Considerations for prescribing portable LED lights for low vision

Peter Borden, PhD[1]; Michele Klein[2]; Gregory Goodrich, PhD[3]

ABSTRACT

Considerations for prescribing portable LED reading lights are presented. Factors include stability, cost, illumination pattern and color. Decaying output can limit effectiveness. Pattern can reduce glare and variation with reading distance. Color may benefit certain individuals. Concepts of "cost of ownership" and "cost per lux" are introduced.

The aim of this paper is to provide information about portable LED lights, especially for those who require intense or controlled light due to low vision conditions such as macular degeneration. Small and light weight LEDs enable portable solutions that are easier to optimize for intensity, glare and illumination pattern, and are often more convenient than fixed lighting. Many portable LED solutions are available, though it is important to understand the performance and cost trade-offs. In particular, low-cost solutions suitable for people with normal vision may be insufficient for those who need intense light.

After a brief summary, this paper is divided into five sections: History, Light, Performance, Color, and "cost of ownership" (COO). These discuss the light battery-powered LED lights provide and how they perform over time. This includes discussions of the use of focus to improve illuminance, illuminance vs. reading distance, use of color, and long-term cost of various LED lights.

SUMMARY

Considerations for head-mounted, battery-powered reading lights are presented. Key factors include

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stability of output over time, cost of batteries, and use of secondary lensing to provide controlled illumination patterns and increase local illuminance. It is shown that special circuits can maintain nearly constant output over battery life, but lack of these circuits leads to a rapid drop in output. Light patterns can be used to reduce the effects of glare and variation in distance between the eye and page. Units with disposable batteries are initially less expensive, but the high cost of button cells can reverse this in a relatively short period. Concepts of "cost of ownership" and "cost per lux" are introduced.

HISTORY

Light Emitting Diodes (LEDs) have advanced rapidly in the last ten years, driven by applications for bright displays and solid-state room lighting. As a result, LEDs, which are highly reliable solid-state devices, are now produced in such great numbers that their cost has plummeted. These factors now make LEDs practical in many low vision applications. Their characteristics include:

- *Efficiency.* High efficiency LEDs convert most electrical input into light, with very little waste heat. They run relatively cool, and can be used with small and light battery-powered sources.
- *Small size and light weight.* With dimensions of only a few millimeters and weighing fractions of a gram, LEDs are readily adapted to portable and body-mounted applications.
- *Life.* LEDs last 20-50,000 hours; longer than the life of most products in which they are used.
- *Safety.* Running at 3-4 volts, they safely avoid the use of hazardous voltages and high temperatures (as in halogen lights) and are easily powered with batteries and solid-state electronics.
- *Ease of focusing.* LED light is much easier to focus than light from conventional sources such as halogen and fluorescent bulbs.
- *Color.* LEDs are available in a wide range of wavelengths over the full visible spectrum. They come in yellow, red, green, white, etc.

LED lights come in various versions, some of which are shown in figure 1. Some are head mounted, such as the VisionEdge™ or LED glasses. These provide the advantage of portability. Others are fixed, such as the desk lamp.

LEDs mounted on clip-on devices or integrated into eyeglass frames have been commercially available for a number of years. However, it is only in the past year that they have been the subject of low vision research. In 2012, Ramane and Shaligram[1] describe a multispectral reading system based upon an array of LEDs and suggest that it would be useful for individuals with low vision. Also, in 2012 Wolffsohn, et. al.[2] studied the reading performance of individuals with low vision and found that when using preferred color temperature individuals had better near acuity, critical print size, and maximum reading speed. These authors recommend that a range of colored LEDs be offered to visually impaired individuals when magnifiers are prescribed.

VisionEdge LED glasses Desk lamp

Figure 1: *Various LED lights*

LIGHT

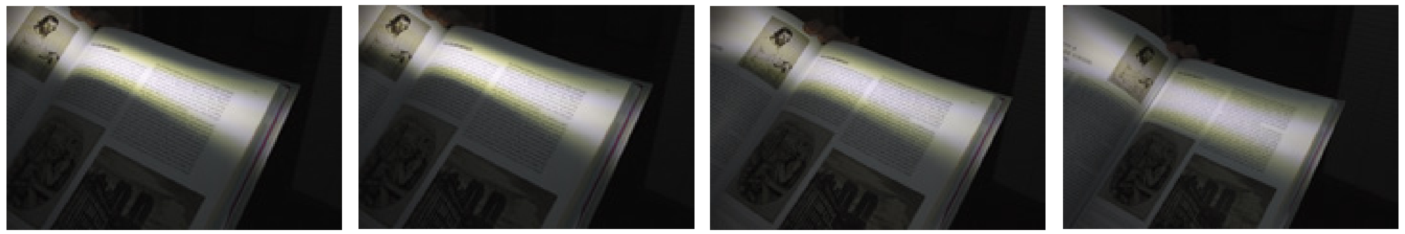
Intensity and convergence

Many LEDs have built-in lenses that form a spot about 4” diameter at 8” (20 cm) distance. Glasses with these LEDs on each side project two spots, as shown in figure 2. The light rapidly spreads as the distance between the glasses and the paper increases, reducing the intensity. The spots converge at about 35 cm, where the illuminance is already fairly low.

This is clearly seen in both the picture sequence in figure 2 and the graph in figure 3. For the glasses tested, the intensity dropped 10X between 20 cm – a fairly close distance – and 40 cm – a common reading distance. For reference, the 100 lux at 20 cm is 3-5 times less than office lighting; the <10 lux illuminance at 40 cm is probably too dim for effective reading by many people with low vision.

It is also possible to employ **secondary lenses**. These focus

Figure 2: *VisionEdge LED array:*



20 cm *27 cm* *34 cm* *40 cm*

Figure 2: *LED glasses:*

20 cm *27 cm* *34 cm* *40 cm*

Figure 2 (above): *Sequences at different distances. Each set of four is at the same photographic exposure to show relative change in illuminance with distance for each device. Exposure settings differ for the two sequences because of the large illuminance difference for the two devices. For the glasses, the left LED has new batteries; the batteries in the right LED are 8 hours old. Note how the spots are distinct at 20 cm and converge by 40 cm. The effect of illuminance versus distance is shown graphically in figure 3.*

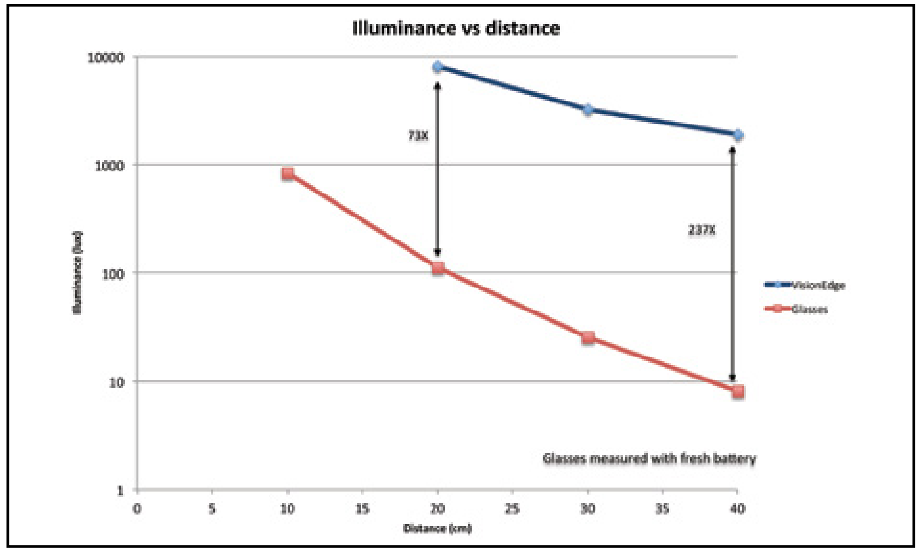


Figure 3: *Illuminance vs. distance for the reading glasses LED (red) and VisionEdge.*

the light to reduce the drop in intensity with distance, as seen in figures 2 and 3. The lensing can create controlled illumination patterns, such as the rectangular pattern shown in figure 2. This provides several benefits for low vision:

- Concentration of light to achieve greater illuminance
- Creation of a “typoscope” effect where the text being read is brightly lit, but the surrounding area is dim, thereby reducing glare

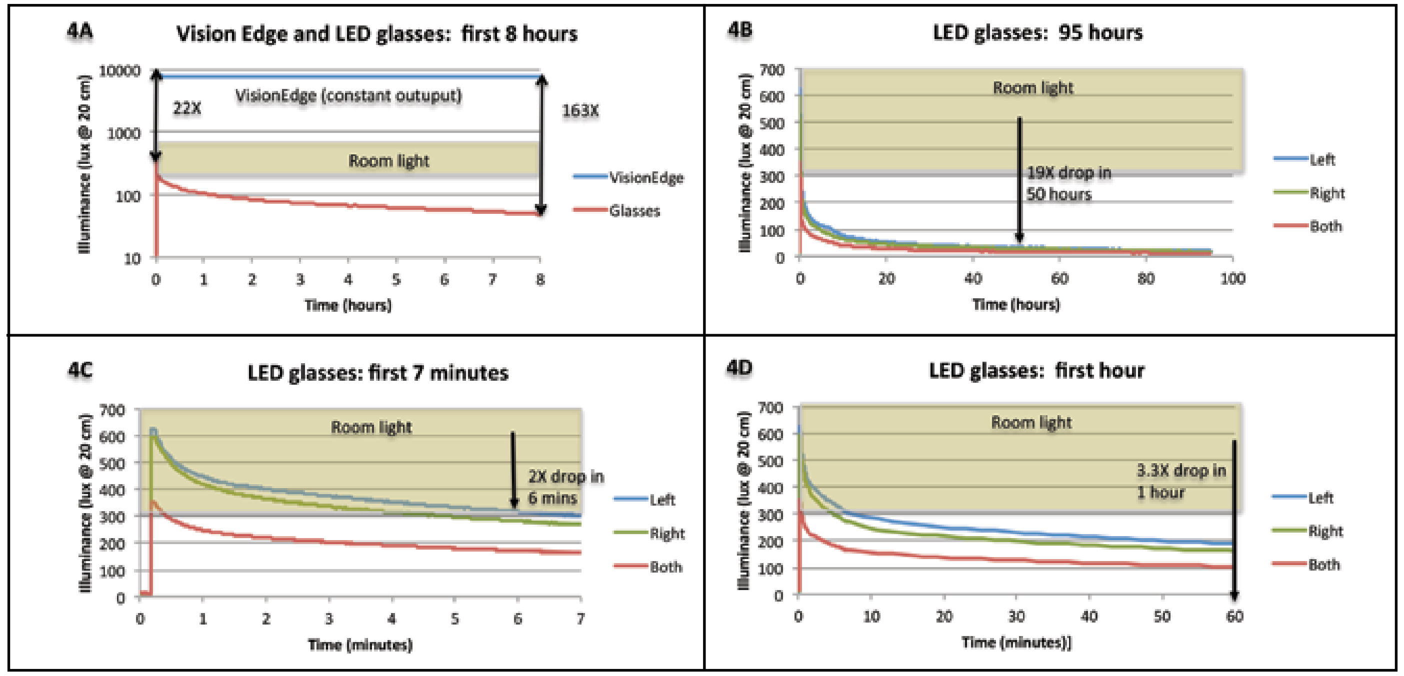


Figure 4: *Top left: Illuminance over time at 20 cm from the VisionEdge and LED glasses. Top right: LED glasses output over 95 hours. The illuminance from each LED is plotted separately as (L) and (R). “Both” illuminance is measured along the center line of the glasses. Bottom left: Glasses output in the first 7 minutes. Bottom right: glasses output in the first hour. Room light levels represent a brightly lit lab or exam room.*

- Use of the defined region as a “guide” to reduce visual confusion

PERFORMANCE

We compare two models designed specifically for near tasks (instead of head-mounted LEDs designed for hiking or general lighting). The more common and less expensive style uses two disposable button-cell batteries to directly power LEDs at the outside edges of a pair of reading glasses (center picture in figure 1). Another (the VisionEdge, left picture of figure 1) uses a rechargeable battery and stabilizing circuit to power an array of 12 LEDs mounted on glasses or visors.

Figure 4 shows how the illuminance from the two devices changes over a period of eight-hours, measured 20 cm (8 inches) from the source. The VisionEdge starts with 22X higher illuminance, due both to its greater number of LEDs and its built-in focusing lens. Its output is constant over the full 8-hour battery charge because it has a high-capacity battery and a built-in stabilizing circuit. The LED glasses’ output decays 7.2X in 8 hours. The VisionEdge shows 163X higher illuminance at 8 hours.

The reading glasses’ output drops 2X in the first 6 minutes and 4X in 1 hour and 50 minutes, due to the drain on its disposable batteries. This is easily seen in figure 2, showing spots from glasses with LEDs with fresh batteries at the left eye and 8-hour old batteries at the right. The glasses will appear considerably brighter in the store, when they are first turned on, but rapidly diminish in intensity with use. This also makes it hard to know exactly when to replace batteries.

LED glasses may be helpful to increase the lighting in dark areas to a useful level and for tasks of short duration, such as reading a restaurant menu. While the disposable batteries recover somewhat between uses, the ongoing decay in output is an issue for tasks of longer duration such as reading. Those with low vision often benefit from increasing the lighting from normal to a very high level; ordinary LED glasses cannot achieve this.

In one experiment on 152 patients in a low vision clinic, 56% patients could improve their reading performance by an average of 1 line on a logMAR reading card by using the VisionEdge LED array at a low setting. With the high setting 88% of patients could improve their performance an average of 2 lines[3].

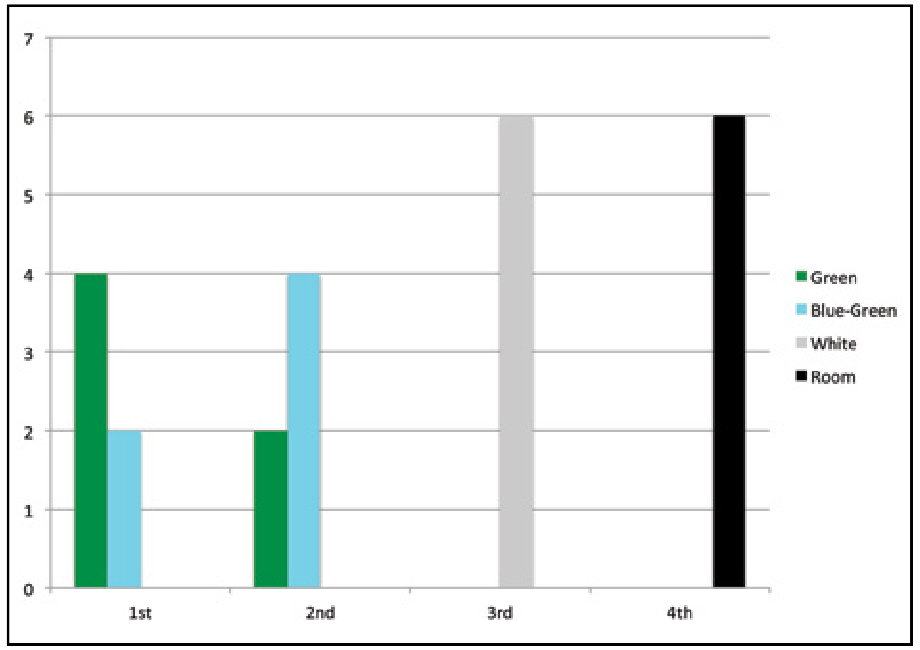


Figure 5: Preference ranking of AMD subjects admitted to a VA rehabilitation program, who were given a choice of green (527 nm), blue-green (503 nm), white (6500K color temperature) or exam room light. All AMD subjects preferred the green or blue-green colors.[4]

COLOR

LEDs are available in a wide range of colors (yellow, red, green, blue, white, etc.). A brightly colored source may improve reading performance and comfort over a white source for certain people. One study[4] (N = 6) found that AMD patients prefer high intensity green and bluish green light over white or room light (4), finding it more comfortable (see figure 5). Subjects (N = 5) with other retinal diseases were mixed in their color preference, however all preferred the white, green, or blue over traditional room lighting. While such results are preliminary, they suggest that it may be possible to use colored light from LEDs to reduce strain in long-duration tasks such as reading.

Figure 6 shows typical spectral curves for white (6,000ºK), blue and green LEDs, along with the CIE (Commission Internationale de l'Eclairage, or the International Commission on Illumination) photopic (bright light) response curve (dashed lines). Green LEDs appear brighter due to the overlap between the green (527 nm) LED and CIE curves. The white LED is a blue LED coated with a phosphor, and presents a blue component not seen with the green LED.

LED light and filters are not the same

The use of colored LED light is different from the use of colored filters. Filters remove light and therefore reduce the illuminance. For example, a green filter in front of a white light removes all wavelengths except for a narrow band near the green. This greatly diminishes the apparent source brightness. Conversely, all of the light from a colored LED is available for lighting. The full emitted power of a green LED is in the green. This makes it easier to obtain high illuminance with colored LEDs than with filtered white sources.

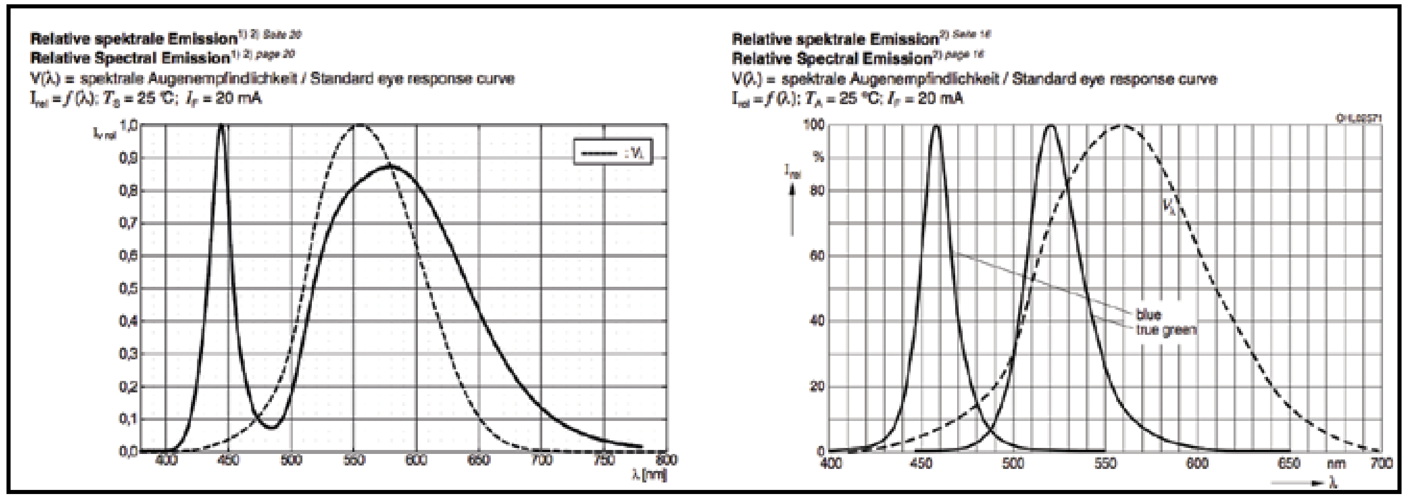


Figure 6: Relative output vs. wavelength for a white LED with 6,000ºK color temperature (left) and blue and true green LEDs (right). The CIE photopic response is shown as a dashed line.

COST OF OWNERSHIP

An LED light array with features such as an output control circuit, secondary optics, and rechargeable battery will initially cost more than non-prescription reading glasses with built-in LEDs using disposable button cells. It is therefore worth comparing the cost and performance of these devices to determine the relative cost of ownership. An additional disadvantage of battery powered devices is that the small batteries and black on black battery housing can be difficult to replace for low vision individuals and/or those with limited manual dexterity.

For people with normal vision who need extra light for short periods, the LED reading glasses can provide a good solution. However, for reading over longer periods, at greater distances (30-40 cm), or for those who need intensely bright light or less glare to see well, the focused, constant output source of the VisionEdge lighting can provide a substantial advantage.

A useful comparison for low vision is the "metric dollars" per lux. This figure of merit measures the cost of achieving a certain level of brightness on the text being read. Table 1 lists dollar cost per peak illumination measured in lux ($/Peak lux) for different sources.

***Table 1:** $/Lux comparison*

Source	Peak lux @ 20 cm	Initial Cost	$/Peak lux
VisionEdge	7,800	$150.00	$0.02
LED Glasses	200	13.50-39.95	$0.07 - $0.20
Halogen lamp†	850	50.00	$0.06

† Halogen lamps are normally placed behind or to the side of a user's head where the working distance would be longer – 40 to 60 cm – and the illuminance will be correspondingly lower.

The VisionEdge and LED glasses entries are based on the measurements described above. The halogen lamp is based on a desk lamp with a 50-watt halogen bulb.

Another useful metric is Cost of Ownership (COO), or the total cost over a period of time, including the initial purchase price and the cost of replacement batteries.

The VisionEdge has a higher initial cost, but requires no further investment because it uses rechargeable batteries.

Reading glasses with two built-in LEDs have lower initial cost, but require repeated changing of four batteries. The COO model shown in figure 7 assumes batteries are changed when the LED output drops to 25% of its starting value, based on test data for two models of glasses. The higher-priced LED glasses use larger, more expensive disposable batteries. These glasses have better initial brightness than the drugstore version, but show more rapid decay in output because of the heavier load on the battery. Batteries are available in a range of prices – the prices considered here are retail drug store and from Amazon.com. Initial cost includes the base price, shipping and taxes.

After 9-46 hours (one to five weeks, depending on frequency and duration of reading use and source of replacement batteries), the VisionEdge becomes less expensive than the high-end LED glasses, and 64-282 hours for the low-end glasses.

CONCLUSION:

State-of-the-art LEDs have advanced to the point that they are practical and affordable in many applications, including portable arrays that slip-on glasses or a visor, or as add ons built into glasses. In prescribing an LED-based product, it is useful to consider their performance, light output, and total cost of ownership.

People will differ in their response to added light. For those with normal or near-normal vision who may need increased light in dim areas for short-duration tasks, (e.g., in a restaurant), ordinary LED glasses may be a good solution. For those who benefit from moderately increased task lighting, VisionEdge offers a compact and portable solution. For those who need a very high light level to read, VisionEdge offers the most effective solution.

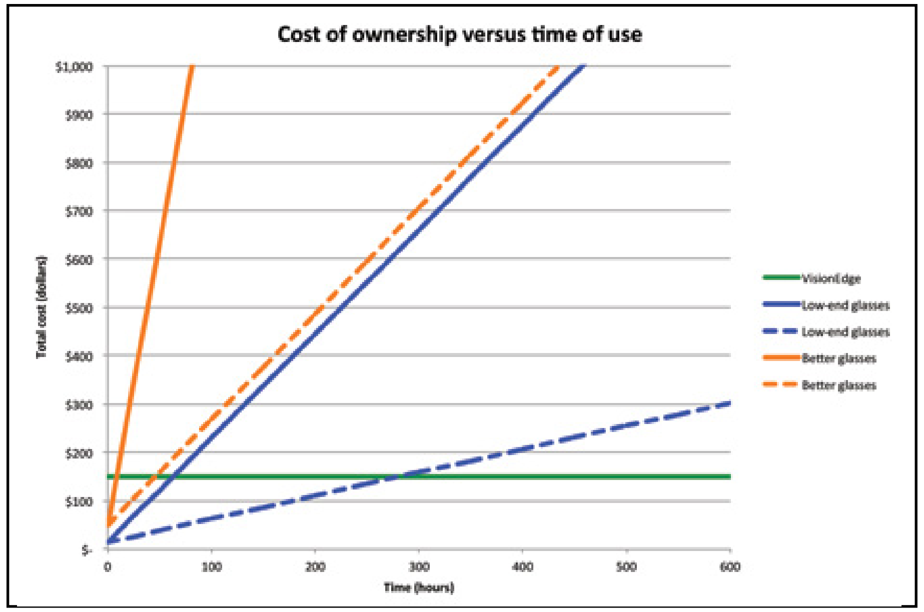


Figure 7: *Cost of ownership for the VisionEdge and two models of glasses with built-in LEDs and button cells. The VisionEdge has a rechargeable battery, so its cost is constant in time. The glasses need battery replacement when the LED output drops to ¼ of its starting value. Battery prices from drug stores (high, solid line) and Amazon.com (low, dotted line) are shown. The better glasses have larger batteries than the low end. This increases light output and battery cost.*

From [1,2]Jasper Ridge, Inc., San Mateo, California; and the [3]Western Blind Rehabilitation Center, Veterans Administration Palo Alto Health Care System, Palo Alto, California.

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Disclosure: P Borden, employee of Jasper Ridge, Inc., a manufacturer of lighting for people with low vision; M Klein, employee of Jasper Ridge, Inc., a manufacturer of lighting for people with low vision; G Goodrich, None.

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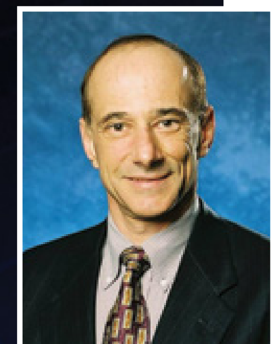
References:

1. Ramane DV, Shaligram AD. Design of multispectral reading light for individuals with low vision. *J Biomed Optics* 2012; 17(1).
2. Wolffsohn JS, Palmer E, Rubenstein M, Eperjesi F. Effect of light-emitting diode colour temperature on magnifier reading performance of the visually impaired. *Clin Exp Optom* 2012; 95(5), 510-14.
3. Fletcher DC, Schuchard R, Renninger L. Luminance in acuity and reading performance of low vision patients. *Envision Conference 2012 Sept 12-15, 2012; St Louis, MO.*
4. Goodrich GL & Borden, P. Can Colored LEDs Advance Low Vision Practice and Research? *Envision Conference 2012 Sept 12-15, 2012; St Louis, MO.*



Dr. Peter Borden, Jasper Ridge Inc., has invented and brought to market multiple products based on optical innovations. After his PhD, he led a group at Varian developing concentrator photo-voltaics, pioneering many optical approaches used today. He then co-founded two start-ups using novel laser optical systems to provide process monitoring and characterization equipment for the IC industry. He also designed task lighting as an advisor to Knoll International. He is a technical advisor for several companies and serves on the advisory board of Santa Clara University where he has taught graduate classes and seminars. Dr. Borden holds PhD and MS degrees in Applied Physics from Stanford and BS degrees in Physics and EE from MIT, where he graduated Phi Beta Kappa. He is the author of over 80 publications and 68 patents.

Evaluation of a recently implemented clinical eccentric viewing training program

Josée Duquette, MSc[1]; Danièle Jean, OD[2]; Jocelyn Loiselle, DESS[3], Marie-Chantal Wanet-Defalque, PhD[4]

INTRODUCTION AND OBJECTIVES

A structured and standardized eccentric viewing (EV) training program has been developed and implemented at the Institut Nazareth and Louis-Braille (INLB; Québec, Canada). It is provided in two formats: a basic version for instrumental activities of daily living (IADL), followed by an optional format for advanced reading.[1,2] Over a period of two years, 28 low vision rehabilitation specialists of INLB were trained to administer the program.

The preferred retinal locus used for EV is estimated with the faceclock technique described by Wright and Watson.[3] Basic EV training is offered with in-house material designed to improve oculomotor function, eye-hand coordination, and perceptual-cognitive strategies. Clients are taught to move their eye instead of their head. They are provided structured paper-pencil material for practice between training sessions. Various ways to integrate EV and to practice oculomotor and eye-hand coordination skills within daily activities are discussed with the clients and strongly encouraged. Instrumental reading in eccentric fixation is also taught, with material of graduated level of difficulty. Training with a magnification device is introduced at this stage. After completion of the basic program, advanced reading training in eccentric fixation can be provided, depending on the needs and objectives of the client. Structured practice material is provided[4] and supplemented with personal materials.

The objectives of this study are to: 1) document the characteristics of EV program and its clientele; 2) obtain a first appraisal of its impact on functional independence and reading skills; 3) ascertain the clients' level of satisfaction.

METHODS

Retrospective data were collected from the clinical visual rehabilitation charts of 154 persons referred for eccentric viewing at INLB.

RESULTS

From the 154 charts, 16 were dismissed due to either too much data missing (n=9), or because EV training was finally not undergone as it was determined not appropriate for these participants (n=7). Information of 138 charts was thus analyzed.

Client characteristics: Two-thirds (n=89) of the subjects were female; one-third (n=49) were male. The average age of participants was 81 (SD=10; Range=30-99). Primary visual diagnosis was age-related macular degeneration in 84% (n=116) of the cases. Almost half of the subjects (n=52) had an additional disabling visual condition such as cataracts (n=22), glaucoma (n=20) or others (n=10).

Near acuity, measured on average 102 days (SD=75) before the first session of eccentric viewing, was available for 128 subjects. For almost half of them (n=62), results corresponded to a severe vision impairment (VI) in reference to the ICD-9-CM (US notation of 20/200 to 20/400).[5] As for the other subjects, 2 had near-normal acuity (20/32-20/63), 33 had a moderate VI (20/80-20/160), 26 had a profound VI (20/500-20/1000) and 5 were nearly blind. Regarding the distance visual acuity, vision impairment was mostly moderate (n=66) or severe (n=61), and profound in eight cases.

Program characteristics and impact: Amongst the 138 subjects, 116 completed the basic program; 19 started the basic program but stopped before completion, mostly for health reasons; and three subjects' data was unavailable. Basic training required three to five sessions of 60-90 minutes for 76% of the cases. EV training was then stopped for 63 individuals (54%), mostly because their needs and goals were then satisfied. Reading skills were improved for many of them. At least nine subjects could already resume advanced reading activities (books, newspaper, etc.). Improved participation in IADL ($n \geq 55$) and leisure activities ($n \geq 24$) was frequently noticed (from 87 available comments coming from therapist notes). After the basic program completion, 53 subjects proceeded with the advanced training in eccentric fixation for reading. The degree of severity of the VI was not correlated with this decision (Figure 1). Advanced training required two to four additional sessions in 79% of the cases.

Pre- and post-reading skills were assessed with the *Évaluation des capacities de lecture en déficience visuelle* (ÉCLec-DV) (the Assessment of reading skills in visual impairment). This assessment tool, developed by the Institut Nazareth et Louis-Braille, provides a measure of reading performance of the person with a visual disability, with correction and their usual aids.[6] Pre-reading skills were measured after the basic program completion; the post-test was done at the end of the advanced training program (n=28). Results are shown in Table 1. Reading speed of a continuous text of 152 or 157 words improved in 46% (n=13) of the cases (average increase of 22 words per minute; p=0.025). Comprehension improved for half the subjects (n=15) (p < 0.001), even if a pre-measurement ceiling effect was found in nine cases. Navigation strategies used to find information on a page became more effective for 39% of subjects (n=11) (p=0.009).

Client satisfaction: Of 34 clients who answered a satisfaction questionnaire, 91% (n=31) were satisfied or very satisfied with the EV interventions (Figure 2). Of them, 15 were from the basic-training profile and 19 from the advanced one. Six subjects stated they could have learned to use their EV without any assistance. However, they all spontaneously commented that training helped to improve their EV. Clinicians noticed an improvement in functional independence, reading and writing skills, leisure activities, mood and self-confidence.

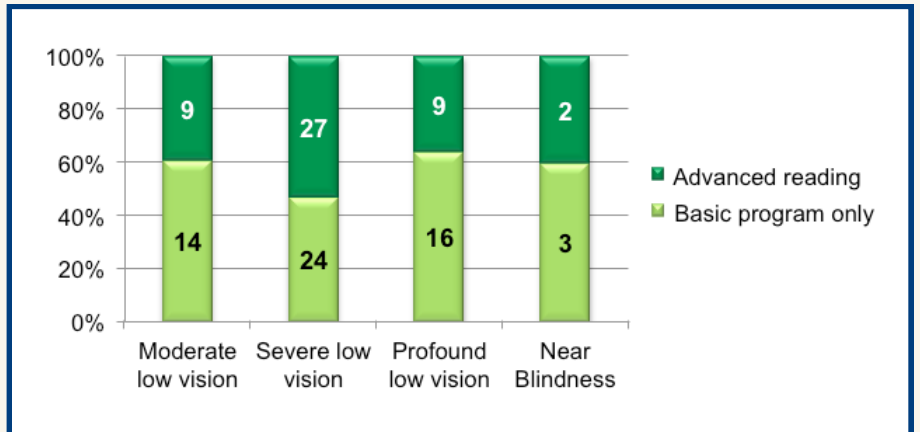


Figure 1. Distribution of subjects in basic and advanced program, by range of visual acuity

LIMITS

Data were collected from clinical charts; consequently, information was somehow heterogeneous and often difficult to analyse. Moreover, the development and implementation of the EV program required numerous new clinical procedures. Clinicians did not necessarily know, understand or master them well at the time of the data collection. This also contributed to the data heterogeneity and incompleteness in some cases.

Comparison of the reading skills was made post-basic versus post-advanced training program. Improvement might have been greater if the first measurements were taken pre- instead of post-basic program. Metric properties of the reading assessment tool are also unknown.

As the data was collected retrospectively from clients' charts rather than in the context of a controlled experiment, this study is open to bias.

Despite its limits, this study provides important information about the relevance and usefulness of designing an EV training program that can be adapted to the needs and capacities of low vision rehabilitation clients.

CONCLUSION

Clients who can benefit from EV training are not only those with severe vision impairment, but also those with a moderate or profound visual impairment.

Advanced reading training in eccentric fixation might not be mandatory for everyone. In many cases, EV training geared towards IADLs appears sufficient in regards to the person's needs and objectives.

The positive results of this study indicate that this new clinical eccentric viewing training program is sufficiently beneficial to justify its continuation and development for the longer term.

FUTURE RESEARCH DIRECTIONS

Further research is required to evaluate more rigorously and systematically the efficacy of this EV training program. Specifically, an experimental protocol that includes an optical coherence tomography or scanning laser ophthalmoscope, as well as functional measures of daily activities, would be desirable.

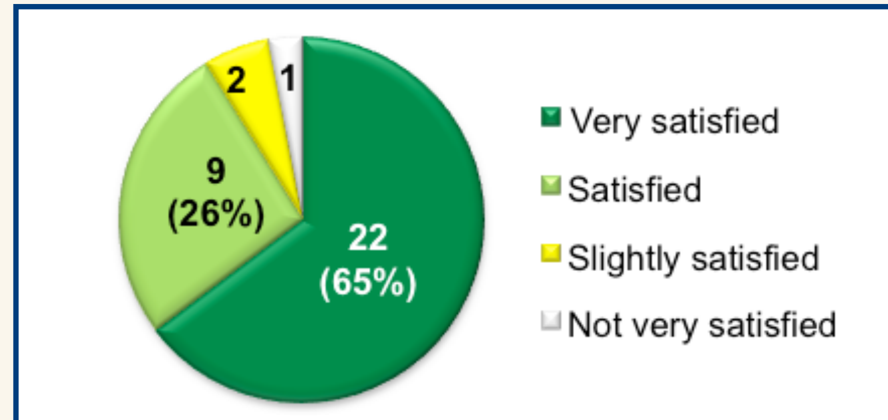


Figure 2. Service users global satisfaction

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Josée Duquette works in the Research Center of the Institut Nazareth et Louis-Braille (INLB), the province of Quebec's largest visual rehabilitation center. Within a research-clinic collaborative project, she coordinated the development and implementation of the eccentric viewing program at INLB.

References:

1. Duquette J, Lapointe N, Loiselle J, Senécal M, Wanet-Defalque M. *Guide des pratiques cliniques. Évaluation et entraînement à la vision excentrique*. Longueuil: Institut Nazareth et Louis-Braille; 2009.
2. Duquette J, Lapointe N, Loiselle J, Senécal M, Wanet-Defalque M. Développement d'un guide des pratiques cliniques en évaluation et en entraînement à la vision excentrique. Presented at: 11th Scientific Symposium on Visual Disability and Rehabilitation; February 10, 2009; Montreal, Quebec.
3. Wright V, Watson GR. *Learn to Use Your Vision for Reading Workbook* (LUVReading Series). Bear Consultants; 1995.
4. Overbury O, Conrod B. *McGill Low Vision Manual*. Betacom Group; 1997.
5. Colenbrander A. Measuring vision and vision loss. In: Tasman W, Jaeger EA, eds. *Duane's Ophthalmology*. 15th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2009:chap 51.
6. Duquette J, Lapointe N, Loiselle J, Senécal M, Wanet-Defalque M. *Évaluation des capacités de lecture en déficience visuelle (ÉCLec-DV)*. 2010 rev ed. Longueuil: Institut Nazareth et Louis-Braille; 2009.

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Contact Lenses From Birth: An Adjunct of Vision Rehabilitation

Presented By: William Park, OD, FAAO

Instruction Level: Introductory

Course Description: Contact lenses are often ignored as a component of providing low vision rehabilitation for the visually impaired. This course emphasizes contact lenses should be the first choice for best corrected visual acuity; with high refractive error and/or nystagmus, aniridia, albinism, cone dystrophies and ocular trauma. Age should not be a factor in inclusion or exclusion for fitting a pediatric patient.

CE Units: ACVREP; 1; AOTA: 0.1; COPE: 1

Understanding the PRL

Presented By: Shirin Hassan, BAppsSc(Optom), PhD

Instruction Level: Introductory

Course Description: Patients with macular disease and central scotomas must use a peripheral, preferred retinal locus (PRL) in place of their damaged retina. This presentation will define what the PRL is and detail the findings of microperimeter studies to explain the development of the PRL including where patients place their PRL, the use of multiple PRLs and the relationship between the PRL and stability of fixation. This presentation will also provide information to clinicians on how to assess and measure the PRL and fixation stability in patients with central vision loss and how poor fixation stability and poor use of the PRL impacts on activities of daily living.

CE Units: ACVREP: 1; AOTA: 0.1; COPE: 1

Using Reading Tests to Evaluate Macular Function in Vision Rehabilitation

Presented By: Donald Fletcher, MD

Instruction Level: Introductory

Course Description: Reading performance, utilizing available reading tests, can be a valuable tool in clinical low vision rehabilitation. This course reviews the tests available, methods of administration, and correct interpretation of findings.

CE Units: ACVREP: 1; AOTA: 0.1; COPE: 1

Vision Rehabilitation of Patients Affected by a Neurological Etiology

Presented By: Karen Kendrick, OTR/L, CLVT; William Park, OD, FAAO

Instruction Level: Intermediate

Course Description:

Part I: Interdisciplinary Neurological Rehabilitation, Hospital to Practice-Based: The Crux of the Matter | William Park, OD, FAAO

This presentation focuses on the complexities and efficacy of providing neuro-optometric rehabilitation in a clinical setting, utilizing an interdisciplinary team approach. Case studies of patients presenting with a multitude of complex systemic and/or neurological manifestations related to traumatic brain injury, cerebral vascular accidents and neoplasms will be presented. Diagnosis and the implementation of neuro-optometric rehabilitation techniques involving primary care, neurology, neuro-ophthalmology, occupational therapy, physical therapy, speech language pathology and behavioral health will be emphasized.

Part II. Occupational Therapy Treatment and Management of the Neurological Patient | Karen Kendrick, OTR/L, CLVT

This part of the program will present occupational therapy neurological rehabilitation assessment, treatment and management of vision loss in the neurological patient. Therapeutic interventions are discussed to improve function, reduce limitations and improve the overall well-being of patients who have experienced disease, traumatic injury or disorders of the nervous system. The goal of occupational therapy neurological rehabilitation interventions are to help the patient return to the highest level of functional vision and independence in daily activities.

CE Units: ACVREP: 2; AOTA: 0.2; COPE: 2

Investigating eye movements during tasks of daily living

Aaron Johnson, PhD[1]

PUPOSE

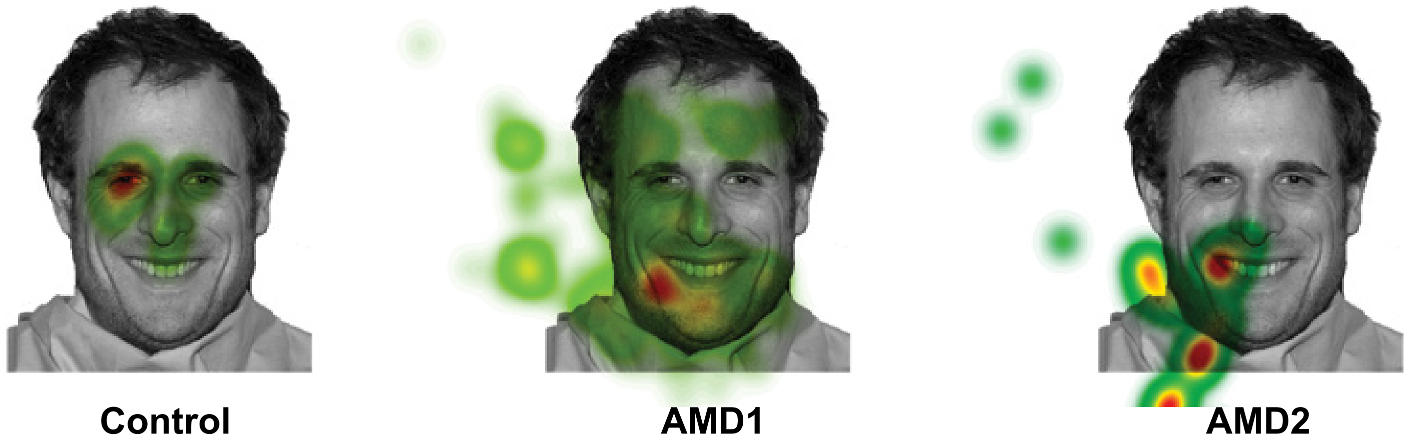
Age-related macular degeneration (AMD) is the leading cause of legal blindness among people over 50 in North America. AMD involves the degeneration of the macula, which is the central part of the retina responsible for high acuity vision. As the disease progresses, those with AMD are forced to rely on peripheral vision, which remains functional. Because of the loss of central vision, patients report difficulties in performing daily tasks such as reading, shopping, preparing meals, recognizing faces and navigating around their environment. Apart from reading, relatively few studies have investigated the impact of AMD on these daily tasks. The goal of the current research was to develop a systematic characterization of the limits of peripheral vision in a variety of daily visual tasks in patients with AMD, in comparison to an age-matched sample.

METHODS

We used 10 individuals that had been diagnosed with AMD, and 10 age-matched controls that were screened for any visual impairment. Participants were asked to complete two tasks of daily living. The first task was face emotion recognition. Participants were presented with a face that expressed an emotion (either happy or angry) or no emotion (neutral). Participants were asked to indicate if the presented face expressed an emotion. If they perceived an emotion, they were asked to classify the emotion as angry or happy. Stimulus size was also manipulated to see if face/emotion recognition changed with size. For the second task, participants were presented with a 3D shape-from-texture object that contained three features (hill/plain/valley) in three locations on the texture. They were asked to identify each feature in each location. In both tasks, performance was calculated, and eye movements were recorded using a video-based desktop eye-tracker (Mirametrix S2, TandemLaunch Technologies, Quebec).

RESULTS

For the face emotion perception task, age-matched controls perform the task at near-perfect performance (~97%) at all image sizes. Further, they accurately fixate the eyes and mouth to gage the emotion. Individuals with AMD show a lower performance in the



Heat maps of fixated regions on a face by an individual with normal vision (control) and a client with age-related macular degeneration. The color "heat map" represents how often the person looked at a region, with green being rarely, and red being frequently. As is evident, eye movements are more erratic in a clients with AMD compared to individual with normal vision. The difference between AMD1 and AMD2 is that AMD1 had no defined preferred retinal loci, whereas AMD2 did.

task, with best performance (~70% accuracy) seen at the largest image size (i.e., life-size), and worst performance (~45%) at the smallest image size (which equates to the size of a face in a magazine). Amongst the worst performers, eye movements were highly erratic. However, those better at the task show increased fixation stability (measured using bivariate contour eclipse). Heat-map analysis indicates the use of a preferred retinal location to fixate the eyes and mouth during the task. Similar results were found for the shape-from-texture task; with controls showing high-accuracy and stable eye movements, and AMD participants showing variable accuracy that was dependent on their fixation stability.

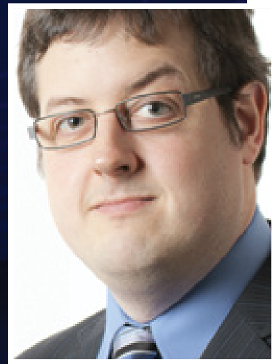
CONCLUSIONS

The findings of the above studies provide data and methodological expertise, allowing a clearer picture of the information processing abilities of peripheral vision, and the extent to which this capacity is shaped by the demands placed upon it. Such knowledge is obviously important in guiding the development of new rehabilitative strategies to overcome the difficulties caused by AMD.

From the [1]Department of Psychology, Concordia University, Montreal, Canada.

Support: None
Disclosure: None
Corresponding Author: Aaron Johnson, Concordia University, Department of Psychology, 7141 Sherbrooke St W, SP-245.05, Montreal, (QC) H4B 1R6; aaron.johnson@concordia.ca.
Acknowlegements: Montreal-Association for the Blind – Mackay Rehabilitation Centre for assistance with access to AMD individuals, and testing facilities.

Dr. Johnson presented this abstract in the Envision Conference 2012 Research Panel: What Does Eye-Tracking Research Teach Us about the Use of Residual Vision? Moderator: Olga Overbury, PhD; Envision Conference 2012 Sept. 12-15; St. Louis, MO.



Aaron Johnson, PhD, is an Assistant Professor in the Department of Psychology at Concordia University, Montreal, Quebec, Canada. He is one of the co-principal investigators of the Concordia Vision Laboratory in the Psychology Department, and is a member of the Center for Studies in Learning and Performance. He received his PhD from the Department of Electrical Engineering at the University of Glasgow in 2002, and then worked as a post-doctoral fellow in the Department of Ophthalmology at McGill University until 2006.

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Development of a Standing Order for Low Vision Rehabilitation and Electronic Health Records

Shirley L. Anderson, OTR/L, SCLV, CLVT[1]

"I was told that there was nothing else that could be done for me. Why didn't anyone tell me about low vision rehabilitation?"

JUSTIFICATION FOR LOW VISION REHABILITATION SERVICES

How many times have we heard this from our patients? In a recently published article in Investigative Ophthalmology & Visual Science (IOVS)[1], the authors also recognized the need for actions to better ensure that low vision patients be referred to receive low vision rehabilitation services. In this study, the authors recruited 345 older patients (93 with AMD, 57 with Fuchs', 98 with Glaucoma, and 97 control patients with normal visual acuity and visual fields.) This study took place between September 2009 and July 2012. Testing criteria included visual acuity, contrast sensitivity and visual field testing. Of these patients, 50% with eye disease reported decreased activity levels and fear of falling compared to 16% from the control group. Ellen Freeman, one of the contributors to this study, stated, "If we could develop a brief, effective intervention focused on select activities, I would like to see it offered in the clinical setting. Then, we could encourage people to see a low vision rehabilitation specialist."[1]

This recent study supports what all of those involved in low vision rehabilitation know instinctively through our intervention – a patient's activities of daily living, including safety and mobility as this relates to the fear of falling, are often adversely affected due to their visual impairment and these areas of need can be addressed through low vision rehabilitation services. Conclusions from this recent study help justify the need for low vision services.

THE ROLE OF LOW VISION REHABILITATION SERVICES IN THE CONTINUUM OF EYE CARE

"The loss of one's sight should not mean the loss of one's vision." *(Author unknown)*

The goal and role of the medical model low vision rehabilitation team (ophthalmologist, optometrist, occupational therapist) is to help identify and address the functional needs of the patient, in order to achieve the goals of the patient.[2]

Steps to the goal and role of low vision rehabilitation services requires "looking beyond" the patient's diagnoses…and considering how these diagnoses affect the patient's function and quality of life.

The essential components for successful intervention for the continuum of eye care for the patient with low vision challenges should include:

- The patient presents with specific needs and goals.
- The patient's environment will influence intervention strategies.
- The ophthalmologist's diagnosis and treatment interventions are critical for the patient's "sight."
- The low vision rehab team is important for the patient's "vision."

The continuum of quality eye care in the medical model includes:

- Patient or family identify decreased vision/function
- Ophthalmologist diagnoses eye condition
- Ophthalmologist provides medical and surgical intervention and refers to low vision rehabilitation
- Low vision optometrist evaluates function, prescribes devices and refers to occupational therapy
- Low vision occupational therapist provides rehabilitation that addresses functional needs and goals

THE RATIONALE FOR A STANDING ORDER FOR LOW VISION REHABILITATION

When a person has a shoulder injury or a hip replacement, it is common practice to have a standing order for therapy to help the patient regain strength, mobility and function. Why should it be any different for a patient with an eye disease, injury or condition that affects a person's functional abilities?

"The standing order is a written document containing rules, policies, regulations, and orders for the conduct of patient care in various stipulated clinical situations. The standing order is usually formatted collectively by the professional members of a department in a hospital or other health care facility. Standing orders usually name the condition and prescribe the action to be taken in caring for the patient."[3]

Low vision rehabilitation services are an essential, but often overlooked, component in the continuum of eye care. The process to identify, develop and implement a standing order policy can better address the needs of the low vision patients in a more timely fashion.

THE STANDING ORDER CRITERIA AND PROCESS

Initiating and implementing the Standing Order referral process can better address the following objectives:

- To ensure that low vision rehabilitation services are addressed as an integral component in the continuum of care.
- To enhance independent living and self-sufficiency with dignity for people who have permanent visual impairments through maximized use of their remaining vision.

"Vision Impairment" refers to significant vision loss from disease, injury, of degenerative condition that cannot be corrected by conventional means such as medication or surgery. The impairment must manifest by one or more of the conditions listed in table 1:[4]

The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnostic codes included in table 2 will be used to support medical necessity:[4]

The level of vision impairment will also take into consideration:

- Contrast sensitivity
- Distortion of shape or size
- Glare disability, night vision or other illumination problems
- Reduction of overall visual function due to eye rivalry

Justification for low vision services also addressed a patient's decreased level of function (ADLs/IADLs), including but not limited to:

- Safety
- Reading
- Orientation and mobility
- Computer access
- Homemaking tasks
- Vocational duties
- Avocational activities and quality of life

The purpose for standing orders for low vision rehabilitation services is to identify and address low vision challenges in the earlier stages of the diagnosed ophthalmologic condition affecting the patient's function and quality of life. After the explanation and justification process has been completed it is time to take the necessary steps to set policy in your organization.

Moderate Visual Impairment	Best corrected visual acuity is less than 20/60 in better eye (including range 20/70 to 20/160).
Severe Visual Impairment (Legal Blindness)	Best corrected visual acuity is less than 20/160 (including 20/200 to 20/400) or visual field diameter is 20 degrees or less in better eye.
Profound Visual Impairment (Moderate Blindness)	Best corrected vision is less than 20/200 or visual field is 10 degrees or less.
Near-Total Visual Impairment (Severe Blindness)	Best corrected visual acuity is less than 20/1000 or visual field is 5 degrees or less.
Total Visual Impairment (Total Blindness)	No light perception.

Table 1 **CMS Level of Vision Impairment**

PROCESS FOR DEVELOPING A STANDING ORDER FOR LOW VISION REHABILITATION SERVICES

Under the standing order, any licensed medical professional or ophthalmic personnel may initiate a referral once the criteria have been determined.

Potential personnel that qualify to initiate order include:

- Certified Licensed Professionals
- Licensed Independent Professionals
- Ophthalmic Medical Personnel

PROCEDURE FOR DEVELOPMENT OF STANDING ORDER FOR LOW VISION SERVICES

The medical personnel will serve as a catalyst to promote more timely referrals for low vision rehabilitation services. The standing order policy empowers medical professionals to impact the patient's access to low vision rehabilitation services.

At this point in the process, it is time to prepare and seek approval of standing order policy. (See the original Template for Low Vision Rehab Consult for the Storm Eye Institute draft that was presented to the hospital medical executive committee for consideration, page 19). Identify and educate the licensed medical personnel who will be capable and/or responsible for initiating the standing order referral.

Once the Standing Order Policy and Procedure has been approved, many professionals have the power and capability to refer qualified low vision patients for low vision rehabilitation services.

Once this policy has been approved, the method to document the standing order has to be established. It is important that this process be accessible to all potential referring professionals.

ELECTRONIC HEALTH RECORDS: "MEANINGFUL USE"

EMR (electronic medical records) is synonymous with EHR (electronic health records) incentive. The American Recovery and Reinvestment Act of 2009 (ARRA) and the Health Information Technology for Economic and Clinical Health (HITECH) are important terms with regard to EHR. The ARRA has formalized the role and responsibilities of the Office of the National Coordinator for Health Information Technology (ONHIT that is also referred to as ONC) within the US Department of Health and Human Services (HHS).[5] These are the organizations behind the Meaningful Use that has three stages. Stage 1 of Meaningful Use ended in October 2012. Stage 2 and Stage 3 rules will emphasize heath information exchange with the expectation that the providers will electronically transmit patient care summaries.[6]

In Stage 1 of Meaningful Use, the goal is:

- Data capture and sharing
- Advanced clinical processes
- Improved outcomes

There are 15 core objectives for the eligible professionals.[6] Two of these core objectives can help justify and possibly promote the standing order process. These are:

- Maintain an up-to-date problem list of current and active diagnoses.
- Capacity to exchange key clinical information among providers of care and patient-authorized entities electronically.

Two key clinical quality measures in Stage 1 address areas specific to vision that include consideration of:

- Primary Open Angle Glaucoma (POAG) and Optic Nerve Evaluation
- Diabetic Retinopathy
- Documentation of Presence or Absence of Macular Edema and Level of Severity
- Diabetes: Eye Exam

Every EHR has the capacity to "create an order" from a list of options. It is important to ensure that the standing order for low vision rehabilitation services is one of the options. Depending on how the EHR is set up, it could/should flag the scheduler to schedule the low vision appointment once the order has been entered.

The Electronic Health Record (EHR) is a good vehicle to help promote and ensure the effectiveness of the standing order for low vision rehabilitation services.

"Health IT plays a central role in building a 21st century health care system – where care is safer, better coordinated and patient-centered, where we pay for the right care, not just more care."[6]

To achieve this objective, the EHR programs are being challenged to promote, provide and demonstrate meaningful use of certified EHR technology. The EHR allows healthcare providers to record patient information electronically instead of using paper records. However, EHRs are often capable of doing much more than just recording information.

368.41	Scotoma involving central area
368.45	Generalized contraction or constriction
368.46	Homonymous bilateral field defect
368.47	Heteronymous bilateral field defect
369.01	Better Eye: Total vision impairment; Lesser Eye: Total vision impairment
369.03	Better Eye: Near-total vision impairment; Lesser Eye: Total vision impairment
369.04	Better Eye: Near-total vision impairment; Lesser Eye: Near-total vision impairment
369.06	Better Eye: Profound vision impairment; Lesser Eye: Total vision impairment
369.07	Better Eye: Profound vision impairment; Lesser Eye: Near-total impairment
369.08	Better Eye: Profound vision impairment; Lesser Eye: Profound vision impairment
369.12	Better Eye: Severe vision impairment; Lesser Eye: Total vision impairment
369.13	Better Eye: Severe vision impairment; Lesser Eye: Near-total vision impairment
369.14	Better Eye: Severe vision impairment; Lesser Eye: Profound vision impairment
369.16	Better Eye: Moderate vision impairment; Lesser Eye: Total vision impairment
369.17	Better Eye: Moderate vision impairment; Lesser Eye: Near-total vision impairment
369.18	Better Eye: Moderate vision impairment; Lesser Eye: Profound vision impairment
369.22	Better Eye: Severe vision impairment; Lesser Eye: Severe vision impairment
369.24	Better Eye: Moderate vision impairment; Lesser Eye: Severe vision impairment
369.25	Better Eye: Moderate vision impairment; Lesser Eye: Moderate vision impairment

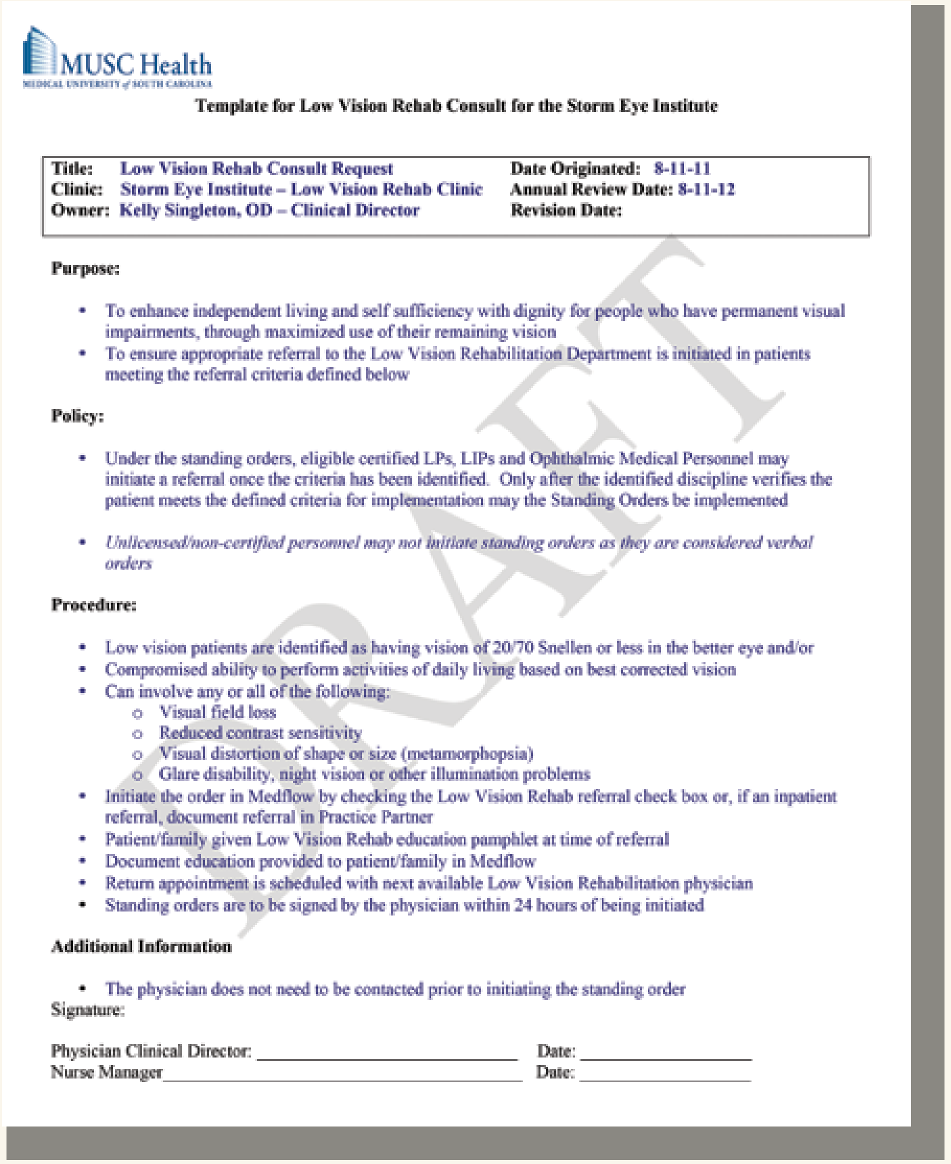
Table 2 **International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)**

The EHR Incentive Program asks providers to use the capabilities of their EHRs to achieve benchmarks that can lead to improved patient care that has been identified as "meaningful use." This means providers need to show they are using certified EHR technology in ways that may improve patient care.[6] The establishment of "meaningful use" in EHR should give all providers in the medical field reason to ponder and consider ways to provide better patient care. The establishment of a standing order for low vision rehabilitation services for the low vision patient that meets the low vision criteria would help to meet the "meaningful use" initiative by providing more timely referrals for appropriate low vision rehabilitation services.

INCORPORATING THE STANDING ORDER INTO PRACTICE

The initiation and implementation of the low vision rehabilitation standing order is a proactive process, which identifies and addresses an effective method to ensure referrals of patients presenting with low vision needs. The recognition of this as a viable method better ensures not only that appropriate referrals are being made, but also that the referrals are also made in a timelier fashion.

This was noted when this author was asked to present on this very topic on a panel of professionals in November 2012 at the joint meeting of the American Academy of Ophthalmology (AAO) and Asia-Pacific Academy of Ophthalmology (APAO) conference held in Chicago. The session was called Vision Rehabilitation Education: Effectively Transmitting the Need for Low Vision Rehabilitation Services to the Ophthalmic Community. I was asked to present in conjunction with the AAO Vision Rehabilitation Committee.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Template for Low Vision Rehab Consult for the Storm Eye Institute

Title:	**Low Vision Rehab Consult Request**	**Date Originated:**	**8-11-11**
Clinic:	**Storm Eye Institute – Low Vision Rehab Clinic**	**Annual Review Date:**	**8-11-12**
Owner:	**Kelly Singleton, OD – Clinical Director**	**Revision Date:**	

Purpose:

- To enhance independent living and self sufficiency with dignity for people who have permanent visual impairments, through maximized use of their remaining vision
- To ensure appropriate referral to the Low Vision Rehabilitation Department is initiated in patients meeting the referral criteria defined below

Policy:

- Under the standing orders, eligible certified LPs, LIPs and Ophthalmic Medical Personnel may initiate a referral once the criteria has been identified. Only after the identified discipline verifies the patient meets the defined criteria for implementation may the Standing Orders be implemented
- *Unlicensed/non-certified personnel may not initiate standing orders as they are considered verbal orders*

Procedure:

- Low vision patients are identified as having vision of 20/70 Snellen or less in the better eye and/or
- Compromised ability to perform activities of daily living based on best corrected vision
- Can involve any or all of the following:
  - Visual field loss
  - Reduced contrast sensitivity
  - Visual distortion of shape or size (metamorphopsia)
  - Glare disability, night vision or other illumination problems
- Initiate the order in Medflow by checking the Low Vision Rehab referral check box or, if an inpatient referral, document referral in Practice Partner
- Patient/family given Low Vision Rehab education pamphlet at time of referral
- Document education provided to patient/family in Medflow
- Return appointment is scheduled with next available Low Vision Rehabilitation physician
- Standing orders are to be signed by the physician within 24 hours of being initiated

Additional Information

- The physician does not need to be contacted prior to initiating the standing order

Signature:

Physician Clinical Director: ______________________ Date: ______________

Nurse Manager______________________ Date: ______________

The objective of this symposium targeted the patients with moderate visual loss. For example, patients successfully treated by anti-VEGF agents may still be unable to read because they require more than normal magnification and lighting. Too few of these patients, and others with difficulties with daily visual tasks whom vision would greatly help, are being referred for low vision intervention. There is a critical need to improve awareness of the benefits vision rehabilitation can offer.[7]

This author, along with five medical doctors and an executive of the AAO, addressed this at the November 2012 AAO-APAO Convention[8]. The presentation's topics addressed ideas to increase awareness of low vision rehabilitation services and methods to increase referrals for low vision rehabilitation services. These topics were:

- General Methods for Increasing Referrals. Sue Vicchrilli, COT, OCS
- Increasing Referrals for Low Vision Rehabilitation – What Can Be Done? Joseph Fontenot, MD
- Microperimetry and Clinical Practice: The Additional Benefit of Microperimetry Results for Referring Physicians. Samuel Markowitz, MD
- Resident Education: Conveying the Value of Vision Rehabilitation. Mary Lou Jackson, MD
- Occupational Therapists and Publicizing the Importance of Vision Rehabilitation. Lylas Mogk, MD
- Standing Orders for Low Vision Rehabilitation Service: A Solution to Ensure Referrals for Low Vision Services. Shirley Anderson, OTR/L, SCLV, CLVT
- The Impact of Reaching Out. Janet Sunness, MD

It was a pleasure to meet with the medical professionals of the AAO and APAO who are passionate about vision rehabilitation services and want to advocate for patients who are visually challenged. Those attending this symposium were from around the world and came seeking answers and solutions to better identify and address the needs of the low vision population. All the topics addressed were important to the promotion of low vision rehabilitation services. The response from the audience regarding initiating a standing order for low vision rehabilitation services was very supportive, especially with the timely mandate of Electronic Health Records implementation by 2014.[9]

CONCLUSION

Keeping everyone on board with the standing order for low vision rehabilitation services will require vigilance since it still takes someone to remember to check the standing order as one of the treatment options. In-services will need to be provided to the doctors, medical interns/residents, occupational, physical and speech therapy departments, nurses, social workers and ophthalmic technicians. These in-services will need to be scheduled routinely to educate new staff and remind established staff about this process and how to initiate a low vision rehabilitation standing order using the EHR. Other departments, including neurology departments with TBI and stroke programs, should be provided with information so that they are aware of their ability to advocate for a patient who has difficulties with activities of daily living due to vision challenges.

The implementation of the standing order for low vision services should lead to an increase in the number of referrals to low vision rehabilitation services. Licensed professionals can be empowered to initiate orders for patients that present with low vision challenges and qualify for low vision rehabilitation services. Empowerment through the standing order addresses patient needs and can lead to increased recognition of the importance of low vision services in the continuum of quality eye care. Once the standing order is implemented, hopefully we will hear our patients say, "I'm so happy I was referred to low vision rehabilitation services; I have learned so much and am more independent. My quality of life has really improved! Thank you all so much!!!"

From the [1]Storm Eye Institute - Low Vision Rehabilitation Services Medical University of South Carolina, Charleston, SC.

Support: None
Disclosure: None

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Acknowledgements: Standing Order Policy for Low Vision Rehabilitation services was established at Storm Eye Institute at the Medical University of South Carolina in August, 2011 through the collaborative efforts of Kelly Singleton, MS, OD, Stephen E. Morse, OD, MPH, PhD, Amanda E. Suggs, RN, CCDS, CCA, and Shirley L. Anderson, OTR/L, SCLV, CLVT.

Shirley Anderson, OTR/L, SCLV, CLVT has more than 35 years of clinical and administrative experience in the field of Occupational Therapy. She holds a Specialty Certification in Low Vision and is a Certified Low Vision Therapist. She has a faculty appointment in the College of Health Professions at the Medical University of South Carolina. Her duties and responsibilities at Storm Eye Institute at MUSC include promoting low vision rehabilitation services.

References:

1. Wang M, Rousseau J, Boisjoly H, Schmaltz M, Kergoat M, Djafari F, Freeman E. Activity limitation due to a fear of falling in older adults with eye disease. *Invest Ophthalmol Vis Sci* 2012 Dec 3;53(13):7967-72.
2. Medicare reimbursement for low vision rehabilitation. Corcoran consulting group. Available at http://www.corcoranccg.com/GetFile.aspx?FileID=0d301c91-0912-44d8-8bb6-29aa5a42ca36. July 1, 2012.
3. Standing Order Definition. *Mosby's Medical Dictionary, 8th edition*. Elsevier, 2009.
4. Centers for Medicare & Medicaid Services. Medicare Learning Network. MLN Matters Number:MM3816. Implemented April 3, 2006. Availble at http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/downloads/mm3816.pdf.
5. The National Digital Medical Records Mandate: ARRA. MedicalRecords.com. Available at http://www.medicalrecords.com/physicians/the-national-digital-medical-records-mandate-arra.
6. Centers for Medicare & Medicaid Services. EHR Incentive Programs. August 27, 2012. Available at http://cms.gov/EHRIncentivePrograms/.
7. Tavenner M, Mostashari F. 2012: The Year of Meaningful Use. The CMS Blog. Baltimore, MD: Centers for Medicare & Medicaid Services. March 23, 2012. Available at http://blog.cms.gov/2012/03/23/2012-the-year-of-meaningful-use/.
8. AAO-APAO Chicago 2012 Final Program, 2012 Joint Meeting: November 10-13. TriStar Publishing, Inc. Available at http://www.aao.org/meetings/annual_meeting/program/archive.cfm.
9. The Office of the National Coordinator for Health Information Technology (ONC). Available at http://healthit.hhs.gov/portal/server.pt.

Envision Conference Keynote Speaker Announced

Internationally renowned pediatric ophthalmologist, **Lea Hyvärinen, MD, PhD, FAAP**, will serve as the Envision Conference 2013 Keynote Speaker, September 19, 2013 at the Hyatt Regency Minneapolis in Minneapolis, Minnesota.

Dr. Lea Hyvärinen is a Finnish pediatric ophthalmologist who, after her thesis on experimental fluorescein angiography in Finland, worked from 1967 to 1969 as the Dr. A. Edward Maumenee's Fellow at the Wilmer Institute, Johns Hopkins Hospital in Baltimore, MD. While there, she started the first clinical fluorescein angiographic laboratory, an important area in diabetic retinopathy, retinitis pigmentosa and histoplasmosis at that time. At Wilmer Institute, Dr. Hyvärinen became interested in vision rehabilitation and has worked in vision rehabilitation and development of assessment techniques for more than 30 years.

Dr. Hyvärinen is well-known for the research and development of the LEA Vision Test System and the LEA Symbols tests for assessment and screening of vision in children. The LEA Test System now contains 40+ tests for numerous clinical test situations and vision screening and for the assessment of children and adults with different communication needs.

Dr. Hyvärinen began training rehabilitation teams in 1984 in Madrid, and has subsequently given courses in more than 60 countries on five continents. She also worked for seven years as the lecturer in ophthalmology at the Nordic Staff Training Centre for Deaf-Blind Services and spent a sabbatical year at the Smith-Kettlewell Institute in San Francisco to study communication during assessment of deaf-blind patients. Dr. Hyvärinen currently works as the Honorary Professor

in Rehabilitation Sciences at the University of Dortmund in Germany, and as a Senior Lecturer in Developmental Neuropsychology at the University of Helsinki in Finland.

Dr. Hyvärinen's address will occur during the Envision Conference 2013 Plenary Session, to be held September 19, 2013 at 8 am.

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April 26 | Clinical Education and Research Presentation Selection Notification
July 5 | Early Bird Registration Deadline
July 12 | Deadline for Advance Price Exhibitor Registration
August 12 | Cancellation Deadline
August 23 | Deadline for Presentation Materials and Handouts
August 26 | Hotel Room Block Deadline
September 19-21 | Envision Conference 2013, Hyatt Regency Minneapolis

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CE – ACCME, ACVREP, AOTA, COPE

July 18, 2013
Low Vision Grand Rounds – Scotoma Awareness in Low Vision Rehab: Circumventing Black Holes in the Printed Page? – Wichita, KS.
CE – ACCME, ACVREP, AOTA, COPE

September 19-21, 2013
Envision Conference 2013. Hyatt Regency Minneapolis, Minneapolis, MN.
CE – ACCME, ACVREP, AOTA, COPE, CRCC

November 7, 2013
Low Vision Grand Rounds – Wichita, KS.
CE – ACCME, ACVREP, AOTA, COPE

September 18-20, 2014
Envision Conference 2014. Hyatt Regency Minneapolis, Minneapolis, MN.
CE – ACCME, ACVREP, AOTA, COPE, CRCC

For more information, visit
www.envisionuniversity.org/calendar.aspx.