Amblyopia: An Evidence-based Treatment Strategy

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Acknowledgements

131 clinical sites

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Amblyopia Treatment: Prior Teaching

- Mainstay of amblyopia treatment is patching
- Rx glasses and occlusion simultaneously
- Patch full-time, especially if severe amblyopia; never < 4 hours
- Patching is better than atropine penalization
- Atropine is only for moderate amblyopia & younger children
- Amblyopia cannot be treated beyond 6 to 9 years of age?

Objectives

To Review:
- Clinically important or unexpected findings
- Provide my clinical perspective

The opinions expressed during this presentation are my own.

PEDIG Studies on Amblyopia Treatment

PEDIG Amblyopia Treatment Studies: Core Elements

- Randomized clinical trials (RCTs) & prospective observational studies
### Core Elements:
**Well Defined Inclusion / Exclusion Criteria**

**Example**
- **Age**: 4 to <13 years
- Amblyopia associated with anisometropia, strabismus (<5∆ at near measured by SPCT), or both
- No amblyopia treatment (atropine, patching, Bangerter, VT, binocular therapy) in past 2 weeks
- Spectacle correction (if required) worn for at least 16 weeks, or until stability of VA is demonstrated (<0.1 logMAR change by the same testing method measured on 2 exams at least 8 weeks apart)
- VA in the amblyopic eye 20/40 to 20/200 (ATS-HOTV) or 33 to 72 letters (E-ETDRS)
- VA in the best-corrected fellow eye meeting the following criteria:
  - If age 4, 20/40 or better by ATS-HOTV
  - If age 5 or 6, 20/32 or better by ATS-HOTV
  - If age 7 or older, 20/25 or better by E-ETDRS (>78 letters)
- Interocular difference ≥3 logMAR lines (ATS-HOTV) or (>15 letters (E-ETDRS)
- No myopia ≥ 6.00 D SE

### Core Elements:
**Clear Protocol with Defined Follow-up Schedule**

**Visit Schedule**
- Enrollment & randomization
- 1-week phone call (7-13 days from randomization)
- 4 weeks ± 1 week (primary outcome)
- 8 weeks ± 1 week (secondary outcome)
- 9-week phone call (7-13 days from 8-week exam)

### Standardized, Masked Outcome Assessment

- Primary outcome: best-corrected distance visual acuity
  - Standardized assessment by masked examiner
  - ATS-HOTV (3 to 6 years)
  - e-ETDRS (≥ 7 years)

### Other Core Elements of PEDIG ATS Studies

Randomized clinical trials (RCTs) & prospective observational studies
- A priori statistical analysis plan based on hypothesis-driven question(s)
- Appropriate sample size
- RCT’s – comparison group with random assignment of treatment; concealed allocation to treatment groups; intent-to-treat analysis

### PEDIG Amblyopia Treatment Studies: Core Elements

Randomized clinical trials (RCTs) & prospective observational studies
- Well defined inclusion / exclusion criteria
- Clear protocol with defined follow-up schedule
- Standardized, masked outcome assessment
- A priori statistical analysis plan based on hypothesis-driven question(s)
- Appropriate sample size
- RCT’s – comparison group with random assignment of treatment; concealed allocation to treatment groups; intent-to-treat analysis; most are effectiveness studies

### Mainstay of Amblyopia Therapy

**THEN**
- Patching

**NOW**
- Refractive Correction
Timing of Refractive Correction & Occlusion

**THEN**
Rx glasses and occlusion simultaneously

**NOW**
Rx glasses alone; hold off on occlusion

Optical Treatment is a Treatment in its Own Right

<table>
<thead>
<tr>
<th>Results (n=146)</th>
<th>Strabismic</th>
<th>Strab/Aniso</th>
<th>Total (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean VA improvement</td>
<td>1.2</td>
<td>2.3</td>
<td>(2.6)</td>
</tr>
<tr>
<td>% Improved ≥ 2 lines</td>
<td>69%</td>
<td>88%</td>
<td>75% (67% - 82%)</td>
</tr>
<tr>
<td>% Improved ≥ 3 lines</td>
<td>50%</td>
<td>63%</td>
<td>54% (45% - 63%)</td>
</tr>
<tr>
<td>% Resolved (IOD ≤ 1 line)</td>
<td>28%</td>
<td>40%</td>
<td>32% (24% - 41%)</td>
</tr>
</tbody>
</table>

Optical Treatment for Unilateral Amblyopia
Mean Improvement in Visual Acuity (logMAR lines)

<table>
<thead>
<tr>
<th>Change in Amblyopic VA</th>
<th>Anisometropic</th>
<th>Combined Mechanism</th>
<th>Strabismic</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Resolved (IOD ≤ 1 line)</td>
<td>27%</td>
<td>28%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Was VA Improvement Related to Eye Alignment?
No relationship!

Refractive Correction
- Full anisometropia, astigmatism, myopia
- Hyperopia
  - Fully correct (primarily for ET)
  - Under-correct symmetrically*
- Based on 1% cyclopentolate refraction

Time Course to Achieve Best Visual Acuity
Most (>90%) achieved best visual acuity by 18 weeks
Refractive Correction

• Follow up at 6-10 week intervals
• Most reach best VA in ≈ 18 weeks


Example: Spectacle Wear Only

<table>
<thead>
<tr>
<th>Nicole 6 years</th>
<th>Cyclo: OD +7.25 -1.50 x 180</th>
<th>OS +4.50 DS</th>
<th>SRx: OD +5.75 -1.50 x 180</th>
<th>OS +3.00 DS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OD VA</td>
<td>OS VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 04</td>
<td>20/63</td>
<td>20/25</td>
<td>Dispense SRx</td>
<td></td>
</tr>
<tr>
<td>Feb 12</td>
<td>20/40</td>
<td>20/16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 21</td>
<td>20/32</td>
<td>20/20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 02</td>
<td>20/25</td>
<td>20/20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 13</td>
<td>20/25</td>
<td>20/16</td>
<td>Start patching 2 hrs</td>
<td></td>
</tr>
</tbody>
</table>

Examples: Spectacle Wear Only

<table>
<thead>
<tr>
<th>Tyler Syst.</th>
<th>Constant LET 20-25∆</th>
<th>OD: +4.25 DS</th>
<th>OS: +6.00 DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 23</td>
<td>20/20</td>
<td>20/250</td>
<td></td>
</tr>
<tr>
<td>March 31</td>
<td>20/16</td>
<td>20/160</td>
<td></td>
</tr>
<tr>
<td>June 18</td>
<td>20/16</td>
<td>20/80</td>
<td></td>
</tr>
<tr>
<td>July 30</td>
<td>20/16</td>
<td>20/50</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Celine 4 yrs</th>
<th>CLET 14∆ (D) &amp; 20∆ (N)</th>
<th>OD: +5.50 -0.50 x 180 (20/50)</th>
<th>OS: +7.50 -1.50 x 180 (20/160)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 31</td>
<td>Dispense SRx</td>
<td>20/40</td>
<td>20/125</td>
</tr>
<tr>
<td>May 12</td>
<td></td>
<td>20/20</td>
<td>20/50</td>
</tr>
</tbody>
</table>

NOW

Consider prescribing refractive correction as the sole initial treatment for amblyopia


Amblyopia: Randomized Clinical Trials

<table>
<thead>
<tr>
<th>Treatment #1</th>
<th>Treatment #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim Follow-up Visit</td>
<td>Final Outcome Visit</td>
</tr>
</tbody>
</table>

RCT's: 3 to <7 years with Unilateral Amblyopia...

<table>
<thead>
<tr>
<th>Daily Patching 6+ hours vs 1% atropine</th>
<th>Daily Patching 2 hours vs 6 hours</th>
<th>Daily Atropine vs Weekend Atropine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Patching Full-time vs 6 hours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What Have We Learned?

### Patching Treatment

**What Have We Learned?**

### Patching vs Atropine for Moderate Amblyopia in 3 to < 7-Year-Old Children

**Clinical Trial Results**

<table>
<thead>
<tr>
<th>Prescribed Dosage</th>
<th>Mean Lines ↑ VA</th>
<th>Mean Post-Tx VA</th>
<th>VA 20/30 or better or Improved ≥ 3 lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patching ≥ 6 hrs</td>
<td>3.16</td>
<td>20/32</td>
<td>79%</td>
</tr>
<tr>
<td>Atropine daily</td>
<td>2.84</td>
<td>20/32</td>
<td>74%</td>
</tr>
</tbody>
</table>

**THEN**

Patching is better & the first-line treatment

**NOW**

Atropine & Patching are Equivalent

---

### Equivalent Results for 6 Hours vs. 2 Hours of Prescribed Patching for Moderate Amblyopia

**Clinical Trial Results**

<table>
<thead>
<tr>
<th>Prescribed Patching*</th>
<th>Mean Baseline VA</th>
<th>Mean Lines ↑ VA</th>
<th>Post-Tx VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 hours</td>
<td>20/63</td>
<td>2.4</td>
<td>20/32</td>
</tr>
<tr>
<td>6 hours</td>
<td>20/63</td>
<td>2.4</td>
<td>20/32</td>
</tr>
</tbody>
</table>

* 1 hour near activities also prescribed

---

### Equivalent Results for Full-time vs 6 hours of Prescribed Patching for Severe Amblyopia

**Clinical Trial Results**

<table>
<thead>
<tr>
<th>Prescribed Patching*</th>
<th>Mean Baseline VA</th>
<th>Mean Lines ↑ VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>20/160</td>
<td>4.8</td>
</tr>
<tr>
<td>6 hours</td>
<td>20/160</td>
<td>4.7</td>
</tr>
</tbody>
</table>

* 1 hour near activities also prescribed

---

### Prescribed Patching Dosages for Amblyopia

**Less is More?**

Shorter duration of patching may ease implementation of treatment
Stewart CE et al. BMJ 2007;335:707+
n = 80
x = 5.5 yrs

x = 4.2 hours
x = 6.2 hours

Actual Patching Dosage

Patching Dosage: Variability of Response

- Allocated to 6 hours of occlusion a day
- Allocated to 13 hours of occlusion a day

Proportion of Deficit Corrected

Stewart et al. BMJ 2007;335:707

Patching Treatment

- Moderate: Start with 2 hours
- Severe: Start with 6 hours
  - 2 hours can work
- Can increase dosage if desired
- Atropine is an alternative

Atropine Treatment for Amblyopia

- Rarely Prescribed
- Daily Administration
- Moderate Amblyopia Only
- Only Young Children

Equivalent Results for Daily vs Weekend Atropine for Moderate Amblyopia

Clinical Trial Results

<table>
<thead>
<tr>
<th>Prescribed Dosage</th>
<th>Mean Lines ↑ VA</th>
<th>Mean Post-Tx VA</th>
<th>VA 20/25 or better or Equal VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>2.3</td>
<td>20/32</td>
<td>47%</td>
</tr>
<tr>
<td>Weekend</td>
<td>2.3</td>
<td>20/32</td>
<td>53%</td>
</tr>
</tbody>
</table>

Atropine Treatment for Amblyopia

- 2 days/week sufficient
- Commonly prescribed
- Severe amblyopia also
- Older & younger children

PEDIG. Arch. Ophthalmol 2004;111:2076-85
Atropine Treatment for Amblyopia

**NOW**

- Well tolerated
- Systemic side effects are rare
- Reverse amblyopia is rare
- Sunglasses / brimmed hats outdoors


**DON'T NEED:**

- Change fixation to amblyopic eye
- Better near VA of amblyopic eye vs atropinized sound eye
- Measure sound eye VA through full plus at FU visits (Check your retinoscopy!)

**Atropine Instruction Sheet**

Your child's amblyopia ('"lazy eye") is being treated with atropine eye drops. Atropine blurs the better-seeing eye and dilates its pupil. This encourages use of the eye with poor vision. This treatment often will improve the vision in the amblyopic eye.

**Treatment:** 1 drop of Atropine in the ______ eye in the morning!

- Every day!
- Every Saturday and Sunday!
- Every Wednesday and Saturday!
- Every Monday, Wednesday, and Friday!

**Administration of drops:**

- Wash your hands before and after giving the drops.
- Have your child lie down and look at a spot on the ceiling.
- Gently hold the lower lid open with one hand, hold the dropper bottle at least 1/2 inch from the eye, and gently squeeze the bottle, allowing a single drop to fall either on to the surface of the eye or onto the inside of the lower eyelid. Blot away the excess with a clean tissue.
- It is normal for the drop to sting for about 10 seconds. If your child is frightened, try administering the drops when the child is asleep.

**Side effects:**

- The drop could cause mild irritation, redness, or swelling around the eye. Rarely, the drop can cause some general problems such as dry mouth, flushed skin, rapid heart rate, or irritability. If this occurs please stop using the drops and contact the office.

**Storage:**

- The drops do not need to be refrigerated, but must be kept out of reach of children.

**Dilated pupil:**

- The pupil may stay dilated for a week or more after a single drop of atropine. This is not something to be alarmed about. Your child should wear a hat and either regular eyeglasses or sunglasses when outside (including recess at school) to make him/her feel more comfortable. Whenever your child sees a doctor or goes to an emergency room, it is important to inform them that your child is using atropine drops so they will know the reason why the pupil is dilated.

**School:**

- Depending on your child's prescription, he/she may continue to use the better eye for distance tasks. However, vision will be blurred for near activities and your child should be allowed to hold things as close as necessary.

**Questions:**

- Please feel free to call us with any questions.

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**Effective Ages at Which Amblyopia Can Be Treated**

**THEN**

Only up to age 6 (or 7 or 8) years

**NOW**

At least to age 17 years

---

**Amblyopia Treatment 7 to 17 years (20/40 - 20/400)**

Randomize

- Optical Correction
- Optical & 2-6 hours daily patching & near activities (+ atropine if <13yr)

Follow-up visits at 6, 12, 18 weeks

Primary Outcome at 24 Weeks

Responder or Non-responder
Amblyopia Can Be Treated Beyond 7 Years of Age

Clinical Trial Results

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Prior Treatment</th>
<th>Optical Tx Only Responders (≥ 2 lines)</th>
<th>Active Treatment Responders (≥ 2 lines)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 to 12</td>
<td>Yes &amp; No</td>
<td>25%</td>
<td>53%</td>
</tr>
<tr>
<td>13 to 17</td>
<td>Yes &amp; No</td>
<td>23%</td>
<td>25%</td>
</tr>
<tr>
<td>13 to 17</td>
<td>No</td>
<td>20%</td>
<td>47%</td>
</tr>
</tbody>
</table>


Individual Variability in Those With Prior Treatment

Effective Ages at Which Amblyopia Can Be Treated

THEN

Only up to age 6 (or 7 or 8) years

NOW

At least to age 17 years

Effective Ages at Which Amblyopia Can Be Treated

7 to 17 Years of Age

- It is not too late!
- Rate of response may be slower & extent of recovery may be less
- Individual variability in response
- May be a reflection of treatment compliance

Older Children

- How About Diplopia?
- NO Persistent Diplopia!
**Older Children**

Does VA Regress After Treatment is Discontinued?

**VA Regress: 7 to 12 Yrs?**

- Cumulative probability of ≥ 2 line decrease = 7%
- VA improvement is sustained in most children for at least 1 year after stopping treatment other than spectacle wear

**Isoametropic Amblyopia?**

+5.50 -4.25 X 180 (20/50)
+5.25 -4.00 X 175 (20/50)

**Mean Binoc VA Improvement Amount / Time Course**

![Graph showing mean binoc VA improvement amount over time]

**Isoametropic Amblyopia?**

- Correct the Refractive Error
- Encourage Child to Wear Optical Correction
- Be Patient

**THEN & NOW**

Residual Amblyopia is Still a Problem
Increasing Patching Dosage for 10 Weeks; 3–<8 Yrs

### Clinical Trial Results

<table>
<thead>
<tr>
<th></th>
<th>10 weeks</th>
<th>≥ 10 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable Residual Amblyopia After 2 Hours of Patching</td>
<td>Lines ↑ VA</td>
<td>% ≥ 2 lines ↑</td>
</tr>
<tr>
<td>Stay on 2 hours</td>
<td>0.5</td>
<td>18%</td>
</tr>
<tr>
<td>Increase to 6 hours</td>
<td>1.2</td>
<td>40%</td>
</tr>
</tbody>
</table>

PEDIG. Ophthalmology 2013;120:2270-7

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When VA Stabilizes With 2 Hours of Patching

**NOW**

Don’t Throw in the Towel Too Quickly

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### Unresolved Issues

- Residual amblyopia
- Wide variation in treatment response
- Patching / atropine not acceptable to all patients

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**How About Binocular Therapy for Amblyopia?**

_**Correspondences**_

**Dichoptic training enables the adult amblyopic brain to learn**

Anna C. Stark, PhD,1, 2, 3, 4, *; Benjamin Thompson,5, 6; Sanding Den,7; Lip Y.S., Chair; Matthew W., and Robert F. Hour.

"By directly reducing suppression, learning was enabled and significant improvements in both monocular and binocular visual function occurred..."

**Binocular iPad treatment for amblyopia in preschool children**

Jenness J.,* Benjamin Thompson,†, Sanding Den,‡, Lip Y.S., Chair, Matthew W., and Robert F. Hour.

**A binocular iPad treatment for amblyopic children**

Li L., Lip Y.S., †, and Robert F. Hour.

Li L.,* Jenness J., ‡, Benjamin Thompson,§, †, and Robert F. Hour.


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When Visual Acuity Stabilizes with 2 Hours of Patching & Residual Amblyopia is Present

**NOW**

- Consider increasing patching time (6 hours)
- Or even just continuing 2 hours
- Or consider 4 hours or alternate treatment e.g., Atropine or Bangerter filter

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PEDIG. Ophthalmology 2013;120:2270-7
Normal Right Eye
Normal Left Eye
Binocular view
Motion Coherence Task

Fellow Eye
Amblyopic Eye

Binocular Experience
Reduces Suppression & Improves Visual Acuity

iPad—Falling Blocks (like Tetris)
Contrast ↓ to Sound Eye to Allow Binocular Play

As Successful Game Play Continues—
Contrast Increased to Sound Eye

Dichoptic Training in Adults Using Tetris Game

Li, Thompson, Deng, Chau, Ho, Hess (2013). Current Biology 23(8), R308–R309.
Studies on Children - All Lab Based

- 104 children
- 1-4 weeks treatment
- 90% improved; mean 1-3 lines
- 18% improved 3+ lines

Knox et al 2012 (supervised)
Mansouri et al 2013 (supervised)
Li et al 2014 (compliant only)
Birch et al 2014 (supervised only)
Kelly et al 2016 RCT (4 week game)

Time for a Randomized Clinical Trial!

ATS18 Study: 5-12 years, 13-<17 years

- RCT compared change in VA in amblyopic children treated with:
  - Part-time patching (2 hrs/day)
  - Binocular iPad game (1 hr/day)

Falling Blocks (Tetris-like) Binocular Game

- On iPad
- Contrast reduced to sound eye to allow binocular play

ATS-18 Randomized Trial

Younger: 5 to 12 years; Older: 13 to 17 years
Randomize

Binocular Game Play
1 hour/day
7 days per week

Patching
2 hours/day
7 days per week

1-Week Call

4, 8, 12-Week Follow-up Exams

16-Week Primary Outcome Exam

Results?
5 to 12 Years: Amblyopic Eye Visual Acuity

<table>
<thead>
<tr>
<th></th>
<th>Binocular (N = 177)</th>
<th>Patching (N = 186)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Improvement (lines)</td>
<td>1.05 (95% CI: 0.85 – 1.24)</td>
<td>1.35 (95% CI: 1.17 – 1.54)</td>
</tr>
<tr>
<td>≥2 Lines Improvement (%)</td>
<td>28.8%</td>
<td>34.9%</td>
</tr>
<tr>
<td>Resolution of Amblyopia (%)</td>
<td>4.5%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Adjusted difference: 2% (-1% to 3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5 to 12 Years: Amblyopic-Eye Visual Acuity at 16-Week Visit

Amblyopic-Eye Visual Acuity

- Game (n=177)
- Patch (n=186)

13 to <17 Years: Results

- Difference was 0.5 line, favoring patching
- iPad adherence (>75% of prescribed treatment) = 13%

Adherence to Treatment >75% of the Time (Log files)

- Binocular (N = 177)
- Patching (N = 186)

- Mean Improvement (lines)
  - 1.05 (95% CI: 0.85 – 1.24)
  - 1.35 (95% CI: 1.17 – 1.54)
- ≥2 Lines Improvement (%)
  - 28.8% adjusted difference: 5% (-4% to 13%)
- Resolution of Amblyopia (%)
  - 4.5% adjusted difference: 2% (-1% to 5%)
- Adherence to Treatment >75% of the Time (Log files)
  - 65%
**Is the minimal treatment response to binocular therapy because of poor treatment adherence or lack of treatment effect?**


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**Dig Rush Binocular Game for Amblyopia Therapy**

Ubisoft & Amblyotech Companies: ATS 20 RCT

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**ATS-20 Study Overview**

Children with stable VA after refractive correction; <4Δ near tropia
Younger: 4 to 6 years old
Older: 7 to 12 years old

Dig Rush Game
1 hour / day
Controls
Glasses Only

4- and 8-week visits

---

**Amblyopic Eye Visual Acuity: 7 to 12 Year Olds**

<table>
<thead>
<tr>
<th>Mean Amblyopic Eye VA Improvement - Letter Score</th>
<th>Binocular (N = 67)</th>
<th>Patching (N = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 4-Weeks</td>
<td>1.3 (95% CI: 0.1 – 2.6)</td>
<td>1.7 (95% CI: 0.4 – 3.0)</td>
</tr>
<tr>
<td>Adjusted difference:</td>
<td>-0.3 (-2.2 to 1.5)</td>
<td></td>
</tr>
<tr>
<td>At 8-Weeks</td>
<td>2.3 (95% CI: 0.7 – 3.9)</td>
<td>2.4 (98.3% CI: 0.8 – 4.0)</td>
</tr>
<tr>
<td>Adjusted difference:</td>
<td>-0.1 (-2.4 to 2.1)</td>
<td></td>
</tr>
</tbody>
</table>

% Completing 75% of Prescribed Treatment

Reported Compliance
68%
Recorded by iPad
58%

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**Greater Improvement in Visual Acuity with ......?**

Better compliance?
Higher contrast?

No dose-response relationship observed

---

**Dig Rush: 4 to < 7 Years**

Still Recruiting
RCT’s of Binocular Treatment for Amblyopia

• Binocular treatment has not been effective in improving amblyopic eye visual acuity & binocular function
• No dose-response relationship observed
• Treatment not personalized enough?

Amblyopia Treatment: Then & Now

• Mainstay of amblyopia treatment is patching & refractive correction
• Rx glasses & occlusion simultaneously: Glasses only at first
• Patch full-time, especially if severe amblyopia; never < 4 hours
• Patching is better than atropine penalization: Both are options
• Atropine is only for moderate amblyopia & younger children: FALSE
• Amblyopia cannot be treated beyond 6 to 9 years of age: FALSE

Acupuncture

• 7-12 yrs: aniso amblyopia
  - 20/40-20/125
  - After SRx ≥ 16 wks
• Randomized to:
  - 2 hrs/day patching
  - 5 x/wk acupuncture
• Outcome: VA at 15 wks

Acupuncture RCT: Results

<table>
<thead>
<tr>
<th></th>
<th>Patching N = 41</th>
<th>Acupuncture N = 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean VA at baseline</td>
<td>20/63†</td>
<td>20/63</td>
</tr>
<tr>
<td>Mean VA at 15 wks</td>
<td>20/33-35</td>
<td>20/40</td>
</tr>
<tr>
<td>Mean improvement after 15 weeks</td>
<td>1.83 lines</td>
<td>2.27 lines</td>
</tr>
<tr>
<td>Mean VA at 25 weeks</td>
<td>20/33</td>
<td>20/38</td>
</tr>
<tr>
<td>Adverse effects</td>
<td>None</td>
<td>4.9% moderate pain (-) infection</td>
</tr>
</tbody>
</table>

*Zhao et al., Arch Ophthalmol 2010;128: 1510-17
Can several days of complete darkness cure lazy eye?
It might. Here’s why.

In Conclusion

Stay Tuned
Because Lots of
Amblyopia Research in Progress

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