The Institute of Optometry is unique in being an independent self-financing charity dedicated to the promotion of clinical excellence, research, and education in optometry.

Roberson (1989)

Paediatrics: general approach

- small, inexperienced adults
- put child at ease; have fun; praise
- may need to be quick
- do what you can, where you can, when you can
- dim lights slowly
- explain, in appropriate language
- train them and give prizes

Paediatrics: when to refer

- active & some old pathology
  - For children aged 6-18y, BV & accomm anomalies are 10x more likely to be present than ocular pathology
  - The authors make an interesting point that, in this age
  - visual conversion reactions can mask pathology
  - non-accidental injury

References


DISCLOSURE

- Paid lectures & KOL/product feedback programmes:
  - Lecture content: always my own
- Author of Pickwell’s Binocular Vision Anomalies, editions 3-5
- I.O.O. Sales Ltd markets IFS orthoptic exercises & IoO Near Test Card which the speaker designed & for which he receives a small royalty
- Community optometric practice in Brentwood, Essex
Non-accidental injury (NAI)
- Ocular signs
  - Peripheral retinal haemorrhages
  - Periocular bruising
  - Subconjunctival haemorrhages
  - Hyphaema
  - Dislocated lens
  - Retinal detachment
- Systemic signs
  - Surface bruises
  - Multiple fractures & injuries
  - Scalds & burns

Child protection
- Avoid unnecessary physical contact
- To protect yourself against unfounded allegations you may:
  - Ensure presence of parent/carer at all times
  - Door ajar so parent/carer can hear
  - Open access policy; staff knock & enter any time
- But take reasonable precautions to preserve confidentiality

See C. Optom guidelines

Development of binocular vision
- Horwood (2003): Occasional (<15% of the time) neonatal misalignments are common and OK in the first month of life and only require referral if:
  - they worsen after 2 months or
  - there is an intermittent deviation at 4 months
- For most infants, motor fusion and sensory fusion develop at about 3-4 months
- By 6 months children should converge to a 20Δ base out prism and, if cooperative, should be able to fixate coarse stereoscopic targets

Symptoms, history, family history
- Symptoms:
  - Do you ever see an eye turning?
  - Distance vision (birds, planes)
  - Near vision (detail in pictures)
- History:
  - Birth on time
  - Birth weight
  - Birth complications
- Family history
  - Esotropia, amblyopia, Rx

Ocular health
- With pre-school, optometrist unlikely to get more than a glimpse
- Pupil reactions possibly, indirect can be useful
- If in doubt, dilate. Photos if possible
- If still in doubt, refer
- Colour vision
  - Ishihara
  - TCU (1 & 2)
HVID NORMS
- neonate: 9.0-10.5 mm
- 6 months: 11.5 mm ± 0.50 mm

PLAN
- INTRODUCTION
- OCULAR HEALTH
- VISUAL ACUITY
- REFRACTION
- ORTHOPTIC FUNCTION
- CONCLUSIONS

Visual acuity: grating preferential looking
- Teller or Keeler or Lea
- Suitable from birth
- Two out of three
- Easier to do than you think!
- No peeping!
- Not good at detecting strabismic amblyopia
  - Vernier is the future
  (Drover et al., 2010)

Visual acuity: Cardiff cards
- Vanishing optotypes suitable from 6 months
- Binocular readings possible for 96% aged 12-36 months
- Adoh and Woodhouse (1994)
- A “game” that children enjoy
- Encourage them (noises etc.)
- Poor at detecting strabismic amblyopia

Visual acuity: shapes and pictures
- Manageable by many 2 year olds
- Avoid isolated uncrowded optotypes
  - Poor at detecting strabismic amblyopia
- Lea & Kay have LogMAR design
- Test Chart 2000 is ideal
- Most children who can do these can match crowded letters

Visual acuity: letter matching
- Worst:
  - Sheridan Gardiner
- Better
  - Snellen Silver
  - Cambridge cards
  - Glasgow Acuity Test
- Best: Test Chart 2000
  - Possible from c. 2.5 years

Handout from www.bruce-evans.co.uk for regular tweets on optometric research.
**Visual acuity: near charts**
- Lea, Patti pics, Kay near VA cards
- Avoid stories
- Institute of Optometry near test card
- Many others

**PLAN**

**INTRODUCTION**

**OCULAR HEALTH**

**VISUAL ACUITY**

**REFRACTION**

**ORTHOPTIC FUNCTION**

**CONCLUSIONS**

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

---

**Automated refraction: Photorefraction**
- Paediatric handheld autorefractors e.g.,
  - Plusoptix
  - Retinomax
- Eccentric photorefraction e.g.,
  - 2Win

**Refraction: Basic minimum**
- Are the retinoscopy reflexes symmetrical and no large refractive errors?
- Be adaptable about working distance
- Hold trial lenses with infants
- Fixation target is anything that will attract their attention, ideally Test Chart 2000

**Refraction: accommodative lag**
- MEM retinoscopy
  - Binocularly faces target on retinoscope at normal reading distance
  - Practitioner monocularly rapidly interposes lenses to neutralise reflex
  - Mean +/- 1 SD quoted as plano to +0.75
- Nott retinoscopy
  - UC-CUBE

**Refraction: cycloplegic**
- Indications for cycloplegic:
  - Symptom of intermittent SOT
  - Sign of SOP or SOT
  - Unexplained poor VA
  - Unexplained symptoms
  - Variable or suspicious Rx
  - Suspected accommodative anomaly
- Refer if under 3 months
  - Under 12 months use 0.5% cyclo
  - Dark pigmentation leave for longer
**Refraction:** when to prescribe (Leat 2011)

- Nearly 75% of children with esotropia &/or amblyopia have a significant Rx
- Hyperopia
  - Age 1+: ≥3.50D in any meridian (give partial Rx)
  - Age 4+: ≥2.50D in any meridian (give partial Rx; reduce by 1-1.50D)
- Astigmatism
  - Age 1.5+: ≥2.00DC; give partial up to age 3-4y
  - Age 4+: ≥1.50DC
  - Correct oblique astigmatism ≥1.00DC from 1y onwards
- Anisometropia: prescribe full aniso correction if amblyopia

**Myopia control**

- Dual focus soft CL slow myopia progression (Ansticie & Phillips, 2010)
  - 40 children aged 11-14y, cross-over RCT, 2x 10 month periods, CV MiSight
  - In 70%, myopia progression reduced by 35%, or more
- Soft CL to reduce hyperopic defocus works
  - Slow myopia progression by 30-50% (Sankaridurg et al., 2011; Ansticie & Phillips, 2011; Lam et al., 2013)
- Bifocal soft CL can slow myopia progression by 60-70% if eso phoric at near, at least for 1y (Alper et al., 2008)
- Bifocal soft CL (CD) can slow myopia progression by 50% (Walline et al., 2013)
- Orthokeratology slows myopia progression by 30-50%

**Orthoptics:** tests of alignment

- Cover test: the gold standard
- Hirschberg: inaccurate 1mm = 15-20Δ
- Krimsky: ≤14Δ
- Bruckner
  - Symmetry of red reflexes, direct ophthalmoscope at 80-100cm, dial in correction for clear view. Darker reflex in strabismic eye
  - Detects strabismus, anisometropia, anisocoria or pathology

**Orthoptics:** motility

- Infants don’t like having head held
  - Move around
  - Or parent can rotate the child

**Orthoptics:** motor fusion

- Base out prism test
  - Have child fix a detailed picture
  - Can measure in older children with prism bar
  - Measure the reserve that opposes the phoria first

---

*Handout from www.bruce-evans.co.uk for regular tweets on optometric research*
**Orthoptics:** stereotests

- Lang works well with infants: look at eye movements
- Frisby makes a good game with squeaky toy
- Recommended from age 2y is Randot
  - Random dot
  - Contoured
- Norms vary from test to test and even between editions of the same test
  
  van Doom, Evans, Edgar, Fortuin (2014)

---

**Stereotests**

www.bernell.com

---

**Key Signs of Decomp. Phoria**

- Symptoms
- Poor cover test recovery

---

**Strabismus: the bottom line for the busy optometrist**

- is it new or changing?
- Amblyopia

---

**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

---

**Strabismus: the bottom line for the busy optometrist**

- is it new or changing?
- do I know the cause?
- any treatment needed? (probably not)
- refer
**Profound learning difficulties**
- e.g., Down syndrome
- often associated with:
  - refractive error
  - strabismus
  - poor accommodation
  - reduced VA
- paediatric techniques may work; be quick
- need eyecare, often need Rx (bifocals)

**Specific learning difficulties (SpLD)**
  e.g., dyslexia
- vision does not cause dyslexia, BUT there can be co-occurring visual problems:
  - normal prevalence of refractive error
  - c.15% have binocular instability
  - c. 20% may benefit from coloured filters
- SpLD may benefit from specialist (non-NHS) eyecare

Evans & Allen (2016)

**PLAN**

INTRODUCTION
OCULAR HEALTH
VISUAL ACUITY
REFRACTION
ORTHOPTIC FUNCTION
CONCLUSIONS

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

**Conclusions: they need us**
- Young children need and deserve more than once only vision screening on school entry
- Many non-pathological orthoptic anomalies can be best managed in primary optometric care
- Accept that you won’t get perfect results
  - Record the quality of the response

**Conclusions: we need them**
- c. 10% of population is under 16 yrs
- children need regular brief exams
- some orthoptic patients prefer exercises in primary care