

Amblyopia Treatment in 2009

Lloyd Bender

Lionel Kowal

Royal Victorian Eye and Ear Hospital

Traditional Amblyopia Treatment

- Eminence vs evidence

Treatment Aims

- Effective in improving visual acuity
- Cost-effective
- Acceptable
- 'Primum non nocere'

Questions

- What age?
- How much?
- For how long?
- When shouldn't we?
- What other treatment?

'Evidence based' rationale

- PEDIG publications
- **Pediatric Eye Disease Investigator Group**
- MOTAS
- **Monitored Occlusion Treatment of Amblyopia Study**

PEDIG

- Large study numbers
- Several different studies
- Attempt to monitor prescribed treatment dose
- Parent diaries

MOTAS

- Smaller numbers
- More rigorous monitoring of patching dose
- Electronic Occlusion Dose Monitor (*ODM*)

- Parent diaries overestimate actual patching time (by 2 or 3) when monitored with electronic Occlusion Dose Monitor

PEDIG:

Glasses alone

- 6/12 to 6/75
- 27% cured
- Another 50% ≥ 2 lines better
- Took up to 7 mo

MOTAS

Glasses alone

- 65 newly diagnosed children
- VA improved (p,0.001) from 0.67 to 0.43 logMAR

‘REFRACTIVE ADAPTATION’

Br J Ophthalmol 2004;88:1552-1556.

PEDIG:

- Ages 3-7
- Can do reliable HOTV
- 1h/d near activity



- VA 6/30 to 6/120
- 6h/d vs all waking hours
- 4mo: 4+ line improvement

- VA 6/12 to 6/24
- 2h vs. 6h/d
- 4mo: 2.4 line improvement

Age and severity of amblyopia not relevant

VA 6/12 to 6/24

Daily atropine vs. patch 6h/d

- 6 months and 2 years: no difference

Daily vs weekend Atropine

- 1/80 Occlusion amblyopia

Atropine and reduced plus

- No benefit cf atropine alone
- Increased risk of occlusion amblyopia

Recurrence of amblyopia

≥ 3 lines acuity improvement

- 25⁰ : ≥ 2 lines loss @ 12mo (15⁰ in first 6 months and 10⁰ in second six months)
- 42% after stopping 6h/d
- **14% if 6h/d tapered to 2h/d before stopping**

Recurrence of amblyopia

1 year follow-up

Amblyopia Type	Vision loss
Mixed	1 line (5 letters)
Anisometropic	1 letter
Strabismic	2.5 letters

Glasses vs. glasses plus

VA 6/12 – 6/120

7-12 year old

- patch 2-6h/d & daily atropine
- Acuity improved by ≥ 2 lines
- 50% better

13-17 year old

- patch 2-6h/d
- Some have improved acuity
- 12mo later: 20% have regressed
- 25% better

MOTAS

- 18w of glasses
- Then patch prescribed (6h c.f. 12h/d)
- **6h/d**: received 4.2 [\pm 0.5] h/d
- **12h/d**: received 6.2 [\pm 1.1] h/d

Percentage of amblyopia deficit corrected

Type	Ref. Adapt.	Occl.	Deficit corrected
All	32	47	78
Aniso	44	42	86
Strab	30	50	80
Mixed	27	50	77

Dose response

AGE	DOSE
< 4years	Less than 3hours /day effective Minimal additional gains with >3 hours/day
>4 years	Significant difference between <3 and 3 - 6 hours/day No difference between 3-6 and 6- 12 hours/day
>6 years	Less than 3 hours/day had little effect Need > 3 hours/day

1 line gain:

- needs ~ 120h occlusion

2 line gain:

- 4y: needs 170h
- 6y: needs 236h

Tentative conclusions

More is better

Younger is better

MUCH more is always better?

- All patients : full-time occlusion
- Success : 20/30 or better or equal VA by fixation pattern.
- 600 pts followed up after cessation of FT patching [mean 7y]. 89% followed > 1 y.

EXCEPTIONAL Results

- 96% attained “success”.
- 60%: equal visual acuity.
- 6/12 - 6/30 : 6/9 or ≥ 3 lines improvement:
PEDIG ~80%, Scott 98%
- **Younger: less occlusion time to endpoint & better visual outcome (P = 0.0001).**
- Incidence of occlusion amblyopia was 26%. Nearly all treatable.

Why so different

	Number	Lost to FU	Strab	Aniso	Mixed
PEDIG	419	5 – 10 %	38%	37%	24%
Scott	600	19%	73%	9%	17%

Maybe more isn't always better...

MOTAS:

- Higher dose rates achieve the best outcome more rapidly but at a risk of accumulating excessive non-therapeutic hours of patching....patching for all waking hours is almost certainly excessive....

Tentative conclusions

- More is better
..but for many, less is fine
- Younger is better
- Taper doses

Strabismic Amblyopia

- Does alignment result in better response to amblyopia therapy?...or no need for amblyopia therapy?

Timing of amblyopia therapy relative to strabismus surgery

- 47 children < 8 y with both amblyopia and esotropia.
- 26 : amblyopia fully treated before surgery
- 21 : surgery before completing amblyopia therapy.
- 5/21 did not require amblyopia therapy after surgery even though they were still amblyopic before operation.

Post Darwinian treatments

Erasmus Darwin (1731 – 1802)

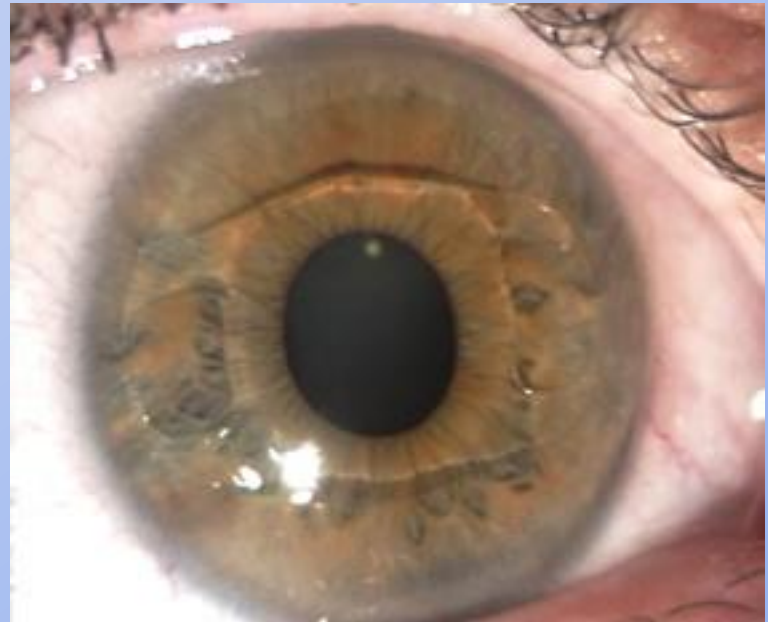
- Refractive surgery
- Drugs?

Refractive surgery

- Surgical safety established
- Anisometropia and Ametropia Encouraging results
- Selected patients

Refractive surgery

- LASIK /LASEK / PRK
- Lens exchange
- Phakic IOL



Results

L. Tycheson

- 260 patients
- 90% within 1.5 D of emmetropia
- 50% improved fusion and stereopsis

W. Astle

- 56 eyes (39 patients)
- Mean SE -1.73 D
- VA improved 1 – 7 lines
- No significant improvement in stereopsis

Drugs

- Levodopa (PEDIG pilot study)
- Citicholine

- Anecdotally helpful in some cases of resistant amblyopia

- Prozac – Restores plasticity in _{rat} adult visual cortex
Science 320,385 (2008)

Engaging the Stakeholders

- Parents commitment vital
- Personality types
- Communication
- Tailoring treatment to suit individuals
- Enthusing staff

