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Community-Based Trial of Peripheral Prism Visual Field Expansion Device for Hemianopia

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Abstract

Background—Peripheral prism glasses, a novel visual field expansion device for hemianopia, showed promise in early, small-sample evaluations.

Objective—To determine functionality of the glasses for general mobility in a larger-scale, community-based, multi-center study with longer-term follow up.

Methods—Forty-three participants with homonymous hemianopia were fitted with temporary press-on™ Fresnel (40 prism diopter) peripheral prism segments. Follow up questionnaires, evaluating functional benefits for mobility, were administered in-office at week 6. Participants who continued wearing the prisms were interviewed again by telephone after 12 months (median). Primary outcome measures included: clinical success (a clinical decision to continue wear) and 5-point ratings of prism-helpfulness for obstacle avoidance when walking.

Results—Thirty-two participants (74%) continued prism-wear at week 6, and 20 (47%) were still wearing prisms after 12 months (8 hours per day) rating the prism glasses as “very helpful” for obstacle avoidance and reporting significant benefits for obstacle avoidance in a variety of mobility situations. Success rates varied among clinic groups (27% to 81%), with higher rates at the clinics that fitted more patients.

Conclusions—Our results demonstrate the functional utility of peripheral prism glasses as a general mobility aid for hemianopic patients.

INTRODUCTION

Homonymous visual field defects (HVFDs) have a prevalence of 0.8% in the general population over 49 years of age.[1] They are caused by lesions in the postchiasmal visual pathways, primarily from strokes, and to a lesser extent, trauma and tumors.[2] Patients with HVFDs have difficulty in detecting obstacles on the side of the loss, resulting in impaired mobility. The main vision-based rehabilitation strategies include: provision of optical aids e.g., prismatic corrections to expand or relocate the visual field;[3] visual search training to improve efficiency of visual exploration on the side of the loss;[4–7] and visual restoration training to recover lost visual function.[8] Here we report the first multi-center evaluation of a novel prismatic visual field expander for patients with HVFDs.

The introduction of press-on™ Fresnel prisms in the 1970s provided a temporary and inexpensive method of applying prismatic corrections for patients with HVFDs.[9–12] Low to moderate powered prism segments (12 – 20 prism diopter (Δ)) were fitted mainly as binocular or monocular sector corrections (covering only part of the lens), providing field relocation or

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expansion of less than 10°.[10, 13–21] Neither method provides visual field expansion effective in all positions of gaze.[22] Binocular sector prisms do not provide field expansion, and only relocate (shift) images to a functional part of the field when gaze is directed into the prism. Monocular sector prisms can provide visual field expansion, but only when gaze is directed into the prism and the accompanying central diplopia may be disorienting to the patient.[3, 23]

In 2000, Peli described a new *peripheral-prism* design of prismatic correction for HVFDs.[22] High power press-on™ prism segments (40Δ) are placed across the whole width of the spectacle lens above and below the pupil area on the side of the field loss (Figure 1). Visual field expansion of about 20°, which is effective at all lateral positions of gaze, is provided via peripheral diplopia (Figure 2). Patients are taught to view through the central, prism-free area of the spectacle lens (never looking into the prisms), so that central diplopia does not occur. A case-series report by Peli,[22] and a recent laboratory-based clinical evaluation,[24] suggest that many patients find the peripheral prism glasses helpful for obstacle avoidance when walking. However, these studies were limited by small sample sizes and prisms were fitted either by Peli or his co-workers.

The purpose of this study was to conduct a multi-center evaluation of the peripheral prism glasses with long-term follow up to determine patient acceptance and functional utility of the glasses for general mobility (walking) when fitted by community-based vision rehabilitation practitioners. Furthermore, to aid future development of a simple fitting protocol, the minimum inter-prism separation that could be tolerated when walking was determined. Procedures and measures that could be implemented within the normal schedule of a vision rehabilitation clinic and that reflected those typically used in clinical practice were employed, thus opening up the study and the novel peripheral prism technique to a wide group of practitioners.

METHODS

The Schepens Eye Research Institute acted as the coordinating and data management center for the study. The tenets of the Declaration of Helsinki were followed, and the study was approved by the Internal Review Board of the Schepens. Data were collected in the period April 2004 to December 2005.

Practitioners

Fifteen community-based vision rehabilitation practitioners at 18 clinics across the USA recruited and screened patients, fitted prisms and performed follow-up evaluations. Practitioners were mainly recruited through an announcement about the study at the American Academy of Optometry 2003 Annual Meeting.

Participants

Participants with complete homonymous hemianopia, as determined by a recent (within previous 3 months) visual field plot, and corrected monocular visual acuity of at least 20/50 in each eye were recruited. Only patients with no physical or cognitive impairments, balance problems or other deficits that could impair ability to walk or use the peripheral prism glasses were included. Based on case histories and medical records, patients with visual neglect, diagnosed dementia, or a history of seizures in the last 6 months were excluded. Visual field mapping extended to at least 50° from fixation in all directions and was performed using Goldmann perimetry (V4e target), Humphrey Field Analyzer 120 point full field screening test or similar tests, depending on the equipment available at each clinic. Before screening data were collected, the nature of the study was explained and informed consent was obtained from all participants. To ensure that study inclusion criteria were uniformly applied (in particular

that all participants met the criteria for complete homonymous hemianopia), screening data and visual field plots were sent to the study coordinator (ARB) who determined eligibility.

Procedures

Study procedures aimed to ensure that all participants were treated equally, regardless of the clinic they attended. Detailed written protocols and data sheets were provided to each practitioner by the study coordinator. Following each assessment, data sheets were sent to the study coordinator for immediate review. This day-to-day monitoring ensured protocol adherence and speedy remediation of protocol deviations. Figure 3 summarizes the study visit schedule.

Prism fitting—The complete study protocol for prism fitting and training is available on the Data Sharing page of author EP's website (http://www.eri.harvard.edu/faculty/peli/index.html). Fitting procedures were modified from the method proposed by Peli.[22] In brief, upper and lower 40Δ press-on™ Fresnel prism segments (3M Health Care, St Paul, MN) were fitted to one lens of participants' spectacles. The prisms are intended as a mobility aid; therefore they were fitted to single-vision distance, bifocal or progressive addition lenses. If the participant did not have suitable spectacles, they were provided with study glasses at no cost. The prisms were fitted on the side of the field loss (e.g., left eye for left hemianopia) with the base in the direction of the field loss (base out prismatic effect), so that objects from the non-seeing side were imaged on the functional side of the retina. The upper prism was fitted first (week 0) and worn at home for 2 weeks before the lower prism was fitted (week 2), providing a graduated introduction to the use of the prisms. If the prism segments were fitted to bifocal or progressive addition lenses, a small semi-circular aperture was cut from the bottom part of the lower segment to provide sufficient area for short duration reading through the near vision correction (Figure 1).

The prism-fitting procedure was designed to determine the minimum amount of inter-prism separation that could be tolerated. "Tolerated" was defined as comfortable single central vision with no change in head posture between walking without and with the prisms. The starting point for fitting the upper prism was to place the lower edge of the segment 6mm above the pupil center. The participant then walked around the clinic with the prism at this height. Toleration of the position was determined by observations of head posture pre-and post-fitting (e.g. elevation of head posture with the prism indicated that it was set too low), and by asking the patient if he/she noticed central diplopia or the prism interfering with central vision. The prism position was adjusted in a staircase fashion using 2mm then 1mm steps to determine the lowest tolerated position (closest to pupil center). The prism was moved down toward the pupil center until it was below the lowest tolerated position, such that it either interfered with central vision or head posture was elevated. It was then moved back up to find the lowest position at which it first did not interfere with central vision or alter head posture. A similar procedure was followed for fitting the lower prism, starting with the upper edge of the segment 6mm below the pupil center and adjusting to determine the highest tolerated position (closest to pupil center).

Participants were taught to view through the central prism-free area of the spectacle lens at all times and to turn the head and eyes to fixate objects of interest that were initially detected from the prism image in peripheral vision. A simple "reach and touch" training exercise was used to familiarize participants with the relationship between the apparent and real positions of objects detected from the prism image; this exercise was also encouraged for home-training. Participants were given verbal and written instructions about how to use the prism glasses and were encouraged to wear them as much as possible each day. They were advised not to use the

peripheral prism glasses for driving or prolonged reading; if necessary, a separate pair of reading glasses was provided at no cost.

Review of prism-fitting positions—The fitting positions of the upper and lower prisms were reviewed at the start of the week-2 and week-6 visits (Figure 3), respectively. If necessary, the position was adjusted and another 2 weeks of prism wear given before progressing to the next part of the study.

Follow up—After both prism segments had been worn for 4 weeks, an in-office follow-up interview was conducted (week 6). A clinical decision whether or not to continue prism wear was made. The criteria to continue wear were: the prisms were helpful for mobility (e.g., helpful for obstacle avoidance when walking outdoors), the patient wanted to continue wear and the practitioner deemed that it was clinically appropriate. Participants' experiences of wearing the prisms were evaluated through a series of questions, including: 5-point ratings of prism helpfulness for detecting obstacles on the "blind" side in time to avoid them when walking; 5-point ratings of vision comfort when wearing the prisms (as the prisms might, for example, cause visual discomfort due to glare from overhead lighting, or due to central diplopia, if not used correctly); and open-ended questions about mobility situations where the prisms were very helpful and about any difficulties encountered.

At least 6 months after the week-6 visit, a long-term telephone interview was conducted with all participants for whom the clinical decision was to continue wear. For participants who were still wearing prisms, the interview included all of the questions asked at the short-term follow up, supplemented by an additional question asking whether they would be willing to pay $600 for permanent prism glasses. For participants who had discontinued wearing the prisms, only questions to ascertain the reasons for discontinuing were asked. Participants who continued to wear press-on™ prisms at the week-6 interview, and either press-on™ or permanent prisms (see below) at the long-term interview, were allowed to keep them at no cost.

Outcome measures

The primary outcome measures were: clinical success, defined as a clinical decision to continue wear, and ratings of prism helpfulness for obstacle avoidance at the short and long-term interviews.

Permanent prism glasses

While the study was in progress, Chadwick Optical Inc. developed a rigid form of the Fresnel prism segment that could be embedded into a plastic spectacle lens. This provided a permanent peripheral prism spectacle correction (Figure 4) as an alternative to the temporary press-on™ prisms, which might have important advantages for long-term wear (better durability, better optical quality, and no need for replacement every 3 months). For these reasons, in April 2005 when the permanent prisms were first available, 15 of 18 study participants who were wearing temporary press-on™ prisms and had worn them for at least 2 months after the week-6 visit were provided (at no cost) with permanent 40Δ peripheral prism glasses. We were interested in long-term use of the prism glasses; therefore our selection was biased towards patients whom practitioners deemed most likely to continue long-term wear. As there were insufficient funds to provide permanent prisms to all participants, those who completed two months wear after April 2005 (7 participants) were not fitted with the permanent form of the prisms. Permanent prism glasses were fitted about 5–6 months after the week-6 visit and about 5–6 months before the long-term interview. The prisms were fitted at the same inter-prism separation as the press-on™ prisms and provided a similar visual field expansion effect.

Statistical analysis

For statistical analyses, participants were grouped according to final status: discontinued prism wear at week 6 (discontinue ≤ week 6), discontinued prism wear after week 6 (discontinue > week 6) and continued prism wear long term (continue long term). The discontinue-at-week-6 group included participants who discontinued both at and before week 6. Differences in fitting positions, wearing times and prism-ratings between participants grouped by final status were evaluated at week 6. For participants who discontinued before week 6, data included in these analyses was from the last visit prior to week 6. As there were many clinics where only a small number of patients were fitted, a two-way grouping of clinics was used (Table 1): Group A (each practitioner fitted ≥ 8 participants) and Group B (each practitioner fitted ≤ 5 participants). None of the continuous variables conformed to a normal distribution; therefore, non-parametric statistics were used for all between-group comparisons. A probability of less than 0.05 was taken to indicate statistical significance.

RESULTS

Sixty potential participants were screened. Fifty met the study criteria and were enrolled; 7 withdrew before the upper prism fitting and 43 were fitted with prisms (Figure 3). Reasons for early withdrawal included: concerns about falling (1), fitted with prisms outside of the study (1), and unknown reasons (5). Prisms were fitted either to single vision distance lenses (56%) or bifocal lenses (42%). Only 1 participant (2%) had prisms fitted to progressive addition lenses.

For 32 (74%) of the 43 participants fitted with prisms, the clinical decision at the week-6 visit was to continue wearing the prisms, and 20 (47%) were still wearing them 12 months later at the long-term interview (Figure 3 and Figure 5). Of the 15 participants who were fitted with permanent prism glasses, 11 (73%) were still wearing them at the long term interview, 2 (13%) had reverted to press-on™ prisms (due to a problem with an early prototype of the bifocal permanent prism glasses), and 2 (13%) had discontinued wear. By comparison, 7 of the 10 (70%) who were not fitted with permanent prisms, were still wearing press-on™ prisms at the long-term interview (Figure 3). The main reasons for discontinuing prism wear (either at or after week 6) were: difficulties in adapting to the prism images (including confusion of images or sudden appearance of images causing anxiety, 32%), no perceived benefit (14%), and deteriorating general health (14%).

[25] Long-term success rates were significantly higher at clinics where 8 or more patients were fitted than at clinics where 5 or fewer patients were fitted (81% and 27%, respectively; $\chi^2 = 12$, df = 1, p = 0.001; Table 1). Evaluating clinical variables (summarized in Table 2) that might affect long-term success rates was not an aim of this study; a much larger sample would have been needed. Spontaneous improvement in hemianopia, most likely to occur within the first three months after the onset of hemianopia,[25] could affect success rates: patients who recover lost visual field might discontinue wearing prism glasses. In our sample there were 5 participants who had hemianopia for less than 6 months, but only 1 discontinued wear. Therefore it is unlikely that spontaneous improvement affected success rates in this study.

There were no differences in final upper or lower prism fitting positions between long-term wearers and participants who discontinued prism wear (Kruskall Wallis, $\chi^2 < 3.0$, df = 2, p > 0.2; Figure 6), and there were no differences in fitting positions between clinic groups (Mann-Whitney, $z < -0.7$, $p > 0.5$). The median inter-prism separation for the 32 participants who continued wear at week 6 was 11 mm (interquartile range (IQR) 8 to 11). The positioning of the lower prism was more critical as it was more likely to interfere with central vision when walking. Seven participants had the lower prism position changed after the visit when it was

first fitted (median 2mm away from the pupil center), whereas only four participants had the upper prism position changed (median 1.25mm away from the pupil center).

At the week-6 follow up, participants who continued long-term prism wear reported longer daily wearing times (Mann-Whitney, $z = -1.6$, $p = 0.1$; Figure 7a), higher vision comfort ratings (Mann-Whitney, $z = -3.0$, $p = 0.003$; Figure 7b), and higher obstacle-avoidance ratings (Mann-Whitney, $z = -4.3$, $p < 0.001$; Figure 7c) than participants who discontinued prism wear at week 6. Minor differences were also apparent between long-term wearers and participants who discontinued wear after week 6: daily wearing times were shorter and obstacle avoidance ratings were lower in the latter group, suggesting that these participants already (at week 6) found the prisms less useful than the long-term wearers (Mann-Whitney, $z = -1.8$, $p = 0.07$; Figures 7a and 7c). Participants who discontinued wear at week 6 gave significantly lower obstacle avoidance ratings than participants who discontinued wear after week 6 (Mann-Whitney, $z = -3.5$, $p < 0.001$; Figure 7c), but daily wearing times were similar (Mann-Whitney, $z = -0.6$, $p = 0.6$; Figure 7a).

At the long-term interview the 20 participants who continued prism wear reported median daily wearing times of 8 hours (IQR 4 to 13) and rated the prism glasses as “very helpful” for obstacle avoidance (median rating 5, IQR 4 to 5), with high levels of vision comfort (median rating 4, IQR 3 to 5). The ratings were not significantly different from those at week 6 (Wilcoxon Signed Ranks, $z < -0.6$, $p > 0.6$), and there were no differences in ratings between participants wearing press-on™ and permanent prisms (Mann-Whitney, $z < -0.5$, $p > 0.6$). Long-term wearers reported that the prisms were particularly helpful when shopping in malls and stores, and moving in crowded and unfamiliar areas (85%). As expected, the main situation in which the glasses were not worn was when doing near vision tasks, including reading and using the computer (45%). A minority (40%) of long-term wearers reported difficulties when using the prism glasses, most commonly problems with steps or curbs (10%) and reading (15%). Of the 19 long-term wearers who answered the question about whether they would be willing to pay $600 for permanent prism glasses, a significantly higher proportion of permanent prism wearers than press-on™ prism wearers responded in the affirmative (100% and 63%, respectively; $\chi^2 = 4.9$, $df = 1$, $p = 0.03$).

DISCUSSION

The results of this multi-center evaluation demonstrate the utility of the peripheral prism glasses as a mobility aid for patients with HVFDs (specifically complete hemianopia). Almost half of all participants were still wearing the prism glasses after 12 months, typically for 8 hours per day, reporting significant benefits for obstacle avoidance in a variety of mobility situations. The minimum inter-prism separation that could be tolerated when walking was determined for each participant, a time-consuming process that would not be practical in a busy clinic. Currently we are evaluating a simplified fitting protocol using a standard inter-prism separation of 12mm (the 90th percentile of the data from participants who continued wear at week 6).

The overall 6-week and 12-month success rates in this study (74% and 47%, respectively) were similar to those reported in early, single-center evaluations of the peripheral prism glasses (when prisms were fitted by Peli and co-workers).[22, 24] However, long-term success rates varied widely between clinics (27 – 81%), with higher rates at clinics where greater numbers of participants were fitted. All participants were treated equally irrespective of which clinic they attended and final prism-fitting positions did not differ between clinics indicating that practitioners adhered to the standardized study fitting protocols. Nevertheless, the results suggest that confidence in fitting and training patients to use the prisms may be an important factor determining success. It is worth noting that the early-withdrawal rates (before prisms were fitted) were lower in clinics with higher success rates (Table 1). A limitation of the study

was that there were a large number of clinics (9) that fitted only 1 or 2 patients and only two clinics that fitted 8 or more patients. While this was a less-than-ideal situation for a multi-center study, our aim was to open up the study and introduce the concept of fitting the prisms to as many practitioners as possible.

The potential advantages of the permanent prisms, and the feel-good factor of being one of the first people to evaluate the new permanent prisms, could have contributed to higher success rates among participants fitted with permanent prisms than participants not fitted with permanent prisms. However, there was little evidence in the study results of higher success rates in the former group, but comparisons were limited by small sample sizes. Although 40Δ press-on™ and permanent prisms provide similar visual field expansion effects, permanent prisms have several advantages over press-on™ prisms for long-term wear. The optical quality is better to start with and does not deteriorate with time, the durability is far superior and they do not have to be replaced every three months. It is encouraging that the majority of long-term wearers (both those fitted with permanent prisms and those not fitted with permanent prisms) indicated that they would be willing to pay $600 for permanent prism glasses; this provides an indication of the perceived importance of the benefits of the glasses in their everyday lives. Of the 12 patients reported in the early series by Peli,[22] four purchased the permanent prism glasses when they became available and one ordered a replacement pair when his prescription changed following cataract surgery. The Massachusetts Medicaid program has subsequently pre-approved payment for the permanent prisms glasses for two patients.

The success rates for the peripheral prism glasses were similar to or better than those reported for alternative monocular sector prism designs (e.g., 20% to 50–60%).[17, 18, 20, 21] However, evaluations of these alternative prism designs were limited by small samples ($n \leq 10$),[18, 21] or lack of clarity and consistency in reporting methodology and results.[20] Furthermore, success rates in these studies might have been overestimated as monocular sector prism glasses could have been worn without experiencing central diplopia.[17, 18, 20, 21] As a monocular sector prism covers less than half of the spectacle lens on the side of the visual field loss, it would have been possible for patients to wear the glasses, yet avoid central diplopia by never looking through the prism (and never experience the intended field relocation effect). By comparison, the peripheral prism design offers the advantage of visual field expansion that is present all the time and in all lateral positions of gaze. However, if the peripheral diplopia is bothersome for the patient, the only relief is to remove the glasses. The typical field expansion (20°) with the 40Δ peripheral prisms is about double that reported for monocular sector designs,[20] and is four times greater than the average 5° field recovery reported for vision restoration therapy,[8, 26] a much more time-intensive, expensive and controversial rehabilitation method with doubtful efficacy.[27–31] Furthermore, the peripheral prism glasses could be used to provide additional visual field expansion to supplement visual restoration or visual search training.

The main factor leading to discontinuation of prism-wear was confusion of images or anxiety from the sudden appearance of images, suggesting that these participants did not fully comprehend how to use the prisms. Such patients may have benefited from further training. Other minor reported difficulties included difficulties with reading (inconvenience for bifocal users of having only a small aperture in the lower prism segment that could only be used for short duration reading; other glasses had to be used for prolonged reading) and problems with steps or curbs. The latter difficulty results from the lower prism segment extending across the entire inferior region of the spectacle lens. If the wearer looks down to negotiate descending steps and happens to glance through the lower prism, central diplopia will result. To alleviate this, press-on™ prisms could be cut to provide a prism-free area below the lower segment (as is the case with the permanent prism glasses; Figure 4).

Peripheral prism glasses provide a promising and relatively inexpensive treatment for HVFDs, which can be successfully fitted by community-based practitioners. Based on participants' reports and acceptance of the device, this study provides evidence of the functional utility of the peripheral prism glasses to aid hemianopic patients with general mobility. However, objective measures of functional performance with and without prisms, and a control or comparison treatment were not included. To provide a more rigorous evaluation of the efficacy of the peripheral prism glasses,[31] we are now conducting a randomized controlled multi-center cross-over trial utilizing real and sham prisms.

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Financial/Proprietary Interest EP has financial interest in a patent related to the peripheral prism glasses (assigned to Schepens Eye Research Institute). KK has licensed that patent for Chadwick Optical Inc. Chadwick Optical Inc. funded the study in part from NIH grant R43–EY014723 through a subcontract with Schepens Eye Research Institute. EP was a paid consultant to Chadwick Optical Inc. on the design of the permanent prisms. ARB has no financial interests.

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Data Access and Responsibility The corresponding author had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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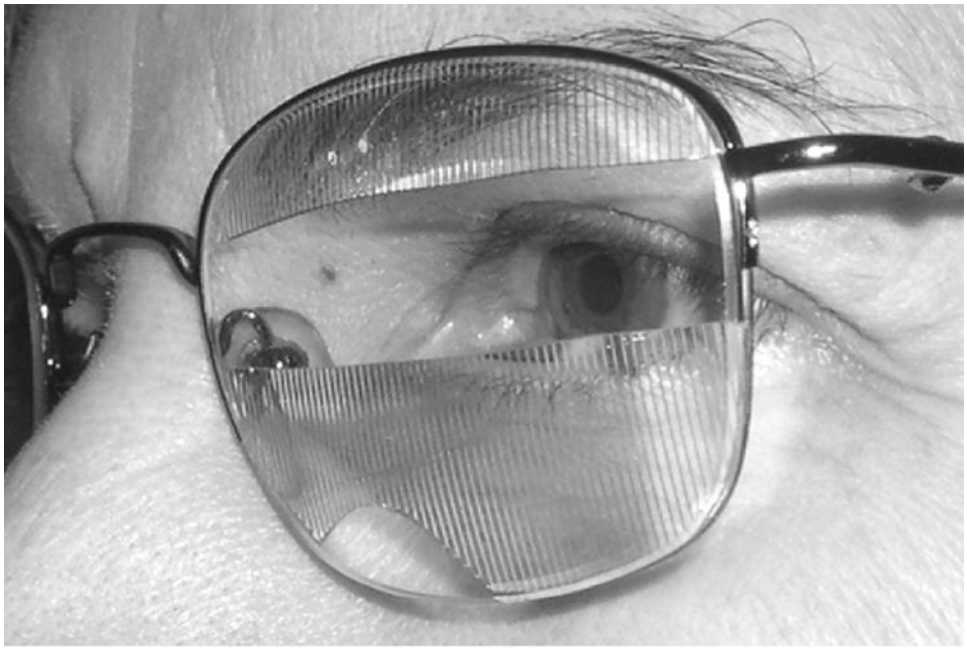

Figure 1.

Press-on™ 40Δ Fresnel peripheral prism segments placed base out on the left spectacle lens of a left hemianope (11mm inter-prism separation). The patient has an uninterrupted binocular view through the central prism-free area of the lens. The prism segments provide field expansion in the upper and lower peripheral fields (Figure 2). For bifocal users, a small aperture was cut from the lower segment to enable short duration reading. Due to the angle from which the photo was taken, the top of the lower prism segment appears closer to the pupil center than the 6mm below at which it was fitted.

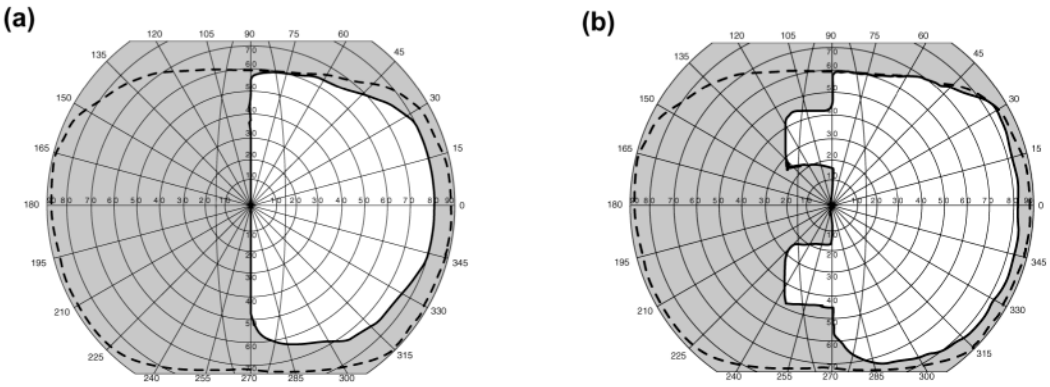

Figure 2.

Binocular visual field (Goldmann V4e) of a left hemianopic patient (a) without peripheral prisms and (b) with 40Δ peripheral prisms fitted at 11mm inter-prism separation showing about 20° horizontal field expansion in the upper and lower peripheral fields. Dashed line represents the extent of the normal binocular visual field.

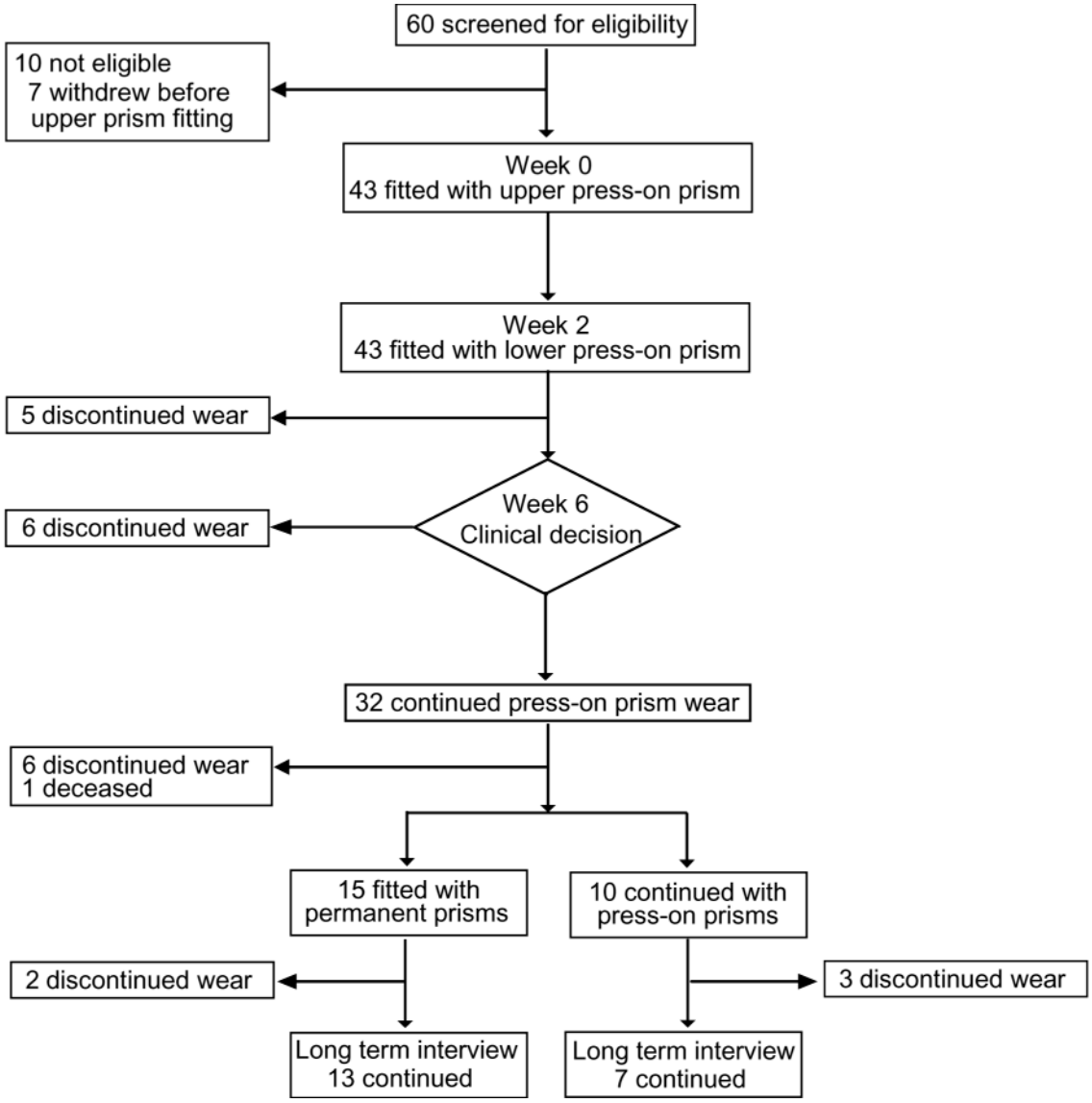

Figure 3.
Participant flow through the study.

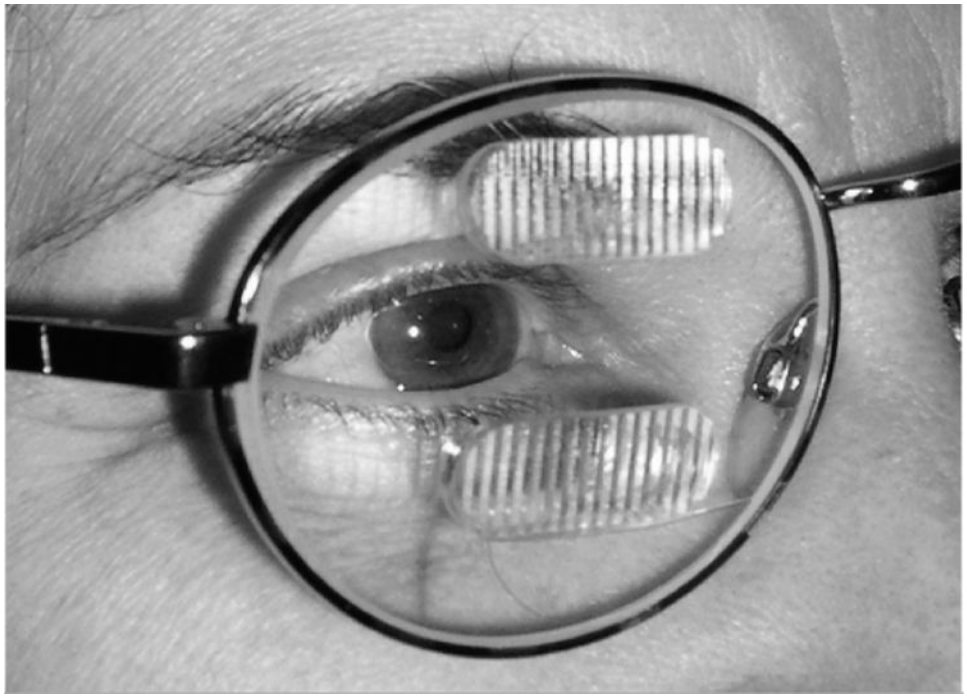

Figure 4.
Spectacles with permanent 40Δ Fresnel prism segments developed by Chadwick Optical, Inc., shown for a patient with right hemianopia. A small bifocal segment (outlined for the purposes of illustration) was placed below the lower prism segment for patients who needed a reading correction; the bifocal segment for the fellow eye was set at the same height.

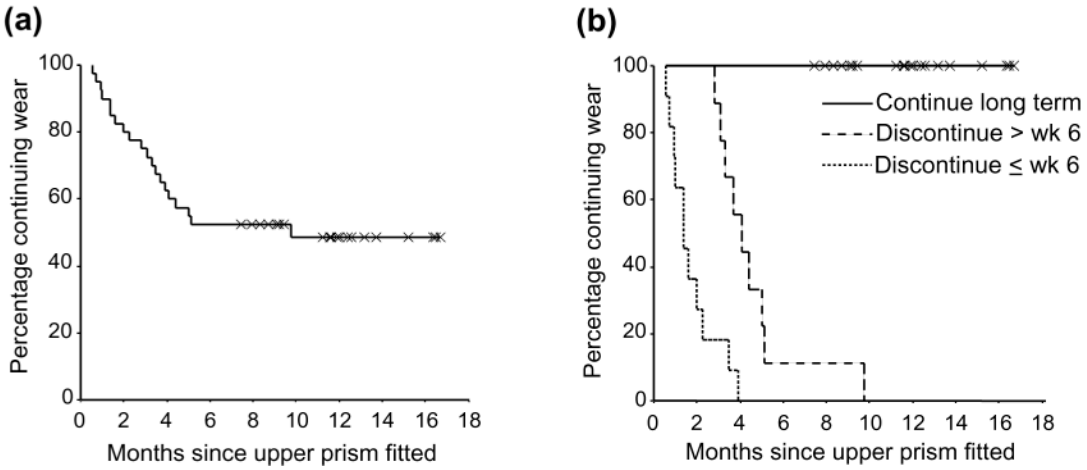

Figure 5.

Percentage of participants fitted with prisms continuing prism wear throughout the study. a) All participants fitted with prisms. b) Participants grouped by final status. X - time point at which each participant who continued long-term prism wear was last interviewed.

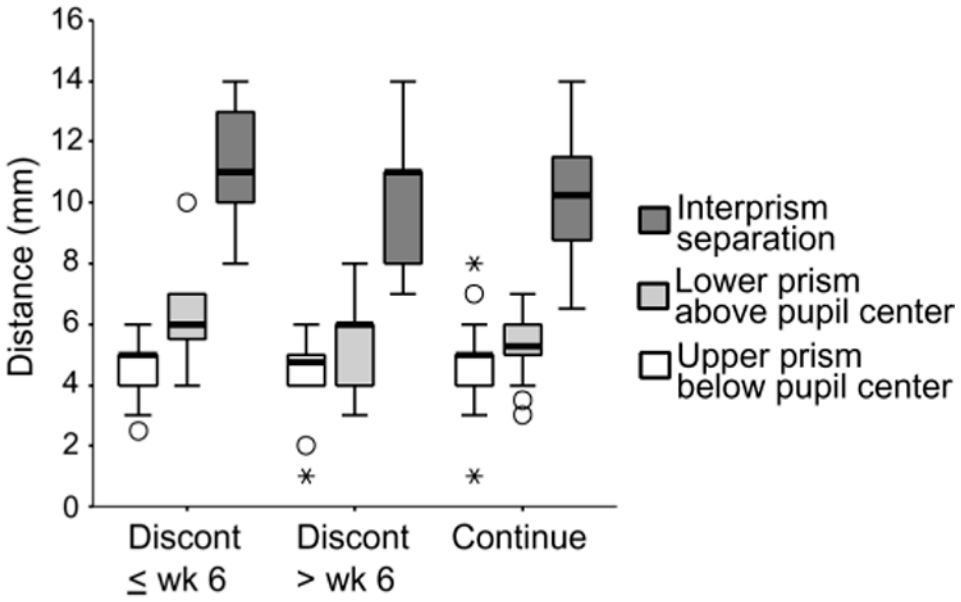

Figure 6.

Prism fitting positions at week 6; participants grouped by final status. There were no differences in prism fitting positions or inter-prism separations for participants who discontinued and continued prism wear ($p > 0.2$). The thick horizontal line within the box represents the median of the distribution. The vertical extent of the box represents the interquartile range (IQR). The vertical lines extending from the ends of the box represent 1.5x IQR. Open circles represent data points that are outliers (1.5x to 3x IQR) and asterisks represent extreme (far) outliers (> 3x IQR)

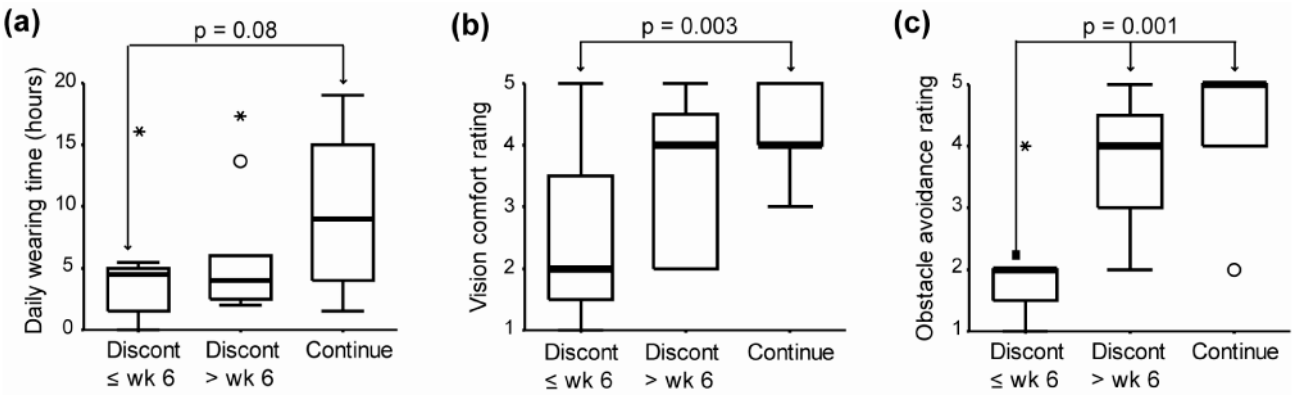

Figure 7.

Questionnaire responses at week 6; participants grouped by final status. (a) Reported daily wearing times. (b) Ratings of vision comfort. (c) Ratings of how helpful the prisms were for detecting obstacles in time to avoid them when walking. Participants who continued long-term prism wear reported longer daily wearing times, higher ratings of vision comfort and prism-helpfulness for obstacle avoidance than participants who discontinued wear at week 6. Rating scale: 1 not comfortable/helpful at all; 5 very comfortable/helpful.

Table 1

Summary of participant progression through the study for the main clinic groups: Group A (each practitioner fitted ≥ 8 participants) and Group B (each practitioner fitted ≤ 5 participants)

Clinic group	Number of clinics in the group	Number of practitioners in the group	Participant numbers				
			Enrolled	Withdrew before press-on™ prisms fitted	Fitted with press-on™ prisms	Subsequently fitted with permanent prisms[a]	Continued long-term wear
A	3	2	18	1	17[b]	8	13 (81%)[c]
B	15	13	32	6	26	7	7 (27%)

[a] 15 participants who continued to wear press-on™ prisms at week 6 were subsequently fitted with permanent prism glasses

[b] Includes the participant who continued wear at week 6 but died before the long-term interview

[c] Percent calculation excludes participant who died.

Table 2

Characteristics of participants fitted with prisms, grouped by final status[a]

	Discontinue at or after week 6 (n = 22)	Continue long term (n = 20)	Test for difference between groups
Age {years} Median (IQR)	63 (48 – 77)	63 (56 – 74)	z = −0.4, p = 0.7[b]
Male {%}	68	65	χ^2 = 0.1, df = 1, p = 0.8[c]
Right hemianopia {%}	59	40	χ^2 = 1.5, df = 1, p = 0.2[c]
Hemianopia caused by stroke {%}	68	85	χ^2 = 1.6, df = 1, p = 0.2[c]
Time since onset {months} Median (IQR)	19(8 – 48)	31 (7 – 60)	z = −0.2, p = 0.8[b]
Single vision glasses {%}	59	50	χ^2 = 1.5, df = 2, p = 0.5[c]

[a] Does not include the participant who died before the long-term interview

[b] Mann-Whitney test

[c] Pearson χ^2 (we could only expect to detect a difference of about 45% between proportions; $\alpha = 0.05$, $\beta = 0.20$).