Binocular vision interactive workshop: case studies quiz

Prof Bruce Evans
BSc (Hons) PhD FCOptom DipCLP DipOrth FAAO FBCLA
Director of Research Institute of Optometry
Visiting Professor City University
Visiting Professor London South Bank University
Private practice Cole Martin Tregaskis, Brentwood, Essex
© 1990-2018 Bruce Evans

PLAN
INTRODUCTION

Case 1: 50y old female in contact lenses with PH of strab since teenager, now worsening (6274)

SYMPTOMS: AHP gradually worse over last year or diplopia
Rx: R+6.00DS 6/6 L+6.25DS 6/6 Add+1.75
WEARING: RGP R+6.00 L+8.50 (monovision)
COVER TEST: D 10Δ L Hyperphoria → GS → L hypertropia
N 15Δ L Hyperphoria → GS → L hypertropia
FUNDUS: fully described; all normal
IOP: R13 L14 mmHg
**LSO palsy**

- In 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

**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
- May contraindicate fitting multifocal spectacles or monovision

**What management?**

A. Refer urgently
B. Refer routinely
C. SV CL & large readers
D. Alternating vision MF CL
E. Stop CL, MF glasses
F. Stop CL, 2 pairs of glasses (DV & NV)
**Case 2: 2½ year old girl, 1st EE**

Polling instructions
Either:
pollev.com/bruceevans029 or
Text BRUCEEVANS029 to 020 3322 5822 once to join, then A, B, C, D, E...

**Characteristics:**
- D XOP > 1.51 greater than N XOP
- Typically, no symptoms as suppress
- Often worse at far distance of 6m
- Often worse with bright sunlight or alcohol
- Often accompanied by a V-syndrome
- Divergent fusional reserve very high
- Can be classified according to effect of occlusion & AC/A ratio
Case 2: 2½ year old girl, 1st EE

**INFORMATION**

**CASE 1**

**CASE 2**

**CASE 3**

**CASE 4**

**CASE 5**

**CASE 6**

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

---

**REPORT OF EYE EXAMINATION OF:**

**XXX**

**Date:** xx/xx/2013

---

**Clinical results**

**Symptoms and Signs**

XXX’s mother has noticed for the last 6 months that XXX’s left eye drifts outwards when XXX is looking to the side. The eye then straightens occasionally, never deviating on something. XXX has been born with a short sightedness and has no history of any eye disease. XXX does not seem to have any difficulty with vision and is developing normally with good general health.

**Visual acuity and refractive error**

- **Near:**
  - Right: 6/30
  - Left: 6/20

- **Refraction (dry refraction):**
  - Right: +1.00Ds
  - Left: +0.50Ds

**Visual fields:**

All visual fields are normal with normal limits as far as seen. Eyes grouped and tested normal OD approximately. SD each eye. Final results: OD normal as far as seen, normal (REPLICA).

**Visual function**

- **Near:**
  - D: orthophoria
  - N: normal
  - G: normal

- **Cover test:**
  - D orthophoria until first cover when breaks down to large F, esophoria with small F. No recovery.

**Eye movements**

- **N/A:**

**Motility:**

- **N/A:**

**Pupils:**

- **N/A:**

**Ocular health:**

- **N/A:**

**Grade**

- **Description:**
  - 1: rapid and smooth
  - 2: slightly slow/jerky
  - 3: definitely slow/jerky but not breaking down
  - 4: slow/jerky and breaks down with repeat covering, or only recovers after a blink
  - 5: breaks down readily after 1-3 covers

---

**Summary and Management**

XXX was, for her age, co-operative throughout my examination. I have not carried out a cycloplegic examination as this was not permitted by her parents. However, I did not find any refractive error that would be likely to influence the immediate divergence. This appears to be of the divergence excess type. I understand that XXX has a hospital stay clinic appointment booked next week and I have recommended that she continue with this to further investigate whether there is any cause for the turning eye. I have advised her that since this only occurs when tired and the monocular vision is good the most likely management at the moment will be to monitor the situation.

I would be grateful to know of the hospital findings.

**Professor Bruce JW Evans**

**Polling instructions**

Either:

- pollerv.com/bruceevans029 or
- Text BRUCEEVANS029 to 020 3322 5822 once to join, then A, B, C, D, E...

---

**Case 3:** 10y old female, monitoring early myopia (late teens)

**Symptoms:**

- D blur, occasional episodes N blur

**V:**

- R 6/15
  - L 6/19

**Ret:**

- R:0.25/-0.5x155
  - L:0.50/-0.5x175

**Sub:**

- R:0.25/-0.5x155
  - L:0.50/-0.5x175

**Cover test:**

- D orthophoria
  - N 3Δ esophoria

**NPC & AA:**

- To nose
  - R 16D L 15D

**Ocular health:**

- Pupils, motility, ophthalmoscopy, fields, refraction: all normal
**Case 3:** 10y old female – further tests

- **Accommod. lag:** not done (would do now!)
- **Cycloplegic:** done in 2009 showing early myopia
- **Maddox wing:** 3Δ eso with subjective
- **Mallett unit s:** 1Δ base out L, aligning prism; or +0.50D aligning sphere
- **AC/A ratio:** 3.5 Δ/D
- **(Sub):** R+0.25/-0.50x155 6/7.5 L-0.50/-0.50x175 6/9

---

**Why does myopia matter?**

- **Common and increasing prevalence**
  - 93% of Taiwanese medical students are myopic (Liu et al., 1996)
  - Prevalence of myopia in USA has increased in last 30 years from 25% to 42% (Vitale et al., 2009)
  - 50-53% of UK university students are myopic (Logan et al., 2005)
  - Prevalence of myopia in UK has more than doubled in last 50 years (McCullough et al., 2016)

- **Significant health impact**
  - High myopia (≥6) increases risk of retinal detachment, myopic macular degeneration, glaucoma, & other conditions
    - "no evidence of a safe threshold level of myopia for any of the known ocular diseases linked to myopia" (Flitcroft, 2012)
  - In the Copenhagen study myopia-related diseases were the most common cause of impaired vision (Holden et al., 2014)

---

**Slowing of myopia progression with multifocal spectacles**

- Larger near segment gives greater treatment effect (Jenkins et al., 2011; Groves, 2012)

---

**Slowing of axial elongation with OK contact lenses**

- As shortened for first 3/12 [orthokeratology] & then grown for second 3/12 [same regimen used]

---

**Slowing of myopia progression with multifocal (HF) or myopia control (MC) soft contact lenses**

- Latest MiSight 2y results
- Latest MiSight 2y results

Not included: Fujikado et al. (2014) – small pilot study of experimental lens only; 0.50D add
Case 3: 10y old myope – what happened?

-2.00  -1.75  -1.50  -1.25  -1.00  -0.75  -0.50  -0.25  +0.00  +0.25  +0.50  +0.75  +1.00

Oct-06 Feb-08 Jul-09 Nov-10 Apr-12 Aug-13 Dec-14 May-16

BF glasses
BF contact lenses

PLAN

INTRODUCTION

CASE 4

Case 4: 3y old boy; Mum says specs not needed

• Ophthalmoscopy normal

Polling instructions
Either:
pollerv.com/bruceevans029 or
Text BRUCEEVANS029 to 020 3322 5822 once to join, then A, B, C, D, E...

Full handout of slides from www.bruce-evans.co.uk
Case 4: 3y old boy; Mum says specs not needed.

- N.B., dry retinoscopy.

What Rx would you have given:
1. Same?
2. More plus?
3. Less plus?

Case 4: 3y old boy; 6 months later.

Case 4: 3y old boy; 6 months later; referral letter.

N.B., dry retinoscopy:
- Case 4: 3y old boy; 6 months later; referral letter (cont.)

I have explained to the [redacted] that for dry retinoscopy we should try to preserve the vitreous humour and to reduce the risk of subluxation. It is common that subluxation will cause the vitreous humour to retract. I have explained that if necessary, we may need to preserve the vitreous humour. I have suggested that the [redacted] may consider the following options and make the appropriate referral. I believe that the [redacted] may consider the following options and make the appropriate referral. Reconsideration of the current management may be required in the future. Reconsideration of the current management may be required in the future.

With kind regards,

[Redacted]

Professor Brown, FRANZCO, FRANZCA, FRCOphth, FRANZCA, FRCOphth, FRANZACN, FRANZCA, FRCOphth, FRANZACN, Fellow of the American Academy of Orthopaedic Surgeons, Fellow of the American Academy of Orthopaedic Surgeons, Fellow of the American Academy of Orthopaedic Surgeons.
Case 4: 3y old boy; 9 months later; reply to referral

I saw him in clinic today. He initially went to the opticians as his mother noticed that he was turning excessively. His own optician found him to be hypermetropic but he was not wearing glasses. His mother now indicates that his right eye turns inward and she came to see me for a second opinion regarding his need to wear glasses.

On examination today, vision was reduced at 0.2 in the right and 0.3 in the left. His right pupil is smaller than his left. He has a marked right strabismus particularly in the distance rather than near. This measured 10°A at near and 15°A in the distance. He had a full range of ocular movements and accommodation did show a significant hypermetropic refractive error. Fundal examination was normal.

I have explained to his mother today that I think he would benefit from glasses as his right eye is now beginning to turn inward and his vision is reduced in both eyes. I have given him a prescription of +3.50/+2.25 in the right and +2.00 in the left. This represents an under correction of 1-30 degree in either eye. He should wear his glasses full time and I will see him in three months’ time to assess the situation.

Yours sincerely,

Consultant Ophthalmic Surgeon

---

Case 6: 5y old girl, new px, 2nd EE, May 2012

---

Case 6: some literature on treatment

- Flow chart based on review of recent RCTs in Evans et al. (2011)
- 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 (Evans, 2006)
- Many cases never require full-time occlusion
  - If 6/9 to 6/25, 2h occl. ± 1 h
  - 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
Case 6: 2 years later, now 7y old girl

PH: birth & 1st year OK
March 2012 vision screening found LE problem
saw local optom, Rx R+1.00DS L+4.00DS, improved by one line, advised patching, parents wanted 2nd opinion

FH: Aunt amblyopia
Symptoms: rarely strab seen in 1st year of life, not since px closes LE when trying to read
D & N s OK; Spx worn schoolwork & homework
GH good, no medication
School all OK

• Discussed contact lenses with patient and parent, who are now keen to wear contact lenses
• Referred back to local optometrist with recommendation for daily disposable contact lenses

"We find comfort among those who agree with us – growth among those who don’t.”
Frank A. Clark

Some famous people who were dyslexic

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