Mainstay of amblyopia treatment is optical correction

- Optical correction of refractive error alone has a true treatment effect on amblyopia beyond the immediate VA gains from simply eliminating optical blur
- Prescribing guidelines are based on cyclopentolate refraction:
  - Full astigmatism, myopia, anisometropia
  - Full plus only for young esotropes; otherwise, cut symmetrically (0.50-2.00 D generally); thus, generally cut plus symmetrically in aniso amblyopia
- Works for anisometropic, strabismic, and combined-mechanism amblyopia
- 25-33% amblyopia resolve (i.e., equal VA or ±1 line) with spectacles alone
- Most of the optical treatment effect occurs within first 16 weeks for unilateral amblyopia (but can continue to improve for up to 45 weeks)
  - Generally 6-8 week FU intervals; may not improve at one FU visit, but then improve at a subsequent visit
- For isometropic (high plus ± high astigmatism OU) amblyopia in 3 to <10 year olds
  - VA Improvements seen for up to 1 year in some patients
  - 50% achieve bilateral (OU) VA of 20/25 better (21% at 5 weeks, 46% at 13 weeks, 59% at 26 weeks, and 74% at 52 weeks)
- Best predictive factor for improvement was worse baseline VA

For 3-<7 years, in cases when resolution does not occur with refractive correction only (up to 70%), Rx patching, atropine, or Bangerter filters.

Patching Treatment (3 to <7yrs)

- Aggressive patching is not necessary
- Consider adhesive patch for young kids so can’t peek
- Consider prescribing 2 hours of patching for moderate amblyopia
- Consider prescribing 6 hours of patching for severe amblyopia
  - 2 hours patching is successful in some cases of severe amblyopia
  - Possibly better compliance when less patching prescribed?
- When want to discontinue patching, if doing ≥6 hours, wean off patching; less recurrence

RCT results for Patching Dosage:

- Moderate (20/40 – 20/80) amblyopia: 2 hrs prescribed patching = 6 hrs of prescribed patching (albeit many probably do not patch the hours prescribed)
- Severe (20/100 -20/400) amblyopia: Prescribed full-time patching = prescribed 6 hours patching; Mean 5-line improvement and mean VA of 20/50 after 16 weeks
• **Once VA Plateaus and Yet Not Equal to Sound Eye**
  - Always verify: 1) compliance, 2) refractive correction, 3) no retinal or ONH problems
  - Options
    - More of the same treatment
    - Increase intensity of treatment (e.g., Increase from 2 hrs to 6 hrs patching)
    - Switch treatment – patching to atropine or vice versa
    - Combine treatments
    - Consider active VT, particularly accommodation and anti-suppression
  - RCT of continuing 2 hrs vs. increasing to 6 hrs after plateaued on 2 hrs
    - Proportion with ≥2-line improvement:
      - At 10 weeks 18% who were Rxed 2 hrs and 40% who were Rxed 6hrs
      - Those followed > 10 weeks to BVA: 39% who Rxed 2hrs & 51% who Rxed 6hrs
      - Mean improvement approx. 1.5 lines vs. 1 line

• **Residual amblyopia** – common; approx. 50% reach 20/25 VA
  - Issue for younger and older amblyopes

• **Atropine Treatment** - atropine (1%) administered to the sound eye is also a treatment option
  - Off-label treatment for amblyopia
  - RCT results of daily atropine vs. ≥6 hrs of patching – similar results
  - Daily administration is not necessary; Weekend only results the same as daily administration; twice per week works (can be weekend or separate days)
  - Effective in moderate and severe amblyopia
  - Effective in younger and older children (at least to 12 years)
  - Rx sunglasses and brimmed hat with written instructions for administration, possible systemic side effects, sun guidelines, storage, and ER
  - Systemic side effects (red as a beet, dry as a bone, hot as a hare, blind as a bat, mad as a hatter) are rare
    - Daily 5% homatropine can be substituted
  - Reverse amblyopia is rare
  - 50% of 3 to ≤ 7 year-olds obtain ≥20/25 VA; 80% reach maximum VA by 4 months; rest take up to 10 months
  - At FU visits, make sure scope/streak fellow eye to determine if any uncorrected hyperopia (atropine may relax more plus) before measure VA (otherwise decreased VA if more plus)

• **Older Amblyopes**
  - No known age cut-off in terms of visual plasticity; albeit easier for a 4-year-old to find time for patching than a 14-year-old; VA most likely improves quicker in younger kids
  - **13-<17 year olds**
    - Those prescribed optical correction & 2-6hrs patching:
      - With no previous treatment: 50% of kids were “responders” to treatment
      - Responder criteria was ≥ 2-line improvement, but considerable variability in amount of improvement
Those who had prior treatment: responder rate same as controls (25%)
  - Anecdotally, teenage kids have worse compliance than younger kids

- **7-13 year olds**
  - Those prescribed optical correction, 2-6hrs patching, & atropine:
    - 50% had treatment response when prescribed optical Rx, patching 2-6 hrs, and 1% atropine; no difference if prior treatment or not
    - Only 7% regressed ≥2 lines after 1 year off treatment
  - What else do we know about this age range?
    - Prescribing 2hrs patching comparable to prescribing weekend-only atropine

- Other Treatment Consideration – Bangerter foil worn FTW on spectacle lens
  - Reasonable option for moderate amblyopia
  - Small difference (<0.5 line) vs. patching 2 hrs
  - Lower treatment burden vs. patching reported by parents
  - Greater potential to peek, however

- **PEDIG currently recruiting 13-17 year olds for comparative study of binocular anti-suppression using iPad vs. 2 hours of occlusion (>360 kids 5-12 years already enrolled)**
  - NEI-funded multi-center randomized clinical trial conducted by PEDIG
  - iPad has Tetris-like game (Hess falling blocks); wear R/G glasses and some blocks are red and some green. Contrast is 100% for amblyopic eye and 10% for sound eye. Need to use both eyes together to play the game; as score increases, contrast increased for sound eye
  - Randomized to 2 hrs daily patching or 1 hr/day binocular iPad game play for 16 weeks
  - Eligibility: Amblyopic eye BCVA 20/40 - 20/200 and no strabismus at near >10Δ
  - Follow-up visits at 4, 8, 12 and 16 weeks
  - No cost for study visits, iPads, patches, new glasses if need for study
  - At the end of study, children assigned to patching will be offered binocular iPad treatment for 16 weeks at no cost or vice versa

**SELECTED PEDIG AMBLYOPIA REFERENCES**


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Amblyopia is the most common cause of monocular visual impairment in children. The most common way of treating amblyopia is by patching the good eye. Recently, a new way of treating amblyopia has been developed. It involves using both eyes together (binocularly) to play a game on an iPad. Initial studies have shown that this new treatment may work very well in some children and adults.

The Pediatric Eye Disease Investigator Group (PEDIG) is conducting a clinical trial to evaluate the effectiveness of this new binocular iPad treatment compared with 2 hours/day of daily patching treatment. The study is supported through funding from the National Eye Institute of the National Institutes of Health, and is being coordinated by the Jaeb Center for Health Research.

This multicenter clinical trial is recruiting 512 children with amblyopia who are 13 - <17 years old.

**Study Specifics:**
- 13 - <17 year old children with unilateral amblyopia of 20/40 and 20/200
- Random assignment to:
  - 1 hour/day of binocular iPad treatment OR
  - 2 hours of daily patching treatment
- Follow-up visits at 4, 8, 12 and 16 weeks
- At the end of the study (after 16 weeks), children who were assigned to patching will be offered the binocular iPad treatment at no cost for 16 weeks (outside of the study).
- All office visits, patches, and iPads are provided at no cost to enrolled participants. Once enrolled, participants are paid $50 per study visit to cover travel and other visit-related expenses.

**How Can You Help?**
- Your assistance is needed in referring children who are 13 to less than 17 years old who have amblyopia.

Sue Parker, Study Coordinator
Southern California College of Optometry at Marshall B. Ketchum University
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F: 714-992-7872
E: sparker@ketchum.edu

PLEASE SEND REFERRALS TO:
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.

<table>
<thead>
<tr>
<th>Treatment: 1 drop of Atropine in the _______ eye in the morning</th>
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<tbody>
<tr>
<td>□ Every day</td>
</tr>
<tr>
<td>□ Every Saturday and Sunday</td>
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<tr>
<td>□ Every Wednesday and Saturday</td>
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</tbody>
</table>

*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 onto 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.

PUT DR office contact info here!