KIDS Я FUN!
Paediatrics for the busy optometrist

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References

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

Non-accidental injury (NAI)

- Ocular signs
  - Peripheral retinal haemorrhages
  - Pericocular 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

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
**PLAN**

INTRODUCTION
OCULAR HEALTH
VISUAL ACUITY
REFRACTION
ORTHOPTIC FUNCTION
CONCLUSIONS

**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

**Visual acuity:** grading 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

(Driver 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 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
  - Sonksen 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

**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:**

- **MEM retinoscopy**
  - px binocularly fixes target on retinoscope at normal reading distance
  - practitioner monocularly repeatedly interposes lenses to neutralise reflex
  - mean ±1 SD quoted as plano to +0.75
- **Nott retinoscopy**
  - UC-CUBE

**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)
    - School age: ≥1.50D
  - Astigmatisim
    - Age 1.5+: ≥2.00DC; give partial up to age 3-4y
    - Correct oblique astigmatism ≥1.00DC from 1y onwards
  - Anisometropia: prescribe full aniso correction if amblyopia

**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
  - **Krimsky:** ≤14°
  - **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

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**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

<table>
<thead>
<tr>
<th>age (months)</th>
<th>test</th>
<th>response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>20 4 out</td>
<td>subject to make any response</td>
</tr>
<tr>
<td>6-10</td>
<td>20 4 out</td>
<td>should be reversed</td>
</tr>
</tbody>
</table>


**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 Dissen, Evans, Edgar, Farken (2014)

**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?

**Is it new or changing?**

- **AMBLYOPIA**
  - Is it new or changing?
    - Yes
      - Do I know the cause?
        - No
    - No
      - Any treatment needed?
        - No (probably not)
        - Refer
      - Can I correct it?
        - Yes
          - If so, refer
    - No
      - Refer
**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
  
  Evans & Allen (2016)

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**Plan**

**Introduction**
**Ocular Health**
**Visual Acuity**
**Refraction**
**Orthoptic Function**
**Conclusions**

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**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

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**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

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