simple push up (bead on string if very remote)
  - jump convergence
  - push up with physiological diplopia
  - jump convergence with physiological diplopia
  - free-space stereograms
- RCT shows intensive programme of exercises better than home push-up
  - Scheiman et al. (2005)
- 15min a day + 60min weekly > 15min a day
  - "Whether synoptophore or jump vergence stereocards are used…the critical variable is the length of time it is maintained”
  - Vaagaa (1979)
- "Convergence exercises independent of accommodation were the most effective treatment”
  - Horwood & Tye (2014)

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

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)

OPEN TRIAL: Effect of treatment on compensation

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<td>Average</td>
<td>passed</td>
<td>passed</td>
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Evans (2000)

PLAN

SYMPTOMS

INVESTIGATION OF INCOMITANCY

INVESTIGATION OF HETEROPHORIA

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TREATMENT

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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

Dr Optometry
- In 2008 the Institute of Optometry launched a 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
- “the ultimate HQ for UK optometrists”

OK, Stanger, what’s the circumference of the Earth? Who wrote “The Odyssey” and “The Iliad”? What’s the average rainfall of the Amazon Basin? But you can’t answer it, can you? Ask questions later.

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