Diagnosis of binocular anomalies

Prof Bruce Evans
BSc (Hons) PhD FCOptom FAAO FEAO DipCLP DipOrth
Director of Research
Institute of Optometry
Visiting Professor
City, University of London
Visiting Professor
London South Bank University
Private practice
Cole Martin Tregaskis, Brentwood, Essex
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PLAN

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

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Optometry & orthoptics

>5% of patients seeing community optometrists have BV problems

83-100% of eye exams by community optometrists include an orthoptic assessment


DISCLOSURE

Paid lectures & KOL/product feedback programmes:
Asian American Academy of Optometry (UK), Association of Optometrists,
Birmingham Focus on Blindness, British & Irish Lions, College of Optometrists in Visual
Technologies, College of Optometrists of Canada, COMS, Genesis Optical (Southend),
Helen Foundation for Blind Children, Institute of Optometry, International College of
Optometrists, Iris Fund for Prevention of Blindness, Johnson & Johnson Vision Care, MRC,
Nuffield, Optos, Perceptive, Specsavers, Thomas Pocklington Trust, University of Strathclyde,
Vauxhall.

Author of Pickwell’s Binocular Vision Anomalies, editions 3-5

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

COLE MARTIN TREGASKIS
OPTOMETRISTS

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### CAUSES OF PARESES

**VASCULAR**
- Diabetes
- Hypertension
- Stroke
- Aneurysms
- Temporal arteritis

**NEUROLOGICAL**
- Tumours
- Multiple sclerosis
- Myasthenia gravis
- Migraine

**OTHER**
- Trauma
- Thyrotoxicosis
- Toxic
- Iatrogenic
- Idiopathic

*Underlined* = more likely in elderly

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### 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

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### Duane’s syndrome

- Restriction of the globe on attempted adduction
- Contraction of medial and lateral recti
- Not all cases exhibit retraction
- Limitation of abduction and/or adduction in one or both eyes
- Can look like a lateral or medial rectus palsy
- May also be elevation or depression of affected eye
- Convergence is very often abnormal, even with adduction appears to be intact

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### Brown’s syndrome

- Mechanical restriction of the superior oblique
- Looks like inferior oblique (IO) palsy
- But IO palsy is much rarer & has:
  - Secondary sequelae
  - Incyclodeviation in primary position
  - Positive Parks three step test
Incomitancies: conclusions

- Some incomitancies are difficult to detect
  - 2/3 of diplopia hypertropic pxs OK on motility
  - Tamhankar et al (2011)
- 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

Potential 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, 1985)

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

- 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)

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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

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STEREOTESTS
www.bernell.com

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
- c.f., convergence weakness exophoria

CONVERGENCE INSUFFICIENCY: INVESTIGATION: outline
- symptoms
- convergence tests
  - near point of convergence, ~ > 8 cm
  - jump convergence (see next slide)
- amplitude of accommodation
- heterophoria tests for near vision
- fixation disparity tests at reduced distance
Strabismus: the bottom line for the busy optometrist

Is it new or changing?

A

M

B

L

Y

O

P

I

A

Strabismus: the bottom line for the busy optometrist

is it new or changing?

yes

no

diagnosis

Amblyopia

e.g., hypermetropia

REFER

can i correct it?

yes

no

Eye exercises

Prisms

Bifocals & negative adds underused

Refractive correction / modification

Motor deviation

Not usually a problem in heterophoria

Beware of treating in strabismus

Amblyopia

Anisometropic: treat at any age

Strabismic: treat up to age 7-8y

INVESTIGATION OF INCOMITANCY

INVESTIGATION OF HETEROPHORIA

INVESTIGATION OF HETEROTROPIA

TREATMENT

CONCLUSIONS

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Motor deviation

- Refractive correction / modification
- Bifocals & negative adds underused
- Prisms
- Eye exercises
- Binocular sensory adaptations
- Not usually a problem in heterophoria
- Beware of treating in strabismus
- Amblyopia
  - Anisometropic: treat at any age
  - Strabismic: treat up to age 7-8y

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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 Mallet Unit
- In hyperopes, don’t over-plus (Chang et al., 2017)
- Prescribe, try to reduce approx. every 3-6/12
- Negative adds (Chen et al., 2016) & 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
  - EF 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  S: 10  RSOT
  - With +2.00 add: N 4  RSOT with +2.50 add: N ortho

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<th>Mar 97</th>
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Exercises v refractive management v prisms

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<td>V likely to make symptoms better</td>
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<td>If regression to the mean, waste of time</td>
<td>If regression to the mean, waste of money</td>
<td>If regression to the mean, waste of money</td>
</tr>
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<td>Costs practitioner, parent, parent time</td>
<td>Costs specs every 3-6 months</td>
<td>Costs specs every 6-12 months</td>
</tr>
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Conclusions: patient & parent should pick the management taking account of their priorities

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