Accommodative Esotropia Greater at Near Fixation: Can a Patch Test Differentiate a Subtype of Those with Deviation Greater at Near?

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Abstract

Purpose/Background:
Patients with accommodative esotropia (AET) with a deviation greater at near than at distance are sometimes treated with bifocals; half will outgrow the need for bifocals, half will require strabismus surgery. We have observed that for some subjects, the distance deviation approaches near deviation after 20 minutes of patching. We suspect these might be the patients who do not outgrow their bifocals.

A similar phenomenon was studied in the 1990s, finding a monocular patch test could distinguish true exotropia with high Accommodative Convergence / Accommodation (AC/A) ratio from pseudo-high AC/A ratio.

Our study is an ongoing two-fold chart review.
   Part 1: Establish if there a subtype of AET with a "pseudo high AC/A" ratio" that can be identified with a monocular patch test.
   Part 2: Assess if patch test responders represent a subgroup with a different course than non-responders.
We may be able to identify subjects with a "pseudo high AC/A ratio" who would benefit from strabismus surgery and offer that treatment earlier, sparing time and expense of bifocals.

We hypothesize a portion of patients with AET with distance/near disparity will be found to have a collapse of distance/near disparity when patched for 20 minutes. These patients will not outgrow their bifocals.

Methods: This is an ongoing retrospective and prospective chart review of patients from Dr. Ellis' Pediatric Ophthalmology Clinic with AET who underwent the patch test; two groups included:
o   (1) AET with distance/near disparity (Group A) and
o   (2) AET without distance/near disparity (Group B) as controls.

We collected the following: prism measurements at distance and near before and after the 20-minute monocular patch test, stereoacuity, best corrected visual acuity, AC/A ratio, refractive error, and demographic information. Primary outcome is "patch test response" defined as post-test measurements reducing the distance/near disparity to ≤ 10 PD. Secondary analysis will compare characteristics of the patch test responders to non-responders with ultimate comparison of clinical course between groups.

Results: To date, 38 subjects are included in this study; 16 with distance/near disparity (Group A) and 22 without distance/near disparity (Group B). Forty-four percent of Group A were found to be "responders". Group A had an average increase in distance deviation of 3.94PD; Group B increased by 2.68PD. Within Group A, patch test responders distance deviation increased by an average of 6PD. Group A non-responders increased by 2.33PD, similar to the change in Group B.

Conclusions/Potential Clinical Implications: This study supports the hypothesis that the 20-minute monocular patch test will result in a collapse in distance/near disparity for a subgroup of patients with AET. If long term follow-up reveals that responders follow a different clinical course than non-responders, this information could be useful for management strategies.

Learning Objectives	Discuss how a 20 minute monocular patch test may establish a new subtype of accommodative esotropia, which may be useful for management strategies.
References and Resources	American Academy of Ophthalmology Basic and Clinical Science Course, Book 6: Pediatric Ophthalmology and Strabismus.
Disclosures	All authors and coauthors have no relevant financial relationships to disclose. The author does not intend to discuss an off-label/investigative use of a commercial product/device.

Accommodative Esotropia: Can a patch test differentiate a subtype of those with deviation greater at near?

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Background

- Patients with accommodative esotropia (AET) with a deviation greater at near than at distance are sometimes treated with bifocals; half will outgrow the need for bifocals, half will require strabismus surgery.
- We have observed that after 20 minutes of patching, in some, the distance deviation approaches near deviation.
- We suspect these might be the patients who do not outgrow their bifocals.
- A similar phenomenon was studied in the 1990s, finding a monocular patch test could distinguish true exotropia with high AC/A ratio from pseudo-high AC/A ratio.
- Our study is a two-fold chart review.
- Part 1: Establish if there is a subtype of AET with a "pseudo high AC/A" ratio that can be identified with a monocular patch test.
- Part 2: Assess if patch test responders represent a subgroup with a different course than non-responders.
- We may be able to identify subjects with a "pseudo high AC/A ratio" who would benefit from strabismus surgery and offer that treatment earlier, sparing time and expense of bifocals.

Hypothesis

- A portion of patients with AET with distance/near disparity will be found to have a collapse of distance/near disparity when patched for 20 minutes.
- These patients will not outgrow their bifocals.

Materials and Methods

- Retrospective and prospective chart review of patients from Dr. Ellis' Pediatric Ophthalmology Clinic with AET who underwent the patch test, including two groups:
  - (1) AET with distance/near disparity (Group A) and
  - (2) AET without distance/near disparity (Group B) as controls.
- We collected the following: prism measurements at distance and near before and after the 20-minute monocular patch test, stereoacuity, best corrected visual acuity, AC/A ratio, refractive error, and demographic information.
- Primary outcome is "patch test response" defined as post-test measurements reducing the distance/near disparity to ≤ 10 PD. Secondary analysis will compare characteristics of the patch test responders to non-responders with ultimate comparison of clinical course between groups.
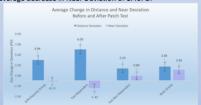
Results

A study of patients seen between 7/22/08 and 4/25/19 in Dr. Ellis' Pediatric Ophthalmology Clinic at Children's Hospital New Orleans were reviewed between 5/1/19 and 5/5/19. To date, 38 subjects are included in this study; 16 with distance/near disparity (Group A) and 22 without distance/near disparity (Group B).

DEMOGRAPHICS	AET with D/N Disparity (n=16)	Basic AET (n=22)
Age in Years (mean)	7.06	8.95
Gender (%)		
Male	56	36
Female	44	64
Race (%)		
White	87.5	82
Black	6	14
Other	0.5	0.05

Results

Forty-four percent (7/16) of Group A were found to be "patch test responders".

Group A had an average increase in distance deviation of 3.94PD; Group B increased by 2.68PD. Within Group A, patch test responders distance deviation increased by an average of 6PD. Group A non-responders increased by 2.33PD, similar to the change in Group B. Group A responders also had an average decrease in Near Deviation of 1.43PD.

Discussion, Conclusions, and Limitations

- This preliminary study supports the hypothesis that the 20-minute monocular patch test will result in a collapse in distance/near disparity for a subgroup of patients with AET.
- If long term follow-up reveals that responders follow a different clinical course than non-responders, this information could be useful for management strategies.
- Limitations of the study include small sample size, small experimental group size, single clinical site, single clinician.

Sub-Group Analysis	Mean Age (years)	Mean Age of Onset Esotropia (years)	Mean Mrx (spherical equiv)	Bifocal (%)	History of Amblyopia (%)	Current Amblyopia (%)	Mean Fusion (seconds arc)	Anisometropia ≥1.5 (%)	Gender (Female %)	Race (White %)	AC/A
Test Responders	6.57	2.43	4.21	0.00	57.14	14.29	696.67	14.29	71.43	100.00	4.61
Test Non-Responders	7.44	1.97	3.84	66.67	33.33	0.00	612.50	0.00	22.22	77.78	5.71
D/N Disparity Group	7.06	2.17	4.00	0.00	43.75	6.25	648.57	0.00	43.75	87.50	5.24
Basic Group	8.95	2.87	4.54	0.00	36.36	9.09	799.55	0.00	63.64	81.82	2.48