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A Randomized Trial Comparing Part-time Patching with Observation for Intermittent Exotropia in Children 12 to 35 Months Old

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Abstract

Objective—To determine the effectiveness of part-time patching for treating intermittent exotropia (IXT) in young children

Design—Multicenter, randomized clinical trial

Participants—Two hundred one children 12 to 35-months-old with untreated IXT meeting the following criteria: 1) IXT at distance OR constant exotropia at distance and either IXT or exophoria at near; 2) 15 prism diopter () exodeviation at distance or near by prism and alternate cover test (PACT) but at least 10 exodeviation at distance by PACT.

Methods—Participants were randomly assigned to either observation (no treatment for 6 months) or patching prescribed for 3 hours daily for 5 months, followed by 1 month of no patching.

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*A complete list of participating members of the Pediatric Eye Disease Investigator Group (PEDIG) can be found in a previous publication.¹

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Conflict of Interest: No conflicting relationships exist for any author.

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Main Outcome Measure—The primary outcome was deterioration, defined as constant exotropia measuring at least 10° at distance and near or receipt of non-protocol treatment for IXT.

Results—Of the 177 participants (88%) completing the 6-month primary outcome examination, deterioration occurred in 4.6% (4 of 87) of the participants in the observation group and in 2.2% (2 of 90) of the participants in the patching group (difference = 2.4%; $P = 0.27$, 95% confidence interval (CI) = -3.8% to +9.4%). Motor deterioration occurred in 2.3% (2 of 87) of the observation group and in 2.2% (2 of 90) of the patching group (difference = 0.08%, $P = 0.55$, 95% CI = -5.8% to +6.1%). For the observation and patching groups respectively, 6-month mean PACT measurements were 27.9° versus 24.9° at distance ($P = 0.02$) and 19.3° versus 17.0° at near ($P = 0.10$); 6-month mean exotropia control scores were 2.8 vs. 2.3 points at distance ($P = 0.02$), and 1.4 vs. 1.1 points at near ($P = 0.26$).

Conclusion—Among children 12 to 35 months of age with previously untreated IXT, deterioration over 6 months was uncommon, with or without patching treatment. There was insufficient evidence to recommend part-time patching for the treatment of IXT in children in this age group.

Intermittent exotropia (IXT), one of the most prevalent forms of childhood strabismus,²⁻⁵ is characterized by an intermittent outward deviation of one or both eyes, often exacerbated by fatigue, inattention, or illness. Although a common condition, the best treatment and optimal timing for this disorder remain unclear,^{6, 7} particularly for young children who are often unable to cooperate for a sensorimotor eye examination or for some non-surgical treatments such as orthoptic exercises. Given these challenges, part-time patching is commonly prescribed in young children as a temporizing measure⁸⁻¹¹ to delay potential surgery or until other forms of non-surgical treatment become feasible. The reported potential benefits of patching include the preservation of binocularity and a reduction in the frequency and/or magnitude of the exodeviation.¹²⁻²⁰

Given the paucity of data regarding the use of patching for very young children with IXT, we conducted a randomized trial of children 12 to 35 months of age to assess the effectiveness of part-time patching compared with simple observation for reducing the risk of deterioration of IXT over a 6-month period.

Methods

The study was supported through a cooperative agreement with the National Eye Institute of the National Institutes of Health and was conducted by the Pediatric Eye Disease Investigator Group (PEDIG) at 60 clinical sites according to the tenets of the Declaration of Helsinki. The protocol and Health Insurance Portability and Accountability Act (HIPAA)–compliant informed consent forms were approved by institutional review boards, and a parent or guardian of each study participant gave written informed consent. An independent data and safety monitoring committee provided oversight. The study is listed on www.clinicaltrials.gov (NCT01032330, accessed 2/12/15) and the full protocol is available at www.pedig.net (accessed 2/12/15).

This 6-month randomized trial evaluates the short-term effect of part-time patching treatment compared with observation in children 12 to 35 months of age. This report represents the first phase of an ongoing 3-year study that also includes children aged 3-<11 years old¹ and also aims to assess the long-term natural history of IXT in the observation group. Relevant portions of the protocol are summarized below.

Eligibility Criteria

The study included children 12 to 35 months of age who had no prior treatment for IXT other than refractive correction (if applicable). For study eligibility, the IXT had to meet the following criteria: 1) IXT at distance OR constant exotropia at distance and either IXT or exophoria at near; 2) 15 prism diopter () exodeviation (tropia or phoria) at distance or near by prism and alternate cover test (PACT) but at least 10 exodeviation at distance by PACT. Table 1 lists all eligibility criteria.

Treatment Regimens

Data were entered on the PEDIG website and participants were randomly assigned (using a permuted block design stratified by site) with equal probability to either observation or 3 hours of daily patching.

Participants randomly assigned to observation received no treatment (other than refractive correction, if needed) for 6 months. Participants randomly assigned to patching were prescribed patching (choice of eye or whether alternating, at investigator discretion) for 3 hours per day for 5 months (in addition to refractive correction, if needed), followed by a one-month washout period of no patching to help eliminate treatment effects maintained only during patching. Parents recorded the number of patching hours completed per day on calendar logs that were brought to the 6-month visit for review.

Investigators were discouraged from prescribing non-study treatment for IXT (treatment other than patching in the patching group or any treatment in the observation group) before a participant met formal protocol-specified motor deterioration criteria; however, exceptions were permitted in cases of overwhelming parental concern.

Testing Procedures and Follow-up Visits

Follow-up consisted of a visit 3 months (± 2 weeks) after randomization and a primary outcome examination 6 months (± 1 month) after randomization.

At each follow-up visit, a study-certified examiner (pediatric ophthalmologist, pediatric optometrist, or certified orthoptist) masked to the participant's treatment group always assessed exotropia control first, followed later by ocular alignment at distance (6 meters) and near (30 centimeters). Exotropia control was measured using the Office Control Score,²¹ which ranges from 0 (phoria, best control) to 5 (constant exotropia, worst control). Control levels 3 to 5 were assigned based on the proportion of time that an exotropia was present during a 30-second observation period before any dissociation. If no exotropia was observed, control levels 2 to 0 were assigned based on the longest time taken for reestablishment of fusion following 3 consecutive 10-second periods of dissociation.

Following control testing, ocular alignment was assessed at distance and near using the cover/uncover test, simultaneous prism and cover test (SPCT), and PACT. If motor deterioration criteria appeared to be met, the masked examiner retested ocular alignment after a 10-minute break to confirm motor deterioration.

At each follow-up visit, investigators judged patching compliance based on parental discussion and review of study calendars. Compliance was classified based on percentage of 'prescribed' treatment completed (did not specify whether 'prescribed' applied to percentage of hours or percentage of days) as either excellent (>75%), good (51% to 75%), fair (26% to 50%), or poor (<25%).

Primary Outcome

The primary outcome measure was deterioration of the IXT within 6 months after randomization. Motor deterioration was defined as a constant exotropia of $\geq 10^\circ$ at distance and near by SPCT, confirmed by a retest, at either the 3- or 6-month visit. A "constant" tropia was defined as a manifest tropia present 100% of the time during the examination, determined by cover/uncover tests performed at least 3 different times during the exam, including one before any dissociation. A participant's IXT also was classified as deteriorated for the primary analysis if non-study treatment for IXT (i.e., any treatment in the observation group; any treatment other than patching in the patching group) was prescribed without motor deterioration criteria being met.

Statistical Methods

The original sample size of 336 subjects was chosen for the long-term primary analysis 3 years after randomization. For the current 6-month treatment group comparison, this sample size had 92% power with a one-sided type I error rate of 5% to detect a difference given expected rates of deterioration of 15% in the observation group vs. 5% in the patching group. Recruitment ended when the study's primary cohort (children aged 3-<11 years of age) met its recruitment goal, at which time 201 children 12 to 35 months of age had been recruited.

The primary analysis was a treatment group comparison of the proportion of participants with deterioration occurring within 6 months of randomization using a one-sided Barnard's test.²² The treatment group difference in the proportion with deterioration was estimated, along with a two-sided exact 95% CI to provide both an upper and lower limit on the potential magnitude of difference. The primary analysis was limited to participants who completed cover/uncover and SPCT testing at the 6-month outcome exam. The primary analysis included 3 participants later found to be ineligible (all 3 in the observation group). An alternative analysis used baseline data (age, constant exotropia at distance, and distance SPCT magnitude) to impute 6-month data by multiple imputation with the logistic regression method²³ for the 11 participants who missed the 6-month outcome examination. Additional analyses adjusting the primary outcome for potential confounding were performed using binomial regression or logistic regression when the binomial models did not converge.

An additional analysis was conducted using a post-hoc alternative definition of deterioration that counted the IXT as deteriorated only if the motor deterioration criteria were met (i.e., regardless of whether non-study treatment was started without meeting motor deterioration criteria).

Secondary 6-month outcomes of exotropia control and deviation magnitude by PACT were evaluated using analysis of covariance (ANCOVA) models adjusting for the baseline level of the outcome. Additional analyses adjusting secondary outcomes for potential confounding were performed using adjusted ANCOVA models.

All analyses followed the intention-to-treat principle. Analyses were conducted using SAS version 9.3 (SAS Institute Inc., Cary, NC).

Results

Baseline Characteristics

Between January 2010 and September 2012, 201 children were enrolled at 60 sites with 97 participants assigned to observation and 104 to patching (Figure 1). Average age was 24.6 (± 6.6) months, 124 (62%) were female, and 125 (62%) were white. IXT was classified as basic type (i.e., distance and near exodeviations within 10° by PACT) in 132 participants (66%). At baseline, the observation group had slightly worse control scores at distance (2.5 vs. 2.3) and near (1.2 vs. 1.0) than the patching group and was more likely to have a constant exotropia at distance (9% vs. 3%); other baseline characteristics appeared similar (Tables 2 and 3).

Visit Completion

The 3-month visit was completed by 85% (82 of 97) and 87% (90 of 104) of the observation and patching groups, respectively. The 6-month primary outcome visit was completed by 90% (87 of 97) and by 87% (90 of 104) of participants, respectively. A masked examiner assessed the primary outcome in all but 3 cases. Comparing the baseline data between the 177 participants who completed the 6-month masked examination and the 24 participants who did not complete the examination (10 in observation group, 14 in patching group) shows that age was 2.1 vs. 1.8 years, white non-Hispanic/Latino ethnicity was 64% vs. 50%, mean distance control score was 2.4 vs. 2.1 points, mean near control score was 1.1 vs. 1.1 points, mean distance PACT was 27.1 vs. 29.0°, and mean near PACT was 17.8 vs. 26.0°. The reasons for not completing the 6-month primary outcome were similar for both treatment groups (Figure 1).

Treatment Compliance in Patching Group

At the 3-month visit, patching compliance was judged as excellent in 55 participants (60%), good in 11 (12%), fair in 8 (9%), poor in 16 (17%), and 2 (2%) did not complete any patching; patching compliance between 3 to 5 months after randomization was similar (data not shown). Forty-eight participants (53%) stopped patching per protocol 3 to 5 weeks before the 6-month visit, 32 (35%) stopped earlier, and 11 (12%) stopped later.

Investigators prescribed unilateral patching for 25 participants (24%), alternate patching for 57 (55%), and both unilateral and alternate eye patching at different times for 10 (10%); the eye prescribed patching was not specified for 12 (12%).

Outcome Analyses

By the 6-month primary outcome examination, deterioration occurred in 4 (4.6%) of the 87 participants assigned to observation and 2 (2.2%) of the 90 assigned to patching (difference = 2.4%; p value from one-sided hypothesis test = 0.27; two-sided exact 95% CI = -3.8% to 9.4%; Table 4). Two of the 4 cases of deterioration in the observation group did not meet the motor deterioration criteria (i.e., constant exotropia of at least 10° by SPCT at distance and near), but were considered deteriorations for the primary analysis because patching was prescribed at the 3-month visit in response to parental concerns. Additional clinical data for participants who experienced deterioration can be found in Table 5 (available at www.aaojournal.org). Adjusting the primary outcome analysis for potential confounders including presence of distance constant XT at baseline did not produce meaningful differences (data not shown). An analysis using multiple imputation with baseline data to impute the 6-month outcome for the 24 participants who did not complete the 6-month examination also yielded results similar to the primary analysis (data not shown).

A secondary outcome based solely on meeting motor deterioration criteria regardless of whether non-study treatment had been started without meeting the criteria occurred in 2 (2.3%) of the 87 participants in the observation group and 2 (2.2%) of the 90 in the patching group (difference = 0.08%, p value from one-sided hypothesis test = 0.55; two-sided exact 95% CI = -5.8% to 6.1%).

For observation and patching groups respectively, secondary 6-month outcomes showed that mean distance control scores were 2.8 vs. 2.3 points ($P = 0.02$), mean near control scores were 1.4 vs. 1.1 points ($P = 0.26$), mean distance PACT measurements were 27.9 vs. 24.9 ($P = 0.02$), and mean near PACT measurements were 19.3 vs. 17.0 ($P = 0.10$; Table 6). Analyses that adjusted for potential confounders (in addition to the baseline value of the outcome) did not produce meaningful differences (data not shown). The distributions of change in control scores and PACT magnitudes between baseline and 6 months are shown in Table 6.

Discussion

We found that deterioration of IXT over a 6-month period was uncommon among children 12 to 35 months of age with previously untreated IXT. The rate of deterioration 6 months after randomization was 2.2% for the patching group, and 4.6% for the observation group overall, or 2.3% for cases that met motor deterioration criteria (i.e., excluding cases of treatment crossover), making it unlikely that part-time patching provides a meaningful short-term benefit for young children with IXT.

We are unaware of any randomized trial with which to compare our results on the effectiveness of part-time patching in children less than 3 years of age with IXT. We have reported findings in children 3 to 10 years of age with IXT as a parallel cohort in the same

randomized trial.¹ Because those children were old enough to measure stereoacuity, deterioration was defined as either motor deterioration, loss of stereoacuity (> 2 octaves), or receipt of non-protocol treatment.¹ In the older cohort, motor and sensory deterioration occurred slightly less often in the patching group (0.6%; N = 1 of 159) than in the observation group (6.1%; N = 10 of 165) ($P = 0.004$); however, there were no cases of motor deterioration (0.0%; N = 0 of 159) in the patching group and only a single case in the observation group (0.6%; N = 1 of 165).¹ Both age cohorts and treatment groups taken together show that children with previously untreated IXT rarely develop constant exotropia over 6 months, on the order of about 1%.¹

Regarding secondary outcomes, there was a suggestion of a slight positive effect from patching. Similar to the current study, the parallel older cohort study¹ found a slightly smaller mean distance exodeviation at the 6-month outcome examination among those who were patched compared with those who were observed (22.2 vs 23.8, $P = 0.01$) and no statistical difference in the mean near exodeviation (15.4 vs 17.6, $P = 0.11$). While the older cohort's mean control score was better in the patching group compared with the observation group at near (0.9 vs. 1.2 points, $P = 0.01$), no statistical difference was found for the distance control score (2.0 vs. 2.3 points, $P = 0.09$).¹ The opposite was found for the current younger cohort; the mean distance control score was better in the patching group (2.3 vs. 2.8 points, $P = 0.02$) but not the near control score (1.1 vs. 1.4 points, $P = 0.26$). The clinical significance of these small differences is unknown.

There are several limitations to this study. The study recruited 60% of its planned sample size, resulting in less statistical power than desired. In addition, the pre-study sample size calculations were based on an assumption of a 15% deterioration rate in the observation group over 6 months, a frequency that appears to have been an overestimate in light of our study results; this made it difficult to determine if patching could lower an already very low 6-month deterioration rate. Our treatment regimen of 3 hours of daily patching was based on consensus from pre-study polling of PEDIG investigators; it is possible that patching more hours may have different results. We acknowledge that 5 months of patching followed by one month of observation is a relatively short time interval to study, and that a longer period of patching may also provide different results. The loss to follow-up was higher than expected at 12%, although it was similar for both treatment groups. In addition, because these children were too young for stereoacuity testing, we cannot evaluate the possible beneficial or detrimental effects of observation or patching on sensory outcomes. In contrast to the study's limitations, the strengths are that it was a multi-center randomized trial, enrolled a fairly large cohort of children less than 3 years of age with previously untreated IXT, and had primary outcome assessments conducted by a masked examiner and confirmed by a retest.

In this study of children 12 to 35 months of age with previously untreated IXT, motor deterioration over a 6-month period was uncommon with or without part-time patching. This finding may assuage the concerns of some clinicians who feel that immediate surgical intervention is necessary to prevent IXT from becoming constant. We found insufficient evidence to support the use of part-time patching for the treatment of IXT in children ages 12 to 35 months.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Appendix 1

Clinical Sites

Sites are listed in order by number of participants enrolled. Personnel are listed as (I) for Investigator, (C) for Coordinator, or (E) for Masked Examiner.

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Reasons Participants Excluded From 6-Month Primary Analysis	Observation Group N=10	Patching Group N=14
Had visit but did not complete masked exam portion	0	1
Did not have visit		
Outcome or treatment related	2 ^c	1 ^d
Difficulty or inability to contact participant	4	8
Other	4	4

Figure 1. Flow of Participants through Study

^aDue to poor cooperation, masked alignment testing could not be completed for 5 participants at the 3-month visit (3 in observation and 2 in patching) and 2 participants at the 6-month visit (1 in each group).

^bThe observation group includes 1 participant who was lost to follow-up and 2 participants who are continuing in the longer-term study follow-up but did not complete the 6-month visit and therefore are excluded from the analysis. The patching group includes 4 participants who were lost to follow-up and 3 participants who are continuing in the longer-term study follow-up but did not complete the 6-month visit and therefore are excluded from the analysis.

^cIn the observation group, 2 participants were withdrawn from the study for outcome-related reasons. One child's mother and the pediatrician felt the IXT had resolved. The other child's parents felt their child's eyes were getting worse and wanted surgery.

^dIn the patching group, parents withdrew 1 child because they were transferring care to another ophthalmologist.

Table 1
Eligibility Criteria

The following criteria must be met for the patient to be enrolled in the study:

- 1 Age 12-35 months
- 2 Intermittent exotropia (IXT) - a manifest deviation meeting all of the following criteria:
 - IXT at distance OR constant exotropia at distance and either IXT or exophoria at near
 - Exodeviation at least 15 prism diopters () at distance OR near measured by prism and alternate cover test (PACT) but at least 10 at distance measured by PACT
- 3 No previous surgical or non-surgical treatment for IXT other than refractive correction (e.g., vergence therapy, patching, vision therapy/orthoptics, or deliberate over-minus with spectacles more than 0.50D)
- 4 No vision therapy/orthoptics for any reason within the last year
- 5 No previous amblyopia treatment other than refractive correction within 1 year
- 6 Investigator not planning to initiate amblyopia treatment
- 7 No hyperopia greater than +3.50 D spherical equivalent (SE) in either eye
- 8 No myopia greater than -6.00 D SE in either eye
- 9 Patients must be wearing refractive correction (spectacles or contact lenses) for at least one week if refractive error (based on cycloplegic refraction performed within 6 months) meets any of the following:
 - Myopia > -0.50 D SE in either eye
 - Anisometropia > 1.00 D SE
 - Astigmatism in either eye > 2.00 D
 Refractive correction must meet the following guidelines:
 - Anisometropia SE must be within 0.25 D of the full anisometric difference correction
 - Astigmatism cylinder must be within 0.25 D of full correction and axis must be within 5 degrees
 - For hyperopia and myopia, the spherical component can be reduced by investigator discretion provided reduction is symmetrical and results in residual (i.e., uncorrected) SE refractive error that does not exceed +3.50 D SE hyperopia or -0.50 D SE myopia.
 - Deliberate over-minus using refractive correction with more than 0.50 D of over-minus will not be allowed. However, not prescribing the full cycloplegic hyperopic correction (i.e., prescribing reduced plus) is not considered the same as over-minus for this protocol and is therefore allowed
- 10 No atropine use within the last week
- 11 Gestational age > 34 weeks
- 12 Birth weight > 1500 grams
- 13 Investigator willing to observe the IXT untreated for 3 years unless specific deterioration criteria are met. Investigator also willing to forgo extraocular muscle surgery for the first 3 months in all cases, and from 3 months to 3 years unless specific deterioration criteria are met.
- 14 Patient and/or parent understands protocol, is willing to accept randomization to either observation or patching, and is willing to accept that surgical or other non-surgical treatment (other than patching in the patching group) of IXT will not be offered by the investigator unless specific deterioration criteria are met.
- 15 Parent has home phone (or access to phone) and is willing to be contacted by Jaeb Center staff
- 16 Relocation outside of area of an active PEDIG site within next 3 years not anticipated
- 17 No limitation of ocular rotations due to restrictive or parietic strabismus
- 18 No craniofacial malformations affecting the orbits
- 19 No prior strabismus surgery or botulinum injection, intraocular surgery, or refractive surgery
- 20 No ocular disorders which would reduce visual acuity (except refractive error)
- 21 No known skin reactions to patch or bandage adhesives
- 22 No strabismus surgery planned
- 23 No significant neurological impairment such as cerebral palsy. Patients with mild speech delays or common reading and/or learning disabilities are not excluded.

24 Investigator not planning to change refractive correction at this time

SE = spherical equivalent

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Table 2
Baseline Demographic and Clinical Characteristics by Treatment Group

	Observation N=97		Patching N=104	
	N	%	N	%
Sex: Female	58	60%	66	63%
Race/ethnicity				
White	65	67%	60	58%
Black/African American	13	13%	14	13%
Hispanic or Latino	13	13%	21	20%
Other	6	6%	9	9%
Age at randomization, months				
12 to <18	22	23%	23	22%
18 to <24	28	29%	19	18%
24 to <30	24	25%	34	33%
30 to <36	23	24%	28	27%
Mean (SD)	24.2 (6.5)		24.9 (6.8)	
Range	12.4 to 35.7		12.2 to 35.7	
Spectacle wear	5	5%	9	9%
Exotropia type^a				
Basic	61	63%	71	68%
Convergence insufficiency	2	2%	1	1%
High AC/A	2	2%	0	0%
Pseudo divergence excess	26	27%	24	23%
True divergence excess	5	5%	8	8%

AC/A = accommodative convergence/accommodation; SD = standard deviation

^aOne observation group participant is missing exotropia type.

Table 3

Baseline Ocular Alignment According to Treatment Group

	Distance Alignment				Near Alignment			
	Observation N=97		Patching N=104		Observation N=97		Patching N=104	
Deviation Type	N	%	N	%	N	%	N	%
Constant exotropia	9	9%	3	3%	0	0%	0	0%
Intermittent exotropia	88	91%	101	97%	69	71%	72	69%
Exophoria	---	---	---	---	21	22%	21	20%
No exodeviation	---	---	---	---	7	7%	11	11%
Exotropia () by SPCT^a								
0 (no measurable tropia) ^b	28	29%	41	39%	63	65%	75	72%
1-9	8	8%	7	7%	11	11%	8	8%
10-14	4	4%	5	5%	4	4%	3	3%
16-18	8	8%	13	13%	3	3%	4	4%
20-25	30	31%	21	20%	12	12%	9	9%
30-35	16	16%	12	12%	3	3%	3	3%
40-50	3	3%	3	3%	1	1%	1	1%
>50	0	0%	2	2%	0	0%	0	0%
Median	20		14		0		0	
Range	0 to 50		0 to >50		0 to 45		0 to 40	
Exodeviation () by PACT^c								
No exodeviation (orthophoria)	---	---	---	---	9	9%	13	13%
1-9	---	---	---	---	7	7%	8	8%
10-14	0	0%	0	0%	24	25%	15	14%
16-18	9	9%	14	13%	9	9%	13	13%
20-25	44	45%	44	42%	30	31%	30	29%
30-35	39	40%	36	35%	14	14%	18	17%
40-45	3	3%	8	8%	3	3%	5	5%
50	2	2%	2	2%	1	1%	2	2%
Mean (SD)	27.4 (7.1)		27.2 (8.2)		18.1 (10.8)		19.4 (12.1)	

Range	Distance Alignment			Near Alignment		
	Observation N=97	Patching N=104		Observation N=97	Patching N=104	
	N	%		N	%	
Exotropia control score²¹						
No exodeviation						
(0) No XT unless dissociated, recovers <1 sec	0	0%	0	3	3%	10
(1) No XT unless dissociated, recovers 1-5 sec	2	2%	2	31	32%	28
(2) No XT unless dissociated, recovers >5 sec	18	19%	27	30	31%	39
(3) XT <50% of 30-seconds	38	39%	33	17	18%	15
(4) XT >50% of 30-seconds	19	20%	27	12	12%	11
(5) Constant XT	11	11%	11	4	4%	1
Mean (SD)	9;	9%	4	0	0%	0
	2.5 (1.2)		2.3 (1.1)	1.2 (1.2)		1.0 (1.0)

= prism diopter; PACT = Prism and Alternate Cover Test; SD = standard deviation; SPCT = Simultaneous Prism and Cover Test; XT = exotropia

^aOne participant was missing SPCT at near.

^b'No measurable tropia' includes participants who: did not have a tropia during the examination, had an exotropia not detectable by the cover/uncover test, and had an exotropia that was not measurable because it was too brief, too small, or the participant was not cooperative enough to allow a SPCT.

^cPACT at distance was required to be at least 10 for eligibility.

--- indicates not applicable

Table 4
Six-Month Primary Outcome According to Treatment Group

	At 3-month visit (interim outcome)		By 6-month visit (primary outcome)**	
	Observation (N=82)		Observation (N=87)	
	N (%)	N (%)	N (%)	N (%)
Deterioration				
Motor deterioration (constant exotropia 10 at distance and near)*	2 (2.4%)	0 (0%)	4 (4.6%)	2 (2.2%)
Started non-protocol treatment without meeting motor deterioration	2 (2.4%)	0 (0%)	2 (2.3%)	2 (2.2%)
	0 (0%)	0 (0%)	2 (2.3%)	0 (0%)

* Measured by simultaneous prism and cover test.

** The 6-month primary outcome is based on deterioration at either the 3-month or 6-month visit.
= prism diopters

Table 6
Six-Month Exotropia Control and PACT According to Treatment Group

	Observation (N=87)	Patching (N=90)	P value ^d
Exotropia control at distance^a			
At 6 months			
Mean (SD)	2.8 (1.3)	2.3 (1.5)	0.02
Range	0 to 5	0 to 5	
Change between baseline and 6 months (pos=better) ^b			
Mean (SD)	-0.3 (1.3)	0.1 (1.5)	
Range	-3 to 4	-4 to 3	
3 points better	2 (2%)	6 (7%)	
2 points better	3 (4%)	10 (11%)	
1 point better	12 (14%)	14 (16%)	
0	32 (37%)	34 (38%)	
1 point worse	19 (22%)	16 (18%)	
2 points worse	17 (20%)	3 (3%)	
3 points worse	1 (1%)	7 (8%)	
Exotropia control at near^a			
At 6 months			
Mean (SD)	1.4 (1.4)	1.1 (1.4)	0.26
Range	0 to 5	0 to 5	
Change between baseline and 6 months (pos=better) ^b			
Mean (SD)	-0.3 (1.1)	-0.1 (1.3)	
Range	-3 to 3	-5 to 3	
3 points better	2 (2%)	3 (3%)	
2 points better	2 (2%)	7 (8%)	
1 point better	10 (12%)	11 (12%)	
0	42 (49%)	45 (50%)	
1 point worse	21 (24%)	14 (16%)	
2 points worse	6 (7%)	5 (6%)	
3 points worse	3 (4%)	5 (6%)	
PACT at distance ()^a			
At 6 months			
Mean (SD)	27.9 (8.2)	24.9 (9.4)	0.02
Range	0 to 45	0 to 45	
Change between baseline and 6 months (pos=better) ^c			
Mean (SD)	-0.6 (8.1)	2.0 (8.6)	
Range	-20 to 30	-22 to 25	
Decreased 8	8 (9%)	22 (24%)	
Within <8	66 (77%)	59 (66%)	

	Observation (N=87)	Patching (N=90)	P value ^d
Increased 8	12 (14%)	9 (10%)	
PACT at near ()^a			
At 6 months			
Mean (SD)	19.3 (9.6)	17.0 (12.2)	0.10
Range	0 to 40	0 to 45	
Change between baseline and 6 months (pos=better) ^c			
Mean (SD)	-1.8 (11.4)	0.9 (12.8)	
Range	-30 to 25	-30 to 25	
Decreased 13	7 (8%)	16 (18%)	
Within <13	66 (77%)	60 (67%)	
Increased 13	13 (15%)	14 (16%)	

^aOne observation group participant was missing control (distance and near) and PACT (distance and near) at the 6-month visit.

^bChange is calculated as control at baseline minus control at 6-month examination measures, therefore positive change = improvement (decreasing control score) and negative change = worsening (increasing control score).

^cChange is calculated based on baseline PACT minus 6-month examination PACT, therefore positive change = improvement (decreasing angle), negative change = worsening (increasing angle). Change in PACT at distance and near was classified using thresholds of 8 and 13 respectively because these amounts exceed the repeatability coefficients of 7.2 and 12.8 for PACT angles larger than 20 at distance and near.²⁴

^dP values from analysis of covariance models adjusting for the baseline level of the outcome.

= prism diopters; PACT = prism and alternate cover test; SD = standard deviation