Paediatric eyecare for the busy optometrist

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References

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**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 & accom 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

**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 child, ophthalmoscopy may be series of glimpses
- Record what you see
- Pupil reactions possible, indirect can be useful
- If poor view, check regularly until good view
- If in doubt, dilate. Photos if possible
- If you think you see pathology, refer
- Colour vision
  - Ishihara, City University

Detecting buphthalmos: HVID norms

- neonate: 9.0-10.5 mm
- 6 months: 11.5 mm ± 0.50 mm
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 (Dover et al., 2010)

Visual acuity: Cardiff cards
- Vanishing optotypes suitable from 6 months
- Binocular readings possible for 96% aged 12-36 months
- 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 now 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
  - Sokoloff Silver
  - Cambridge cards
  - Glasgow Acuity Test
- Best: Test Chart 2000
  - Possible from c. 2.5 years

Visual acuity: near charts
- Lea, Patti pics, Kay near VA cards
- Avoid stories
- Institute of Optometry near test card
- Many others
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**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

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**Refraction: accommodative lag**

- MEM retinoscopy
  - px *binocularly* fixes 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

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**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

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**Automated refraction: Photorefraction**

- Paediatric handheld autorefractors e.g.,
  - Plusoptix
  - Retinomax
- Eccentric photorefraction e.g.,
  - 2Win

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**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)
  - School age: ≥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

These are premature because there are many questions that remain unanswered and we do not have the quality of evidence that we would like. The clinician, however, must make.
**Myopia control**

- Soft CL with peripheral add & OrthoK slow myopia progression by 30-70%

**Orthoptics: tests of alignment**

- **Cover test:** the gold standard
  - Hirschberg: inaccurate 1mm = 15-20s
  - Krimsky: ±14s
  - 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

**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 Doorn, Evans, Edgar, Fortuin (2014)

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

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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?

- yes
- no

do I know the cause?

- yes
  - e.g., hypermetropia
  - can I correct it?
  - yes
  - no
  - refer
- no
  - refer

any treatment needed?

- (probably not)
- no

is it new or changing?

Strabismus: the bottom line for the busy optometrist

Profound learning difficulties

- e.g., Downs 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, but we don’t treat dyslexia

Evans & Allen (2016)
**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.
- Many orthoptic patients prefer management in primary care.