Amblyopia Treatment Update
Results of PEDIG Trials

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Amblyopia definition

- Amblyopia = “dim vision”
- von Graefe: “the observer saw nothing and the patient very little”
- Visual impairment without apparent organic pathology
- Visual impairment resulting from abnormal development of the brain
  - A consequence of blurred or unequal inputs to the eyes during the sensitive period for visual development

Amblyopia classification

- Strabismus
- Anisometropia
- Form deprivation
  - Amexiety

PEDIG amblyopia studies

- Amblyopia subtype
  - Strabismic
  - Anisometropic
  - Combination strabismic anisometropic
  - Ametropic
- Amblyopia severity
  - Moderate: Va 20/40-20/80
  - Severe: Va 20/100-20/400
- Patient age: 3 to 17
- Treatment type and dose
  - Refractive correction
  - Patching
  - Atropine
- Natural history data
A 5 year old girl has 20/60 Va OD, on account of strabismic and anisometropic amblyopia, and 20/20 OS. The appropriate treatment is:

- A. Patching alone
- B. Atropine alone
- C. Spectacles and patching
- D. Spectacles and atropine
- E. Strabismus surgery

What can we expect Va OD to be after 6 months of treatment?

- A. 20/20
- B. 20/30
- C. 20/40
- D. 20/60

What can we expect Va OD to be at age 10 years?

- A. 20/20
- B. 20/30
- C. 20/40
- D. 20/60

Patching vs. Atropine for Moderate Amblyopia
Patching vs. Atropine for Moderate Amblyopia

- Age 3-6 years
- Strabismic and/or anisometropic amblyopia
- Either patching or atropine for 6 months

- Patching > 6 hours per day
- Resolution: stop patching
- Failure at 4 months: increase to 12 hours per day

- Atropine daily
- Resolution: stop atropine
- Failure at 4 months: add a plano lens if patient is hyperopic

Success: taper patching
Success: taper atropine
Resolution: stop patching
Resolution: stop atropine
Failure at 4 months: increase to 12 hours per day
Failure at 4 months: add a plano lens if patient is hyperopic

Mean Va 20/63 improved to mean Va 20/32 in both groups, although improvement was faster in the patching group.

- Treatment success:
  - 79% in the patching group
  - 74% in the atropine group

Sound eye visual acuity was reduced more often in atropinized eyes (24%) than patched eyes (8%)
However, sound eye visual acuity reductions did not persist
Atropine was better accepted by parents than patching

The visual benefit was maintained to age 10 years:
- Mean amblyopic eye Va was 20/32
- 46% of amblyopic eyes had Va 20/25 or better ("cure")
Patching vs. Atropine Cost-Effectiveness

- **Patching**
  - $0.35 / patch -> 6 months = $100

- **Atropine**
  - One 15 ml bottle lasts 6 months = $15

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Patching vs. Atropine for Moderate Amblyopia

- **Take home points**
  - Either treatment modality is fine
  - Amblyopia gets better, and the improvement lasts for years
  - Only about half of patients with moderate amblyopia are “cured”
  - Achieving lasting improvement in a child’s vision is inexpensive

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How much patching should I prescribe?

- A. 2 hours per day
- B. 4 hours per day
- C. 6 hours per day
- D. Full day

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Part-time vs. minimal-time patching for moderate amblyopia

- **3-6 year-olds**
- Patching 2 or 6 hrs/day for 4 months
- Both groups had a 2.4 line improvement in vision

- **Practical application**
  - 2 hours prescribed patching is sufficient for the initial treatment of moderate amblyopia
  - (weekend atropine is sufficient for the initial treatment of moderate amblyopia)
Does it help to perform near activities while patching?

- Age 3-7 years
- Moderate and severe amblyopia
- 2 hours of patching daily with near or distance activities
- Near: crafts, reading, writing, computer and video games
- Distance: outdoor play, watching TV
- No difference in visual acuity improvement after 8 weeks between groups

Does it help to add a plano lens when using atropine?

- 3-6 year-olds
- Moderate amblyopia
- After 4 months of treatment, Va improvement in the plano lens group was 2.8 lines vs. 2.4 lines in the atropine alone group
- The likelihood of amblyopia resolution was slightly higher in the plano lens group (40%) compared to the atropine alone group (29%)
- Sound eye Va was reduced in more patients in the atropine + plano lens group than in the atropine alone group, but the Va reduction did not persist.

How much patching should I prescribe if the patient’s vision is 20/200?

- A. 2 hours per day
- B. 4 hours per day
- C. 6 hours per day
- D. Full day

How much visual improvement would you expect?

- 1 line after 4 months
- 2 lines after 4 months
- 5 lines after 4 months
- 8 lines after 4 months
Part time vs. full time patching for severe amblyopia

• 3-6 years
• 6 hours vs. full time daily patching for 4 months
• Va improved 4.7 - 4.8 lines in both groups
• Practical application
  – 6 hours patching is sufficient for the initial treatment of severe amblyopia

Your 5 year-old patient's vision improved from 20/200 to 20/60 after 3 months of patching, 6 hours daily. What should you do next?

A. Stop treatment
B. Reduce patching to 2 hours per day, then stop
C. Continue patching of 6 hours per day
D. Continue patching of 6 hours per day and add daily atropine

Occlusion dose monitors

What is the likelihood that amblyopia would recur if you stopped treatment?

• A. 95%
• B. 50%
• C. 25%
• D. 10%
Recurrence of amblyopia after treatment discontinuation

- 3-7 years of age
- Moderate and severe amblyopia
- Successfully treated for 3 months or longer with patching or atropine
- Patients were then followed off treatment for 52 weeks
- Amblyopia recurrence defined as >2 line loss in Va
- Amblyopia recurred in 24% (patch) and 21% (atropine) of patients
- In patients who had been treated with 6-8 hours of daily patching, amblyopia recurrence was more likely if patching was abruptly stopped rather than tapered prior to cessation

A 12 year old-boy presents with 20/100 Va due to strabismic anisometropic amblyopia

- How do you manage his amblyopia?
  - A. Spectacles alone
  - B. Spectacles and patching
  - C. Spectacles and atropine
  - C. Spectacles, patching and atropine

A 15 year old-boy presents with 20/100 Va due to strabismic anisometropic amblyopia

- How do you manage his amblyopia?
  - A. Spectacles alone
  - B. Spectacles and patching
  - C. Spectacles and atropine
  - C. Spectacles, patching and atropine

Treatment of amblyopia in older children

- 7-12 years, and 13-17 years
- Moderate and severe amblyopia
- All treated with spectacles
- 6 month treatment
- 7-12 year-olds randomized to spectacles alone or spectacles+patch+atropine
- 13-17 year-olds randomized to spectacles alone or spectacles + patch
- 7-12 year-olds: 53% vs. 25% response rate (2 lines or more in Va improvement)
- 13-17 year-olds: 25 vs. 23% response rate
- (Subgroup analysis: 13-17 year-olds not previously treated: 47% vs. 20% response rate)
Summary

- Patching = atropine
- 2 hours prescribed patching sufficient for treatment of moderate amblyopia
- Weekend atropine sufficient for treatment of moderate amblyopia
- Near activities not critical
- Plano lens not critical
- Taper amblyopia treatment
- Even older children and teenagers may respond to amblyopia treatment

Current study

- We are enrolling 3-7 year-old patients in a study to determine whether increasing patching from 2 to 6 hours per day treats residual amblyopia (that has stopped improving at 2 hours of patching per day)
- Please refer your patients at any stage of amblyopia diagnosis or treatment
- Dr. Rutar and De Alba: 415-353-2560