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Bifocals Fail to Improve Stereopsis Outcomes in High AC/A Accommodative Esotropia

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Abstract

Objective or Purpose—To assess whether stereopsis outcomes of patients with accommodative esotropia with high AC/A were improved after treatment with bifocal glasses as compared to single vision lenses.

Design—Retrospective cohort study.

Participants—Patients seen in the department of Ophthalmology at Boston Children's Hospital between 2006 and 2014 with accommodative esotropia with high AC/A (esotropia eliminated or decreased to within 10° at distance with full hyperopic correction); near angle (in full hyperopic correction) >10° more than distance angle; evidence of stereopsis, binocularity (on worth 4 dot testing), or improvement in near angle with +3.00 lenses; at least 4 years of records available for review.

Methods, Intervention, or Testing—Use of bifocal or single vision glasses. Charts were retrospectively reviewed. Stereopsis was log transformed for statistical analysis. Linear and logistic regression was used to control for confounders.

Main Outcome Measures—Stereopsis at final follow-up, difference in stereopsis between final and initial visits, and progression to strabismus surgery. Secondary outcomes include final near and distance deviations.

Results—Of the 180 patients who met inclusion criteria, 77 used bifocals and 103 used single vision lenses. Bifocals did not improve stereopsis outcomes compared to single vision lenses. In both groups, stereopsis was similar at initial and final visits, with similar improvement in both groups. Children in the bifocal group had a 3.6-fold higher rate of strabismus surgery than children in the single-lens group ($p=0.04$.) Additionally, children in the bifocal group had near deviations 4° greater than those with single lenses at final follow-up, even after controlling for age and initial

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deviations ($p=0.02$.) These results did not change if surgical patients were eliminated, or in the subgroup with initial distance deviation of 0 in full hyperopic correction.

Conclusions—Despite their widespread use, there is no evidence that bifocals improve outcomes in children with accommodative esotropia with high AC/A. In our retrospective review, children in bifocals had higher surgical rates and a smaller improvement in the near deviation over time. While our results suggest that eliminating bifocals could reduce the cost and complexity of care while potentially improving quality, prospective, randomized, controlled trials are needed to determine whether a change in practice is warranted.

Introduction

In patients with accommodative esotropia and high AC/A, the full hyperopic correction often controls alignment at distance, but a deviation at near persists. A near addition lens (bifocal) often reduces or eliminates this residual near-angle, motivating many clinicians to recommend bifocals to improve near alignment, with the logical goal of improving sensory outcomes. Although the only two comparative trials that have evaluated sensory outcomes of bifocal treatment have failed to show benefit,^{1,2} the use of bifocals for patients with accommodative esotropia and high AC/A remains common. In this study we present evidence that sensory outcomes were not significantly different between patients treated with single vision lenses and patients treated with bifocals, and that patients in the bifocal group were more likely to need strabismus surgery.

Methods, Intervention or Testing

We conducted a retrospective chart review of patients with accommodative esotropia with high AC/A seen at Boston Children's Hospital for at least 4 years. Patients were treated with either bifocals or single vision lenses based on practitioner preference. Inclusion criteria (at the qualifying visit) included esodeviation (measured with distance correction, based on full cycloplegic refraction) of $<10^\circ$ at distance and $>10^\circ$ at near, with at least 10 difference between distance and near measurements. Included patients were required to display either fusion (on Worth 4-dot testing), stereopsis (on Titmus or Randot testing), or improvement in near angle to $<10^\circ$ with $+3.00$ lenses. Exclusion criteria included prior strabismus surgery, Down syndrome, developmental disorder that precluded stereopsis testing, aphakia, pseudophakia, and myopia.

For each patient, a “qualifying visit” was identified when the following criteria were met: cycloplegic refraction known, patient being treated with single vision spectacles, and inclusion criteria met. Results from the “qualifying visit” are the initial values reported. Follow-up commenced with the qualifying visit, and the reported follow-up time is the time between the qualifying visit and the final study visit. While all patients had a minimum of 4 years of visits for inclusion in the study (and thus had a 4 year interval of observation), not all had 4 full years between the qualifying visit and the final study visit. This was because some patients had several visits before the “qualifying visit” (usually because the patient did not initially demonstrate stereopsis or fusion), while others required surgery before completing the full 4 years of follow-up, with the last pre-operative appointment serving as the final “study” visit.

Visual acuity, ocular deviation at near and distance, fusion, refraction, amblyopia, and stereopsis were recorded. Visual acuity was measured with age-appropriate methods – Snellen letters when possible, HOTV or LEA symbols for younger children, and preferential looking testing for children unable to cooperate with other methods. Deviations were measured using alternate prism cover testing, with patients wearing their full cycloplegic refraction, at both distance (6m) and near (1/3m). Stereopsis was measured using the Titmus fly and with Randot animals and circles. All initial measurements were performed through the patient's distance correction. For patients wearing bifocals, final measurements of stereopsis were conducted through the bifocal segment. For patients wearing single vision lenses, final measurements of stereopsis were conducted through the distance correction. Fusion was measured using the Worth 4-dot test at distance and near. Cycloplegic refraction was determined by retinoscopy for all patients. Amblyopia was defined as at least a 2 line difference in visual acuity measurement between the two eyes.

To facilitate statistical analyses and calculation of means and differences, we used logarithmic transformation of stereopsis, with natural logs. Stereopsis values and corresponding log transformations are shown in Table 1. No measurable stereopsis was assigned a value of 10,000 for purposes of logarithmic transformation. Analyses were repeated with 6,000 and 100,000 as assigned values for no stereopsis, with no change in the conclusions. Mean differences were compared between patients treated with bifocals and those treated with single vision lenses.

Linear regression was used to control for confounding variables including initial stereopsis, amblyopia, age, initial cycloplegic refraction, and initial deviations at distance and near. For patients in whom initial stereopsis could not be tested due to age or cooperation, including 10 with single vision and 6 with bifocals, initial stereopsis was treated as 0. All calculations were repeated with those values as missing values, with similar results.

Patients were coded as progressing to surgery if they had strabismus surgery during the care interval. (All of the patients who progressed to surgery did so because of decompensation of their distance alignment.) For surgical patients, the final pre-surgery visit was used as the final study visit. The binary outcome of having surgery or not was compared to the exposure to bifocals and analyzed with Fisher's exact test. Logistic regression was used to control for confounding variables. All statistical analyses were conducted in SAS, version 9.3 (Cary, NC).

The study was compliant with the Health Insurance Portability and Accountability Act. Institutional review board approval was obtained through Boston Children's Hospital, and all research adhered to the tenets of the Declaration of Helsinki.

Results

A total of 180 patients met inclusion criteria, of whom 77 were treated with bifocals and 103 with single vision lenses. Average care interval was 4.3 years. Patients were cared for by a total of 9 different faculty pediatric ophthalmologists. Baseline characteristics are shown in Table 2. The groups had similar distributions of age, gender, initial visual acuity, and

amblyopia. They did differ on initial cycloplegic refraction (single vision patients were, on average, more hyperopic) and initial deviation at near, with bifocal patients more esotropic at near than patients treated with single vision lenses. All but 2 patients in the bifocal group received an add of at least +2.50 D.

Improvement in Stereopsis was Similar in Both Groups

Stereopsis was similar in the single vision and bifocal groups initially and at final follow-up (Figure 1A). Patients in the bifocal group had an average improvement in stereopsis of -0.95 logArcsec over the 4-year care interval, and single vision patients had an average improvement of -1.18 logArcsec (adjusted $p=0.76$) (Figure 1B). (Using the logArcsec scale, improvement in stereopsis is represented by a negative change, which indicates a smaller number.) Final mean stereopsis (measured through bifocals in the bifocal group and through distance correction in the single vision group) was 5.94 ± 2.3 logArcsec in the bifocals group vs. 5.59 ± 2.1 logArcsec in the single vision group (equivalent to 379 arcsec for the bifocal group and 268 arcsec for the single vision group). Predictors that were significantly associated with improved stereopsis in either group were better initial stereopsis ($p < 0.001$), lower initial deviation at distance ($p=0.02$), and lack of amblyopia ($p=0.004$). In addition, the association of lower initial deviation at near with greater improvement in stereopsis was of borderline significance ($p=0.052$).

Bifocals are Associated with Increased the Risk of Surgery and Larger Near Deviation at Follow-Up

All patients requiring surgery progressed to surgery because of decompensation of their distance deviation to $>10^\circ$. In most cases, these were large decompensations (an average increase in distance deviation of 25 PD from initial measurements in the bifocal group and 20.5 PD in the single vision group). In the full cohort, 16 patients had strabismus surgery, including 12 in the bifocal group (15.6%) and 4 in the single vision group (3.9%) (Figure 2A.) This gives an unadjusted odds ratio of 4.6 (95% confidence interval 1.4 – 14.8, $p=0.008$). Surgical patients tended to be younger and have higher initial deviations. The adjusted odds ratio (after controlling for age and initial deviation) was 3.6 ($p=0.04$.)

At final follow-up, bifocal wearers had an average near deviation of 22.0 ± 14.9 (median 20) vs. 14.4 ± 10.5 (median 14) in the single vision group; that is, the unadjusted difference in near deviation was 7.6 larger in the bifocal group (Figure 2B). After adjusting for initial near deviation, age, and initial distance deviation, using bifocals was associated with an average near deviation 4 worse than with single vision lenses ($p = 0.02$). Bifocal wearers also appeared to have a larger distance deviation at follow-up, but the adjusted difference was not statistically significant.

More Stringent Inclusion Criteria Did Not Change the Results

As there were more surgical patients in the bifocal group, and surgical patients had poorer outcomes, we hypothesized that the 16 surgical patients might be masking improvement in the bifocal group. When we re-analyzed the data eliminating all surgical patients, the final stereopsis was 5.45 ± 2.1 logArcsec in the bifocal group and 5.45 ± 2.0 log Arcsec in the single vision group (233 arcsec, $p=0.99$) (Figure 3A.) The mean stereopsis improvement was

-1.3 $\pm$ 1.8 logArcsec in the bifocal group vs. -1.24 $\pm$ 1.8 logArcsec in the single vision group (p=0.77 unadjusted; p=0.62 after adjusting for initial stereopsis, amblyopia, age, initial cycloplegic refraction, and initial deviation.) After adjusting for age and initial deviation, wearing bifocals was associated with a final near deviation that was 2.2 greater than in the single vision lens group (p=0.03).

We separately analyzed the subset of patients who were orthophoric at distance with correction, since these patients might be the most likely to benefit from bifocals. The subset included 35 bifocal patients and 49 single vision patients (Figure 3B). Final stereopsis among these patients was 5.33 $\pm$ 2.3 logArcsec (206 arcsec) in the bifocal group and 5.39 $\pm$ 2.1 logArcsec (219 arcsec) in the single vision group (p=0.99 after adjusting for age, initial stereopsis, amblyopia, initial cycloplegic refraction, and initial near deviation). The improvement in stereopsis was -1.21 $\pm$ 2.1 logArcsec in the bifocal group vs. -1.40 $\pm$ 1.9 logArcsec in the single vision group (p= 0.99 after adjusting for age, initial stereopsis, amblyopia, initial cycloplegic refraction and initial near deviation).

Among patients in the subset that was orthophoric at distance, the final near deviation followed the same trend as in the full cohort, with 16.9 $\pm$ 13.2 in the bifocal group vs. 13.5 $\pm$ 9.3 in the single vision group, but the difference was not statistically significant in this smaller group (p=0.18 unadjusted, 0.23 adjusted.) Only 4 patients in this group required strabismus surgery, of whom 3 were wearing bifocals. This gives an odds ratio of 4.5, with 95% confidence limits of 0.44 – 45.20, (not significant.)

In clinical practice, the bifocal add fully reduces the near deviation to a phoria in some patients, while a small tropia remains in others. To determine whether these differences might have influenced outcomes, we performed a sub-analysis including all bifocal patients as well as the 63 single vision patients in whom near deviation had been checked with +3.00 lenses in the office. To conduct the analysis, we divided both bifocal and single vision patients into subgroups depending on whether they were phoric or tropic at near with the +3.00 lenses, thus creating four groups: Phoric bifocal (phoric at near through the bifocal add), tropic bifocal (tropic at near through the bifocal add), phoric single vision (phoric at near through a +3.00 add), and tropic single vision (tropic at near through a +3.00 add). Within these subgroups, stereopsis in the phoric bifocal group improved -1.36 $\pm$ 1.7 logArcsec vs. only -0.69 $\pm$ 2.1 logArcsec in the tropic bifocal group (p=0.01, adjusted for initial deviations and initial stereopsis). We next compared outcomes of the phoric bifocal group with the phoric single vision group and found no difference in stereopsis improvement, final stereopsis, or final distance or near deviation (Table 3). One patient in the single vision lenses group with a near phoria required surgery. We also compared the tropic bifocal group with the tropic single vision group and found no significant difference in stereopsis improvement or final stereopsis. The tropic bifocal group, however, had final deviations that were twice as large as in the tropic single vision group at both distance (p=0.01) and near (p=0.03) (Table 2.) Of the tropic patients, 12 (26%) in the bifocal group and 3 (7%) in the single vision group required surgery, (OR 4.3, 95% confidence limits 1.1-16.7, p=0.03).

Discussion

In this retrospective study, we show that high AC/A accommodative esotropia patients who are treated with single vision lenses have stereopsis outcomes similar to those treated with bifocals. With an average follow up of over 4 years, both initial and final stereopsis were similar in patients treated with bifocals and those treated with single vision lenses, with final stereopsis nearly identical in the two groups.

While stereopsis improved over time in the bifocal group, there was a similar improvement in the single vision group. This may explain why many practitioners cite anecdotal evidence that their patients improve with bifocals as justification for prescribing bifocals. A clinician trained to use bifocals in high AC/A accommodative esotropia would not have experience with the reference group of patients treated with single vision lenses. We have taken advantage of a natural experiment within our large academic pediatric ophthalmology practice in which some ophthalmologists routinely prescribe bifocals for this condition whereas others do not.

We did find several important differences between the bifocal and single vision groups, but (quite unexpectedly to us) the outcomes appeared better in the single vision group. Patients treated with bifocals showed an increased risk of requiring surgical intervention and demonstrated a greater near deviation at final follow-up. Conversely, patients treated with single vision lenses demonstrated a trend of diminishing near angle at the final follow-up visit. We hypothesize that binocular experience at distance with variable deviation at near (as occurs in patients wearing single vision lenses) may drive sustained fusional divergence to decrease the near deviation and maintain some degree of binocularity in everyday life even though control is poor under office testing conditions. Conversely, wearing bifocals to eliminate the near deviation at 1/3 m eliminates the need to sustain fusional divergence to preserve stereopsis – but *only* at or around 1/3 m. Single vision wearers might thus “learn” to control their deviations over a range of distances more effectively, possibly reducing the risk of requiring strabismus surgery. We further propose that while this learned fusional divergence at near may not be effective at the standard office stereopsis testing distance of 1/3 m, it may be quite effective at intermediate distances used during ordinary life of 1-2 m, allowing single vision patients to use their fusional divergence in these situations whereas bifocal wearers have lost any such adaptive mechanism and paradoxically spend more of their waking hours with a manifest deviation.

There are some situations where bifocals may be helpful – in particular, for patients with hypoaccommodation. This can generally be diagnosed using dynamic retinoscopy and near visual acuity assessment, and we routinely treat hypoaccommodating patients with bifocals. In addition, some children who have worn bifocals for years will actively use the bifocal segment for reading, clearly adjusting their head position to use the bifocal. We believe that these patients have lost their fusional divergence and now require the bifocal to remain binocular at near; furthermore, prolonged experience with the bifocal may have caused them to lose accommodative capacity or drive. We do not know if such children would have maintained their accommodation (in addition to their fusional divergence at near) if they had not been given the bifocal.

While it is standard clinical practice to prescribe +2.50 or +3.00 bifocal power in children with high AC/A accommodative esotropia,⁴ some clinicians prescribe the smallest bifocal power needed to convert the near measurement to a phoria.⁵ It is possible that patients treated with such an approach would have different outcomes, but in our practice, when bifocals were prescribed, only 2 patients received less than a +2.50 add.

This study is limited by its retrospective, non-randomized nature. Choice of bifocals or single vision lenses was at the discretion of the treating physician. We should note that while a total of 9 practitioners cared for these patients, the same orthoptic team performed the initial office assessments using identical, department-wide documentation standards. Although this study examined only patients seen at the Ophthalmology Department at Boston Children's Hospital, some of our practitioners always recommend bifocals, some decide on a case-by-case basis, and some never prescribe bifocals for this indication, even for patients who are tropic at near and whose near deviation is reduced to zero with an add. On occasion, bifocals may have been prescribed or recommended by clinicians who prescribe on a case-by-case basis as a “last-ditch” effort before surgery, which could theoretically explain why more bifocal patients progressed to surgical intervention. Our inclusion and exclusion criteria, however, eliminated patients who were obvious surgical candidates (i.e. deviation at distance not controlled with full correction). Additionally, all of the surgical patients (in both groups) had marked decompensation of their distance deviations (on average, $>25^\circ$), not surgery to “get out of the bifocal”. Nevertheless, sensory outcomes were re-analyzed with elimination of surgical patients from both cohorts. This did not change sensory outcome results. Even by excluding all surgical cases, both initial and final stereopsis was similar in patients treated with bifocals and those treated with single vision lenses.

There were some baseline differences between the bifocal and single vision lens groups, especially in initial near angle of deviation and initial cycloplegic refraction. In addition, some clinicians assert that accommodative esotropia patients whose distance angle is completely eliminated with full hyperopic correction are qualitatively different from those with persisting small angle esotropia (less than 10°) at distance. While the only way to control for these and other hidden confounding differences would be to perform a prospective, randomized clinical trial, and we advocate that one is needed to definitely address these questions, we attempted to control for all such differences statistically. Linear (for stereopsis) or logistic (for surgery) regression was used to control for initial near deviation, as well as several other confounders. We also performed a subgroup analysis (not shown) including only patients with an initial near deviation of greater than 20° . Despite all such efforts, the results showed no difference in stereopsis in either group as well as an increased likelihood for requiring surgery in the bifocal group.

Patients who remain tropic at near through a +3.00 add (even with an angle $<10^\circ$) appear to be at particular risk of having a poor outcome when treated with bifocals; the final deviation in this group was twice as large at both distance and near compared with the single vision group. In contrast, bifocals do not appear to be harmful or helpful in patients who are phoric at near, with no difference in stereopsis or deviation angle and only one single vision patient in this group progressing to surgery.

Bifocals are potentially stigmatizing for patients and often difficult for children to use properly. Given how commonly bifocals are prescribed to patients with high AC/A, it is notable that there is no literature showing a benefit. We could find only three published comparative studies, all failing to show any benefit of bifocal therapy. Only two studies, by the same authors (and including many of the same patients), evaluated stereopsis outcomes, and found no benefits.^{1,2} A third study compared bifocals, single vision lenses and surgery, and found that none of the bifocal patients achieved “success.” They did not evaluate stereopsis.⁶

While it is clear that a prospective, randomized, controlled study of bifocal use in patients with high AC/A accommodative esotropia would provide a more definitive answer to the question of whether bifocals are beneficial in accommodative esotropia, such studies are costly and require preliminary data to allow for sample size calculations. If bifocals are determined to provide no benefit, the economic consequences could be substantial: Esotropia is present in as many as 2% of children under age six, of whom 36% have accommodative esotropia, with as many as half of that group having the convergence excess type,^{7,8} meaning that 0.36% of all children under age 6 may qualify for bifocal therapy. With 20 million children aged 1-6 in the United States today,⁹ this means that 72,000 children (or 14,400 annually) are candidates for bifocal therapy. Bifocals add \$60 to the average \$86 cost of spectacle lenses,¹⁰ meaning that the total additional cost of bifocal therapy may be \$864,000 annually. Furthermore, if our estimate of a 15% incidence of surgery in bifocal patients (vs. a 4% incidence in single vision patients) over a 4-year care interval is borne out in a prospective study, and if the cost of strabismus surgery is \$5028 (in 2015 dollars),¹¹ there would be 400 fewer surgeries annually for a savings of \$2 million. Thus, a prospective study confirming our preliminary findings could either justify or eliminate health care expenditures of \$800,000 to \$2.8 million annually in the United States alone.

This study demonstrates that control of esodeviation at distance (to less than 10) using the full hyperopic correction is adequate for development of stereopsis even if a large residual deviation persists at near. Bifocals did not improve sensory outcomes in children with high AC/A accommodative esotropia who otherwise respond to the full hyperopic correction. Furthermore, in our cohort, bifocal wear was associated with an increased risk of progressing to surgery and with persistence of a larger near angle of esotropia over time. Patients who are tropic at near with a +3.00 add appear to be at greatest risk of having a poor outcome with bifocals. Due to the inability to control for all known and unknown confounders and potential bias in a retrospective study, a randomized controlled trial is needed to further address these questions. If our results are upheld by such a study, the costs and logistic complexity of bifocal therapy could be eliminated by treating patients with accommodative esotropia and high AC/A with single vision lenses, not bifocals, which would reduce the cost of care while sustaining or possibly improving the quality of treatment outcomes.

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Figure 1.

Stereopsis outcomes of bifocal and single vision lens groups. A. Neither initial stereopsis measurements nor final stereopsis measurements differed between the groups, although both groups saw significant improvement over the period of follow-up. B. Box-and-whisker plot showing individual changes in stereopsis between initial and final visits. Stereopsis was log transformed to facilitate mathematical calculations. See Table 1 to transform logArcsec to arcsec. [In the box-and-whiskers plots, the bottom and top of each box represent the 25th and 75th percentiles (the lower and upper quartiles, respectively); the band near the middle of the box is the 50th percentile (the median), the × marks the mean value. The whiskers are based on the Tukey method. The upper whisker is the smaller of the 75th percentile plus 1.5 times the interquartile range (IQR), or the maximum value. The lower whisker is the larger of the 25th percentile minus 1.5 times the IQR or the minimum value. Values greater than 75th percentile plus 1.5 IQR, or less than 25th percentile minus 1.5 IQR are plotted as individual points. **p<0.01

Figure 2.

Structural outcomes of bifocal and single vision lens group. A) Progression to surgery in bifocal group (dark bar) vs. single vision group (light bar). Adjusted odds ratio showed a 3.6-fold higher risk of progression to surgery in the bifocal group. (B), Box and whisker plot showing size of near esodeviation (measured at 1/3m through distance correction) at final follow-up. Single vision group had a significantly smaller angle. [In the box-and-whiskers plots, the bottom and top of each box represent the 25th and 75th percentiles (the lower and upper quartiles, respectively); the band near the middle of the box is the 50th percentile (the median), the × marks the mean value. The whiskers are based on the Tukey method. The upper whisker is the smaller of the 75th percentile plus 1.5 times the interquartile range (IQR), or the maximum value. The lower whisker is the larger of the 25th percentile minus 1.5 times the IQR or the minimum value. Values greater than 75th percentile plus 1.5 IQR, or less than 25th percentile minus 1.5 IQR are plotted as individual points. **p<0.05

Figure 3.

Subgroup analysis of stereopsis outcomes after eliminating surgical patients (A) or restricting the analysis to patients orthophoric at distance (B). For A, patients who underwent surgery after the initial examination were excluded. For B, patients with residual microtropia at distance were excluded. No significant differences were found in stereopsis between bifocal and single vision groups. Stereopsis measurements were log transformed. See Table 1 to convert logArcsec to arcsec. In the box-and-whiskers plots, the bottom and top of each box represent the 25th and 75th percentiles (the lower and upper quartiles, respectively); the band near the middle of the box is the 50th percentile (the median), the × marks the mean value. The whiskers are based on the Tukey method. The upper whisker is the smaller of the 75th percentile plus 1.5 times the interquartile range (IQR), or the maximum value. The lower whisker is the larger of the 25th percentile minus 1.5 times the IQR or the minimum value. Values greater than 75th percentile plus 1.5 IQR, or less than 25th percentile minus 1.5 IQR are plotted as individual points.

Table 1
Transformation of stereopsis to logArcsec

arc-sec	logArcsec
Nil	9.21
3000	8.01
800	6.68
400	5.99
200	5.30
140	4.94
100	4.61
80	4.38
70	4.25
60	4.09
50	3.91
40	3.69
30	3.40
25	3.22
20	3.00

* To transform zero stereopsis to a real number, a stereopsis value of 10,000 arcsec was selected.

Table 2

Analysis of subgroups based on presence of phoria or tropia at near when tested through +3.00 lenses. p values are based on 2-sided t-tests. Only one of the patients in the “phoric at near” subgroup required surgery. That patient was in single vision lenses. See Table 1 to convert logArcsec to arcsec.

	Phoric at near subgroup			Tropic at near subgroup		
	Bifocals	Single vision	P	Bifocals	Single vision	P
Stereopsis improvement (logArcsec)	-1.4 ± 1.7	-1.2 ± 1.8	0.69	-0.7 ± 2.1	-1.2 ± 1.8	0.25
Final stereopsis (logArcsec)	4.4 ± 1.4 (81 arcsec)	5.2 ± 2.0 (181 arcsec)	0.09	6.9 ± 2.2 (992 arcsec)	6.7 ± 2.2 (812 arcsec)	0.73
Final near deviation (prism diopters)	14.8 ± 10.3	14.3 ± 10.6	0.86	26.8 ± 15.7	19.2 ± 11.3	0.01
Final distance deviation	2.3 ± 3.4	5.0 ± 7.7	0.14	14.6 ± 15.4	8.8 ± 9.3	0.03

Table 3

	Bifocals (n=77)	Single Vision (n=103)	P value
Age (yrs)	5.134 ± 2.09	5.38 ± 2.16	0.43
Follow-up (yrs)	4.21 ± 2.10	4.37 ± 2.11	0.61
Initial CRx (diopters)	+3.10 ± 2.22	+4.22 ± 1.97	0.0004
Initial Dec (PD)	3.51 ± 3.98	3.00 ± 3.44	0.36
Initial Ncc (PD)	25.19 ± 9.72	20.25 ± 6.72	<0.0001
Initial VA (logMAR)	0.15 ± 0.14	0.18 ± 0.15	0.1097
Amblyopia (n, %)	22 (28.6 %)	37 (35.9%)	0.34
Female (n, %)	43 (55.8%)	58 (56.3%)	0.99