Article ▸ # The Essential Role of Low Vision Rehabilitation in the Presence of Modern Day Technology

Linda Pham, OD, Connecticut VA Healthcare System, West Haven, Connecticut
Theresa Zerilli-Zavgorodni, OD, Connecticut VA Healthcare System, West Haven, Connecticut
Nancy Shenouda-Awad, OD, Connecticut VA Healthcare System, West Haven, Connecticut
Jonathan R. Hamilton, OD, Connecticut VA Healthcare System, West Haven, Connecticut

## ABSTRACT

**Background:** TA sudden or gradual onset of vision loss, regardless of etiology, is typically devastating. Adjustments to activities of daily living (ADLs) must be made for those living with visual impairment in order for them to function independently. While there are many different types of low vision aids from which to choose, careful assessment is important to determine its appropriateness for a patient. It is easy to be drawn to the newest technology when presented with an array of optical and non-optical devices. However, while there are many advantages to technology, there can be limitations and disadvantages that may interfere with the visual function of a low vision patient.

**Case Report:** A 71-year-old male presented to the Eastern Blind Rehabilitation Center (EBRC) at the West Haven Veterans Hospital in Connecticut. He reported blurred vision, difficulty ambulating, and reduced ability to perform his ADLs. He had experienced vision loss OS after a non-arteritic ischemic optic neuropathy (NAION). Six years later, he incurred an NAION OD following cataract surgery. Prior to his admission to the EBRC, he had obtained several electronic devices to assist him with his vision loss. One of the more advanced technological devices he received was the OrCam. The OrCam is an electronic portable artificial vision device that has the ability to read text aloud to the patient. It can also identify preloaded objects and people. Although this device was beneficial, without concurrent low vision rehabilitation (LVR), the patient was unable to use his residual vision to its fullest capacity, thus limiting both device proficiency and visual performance.

**Discussion:** For patients with vision loss secondary to pathology, there may be adjacent areas of viable retina that can be used. These areas or islands of functional vision are known as preferred retinal loci (PRL). LVR employs maximizing visual function through the use of compensatory strategies, environmental modifications, PRL utilization, conventional optical and non-optical devices, and technology. Learning to use residual vision in conjunction with optical devices and/or technology promotes optimal visual performance and allows low vision patients to remain functional without technological dependency. This case illustrates a patient who became more dependent on his remaining vision to perform his ADLs and subsequently less reliant on technology following LVR.

**Keywords:** blindness, eccentric viewing, Low vision rehabilitation, portable artificial vision device, technology

## Introduction

Low vision refers to significant visual impairment that cannot be improved by corrective lenses, medications, or surgery.[1] This includes a best-corrected visual acuity (BCVA) of worse than 20/70 in the better-seeing eye, visual field loss, legal blindness, and almost total blindness.[2] Legal blindness in North America is defined as a best-corrected central visual acuity of 20/200 or less in the better eye or a visual field of less than 20 degrees.[2] Vision loss is often associated with emotional stress, decreased quality of life, loss of independence, and limitations of activities of daily living (ADL).[2] Severe visual impairment can lead to clinical depression and anxiety. Furthermore, depression in the visually impaired occurs at a five-fold rate compared to the general population of non-visually impaired older adults.[3]

Visual impairment that is associated with non-arteritic ischemic optic neuropathy (NAION) typically involves loss of both visual field and visual acuity.[4] Peripheral field defects may compromise the patient's ability to navigate within their surroundings safely, predisposing him/her to fall-related injuries such as hip fractures.[5] On the other hand, a reduction in central acuity from NAION typically affects the patient's ability to read and to recognize familiar faces. Patients may also experience a loss of contrast sensitivity, increased light sensitivity, and glare intolerance.

Low vision rehabilitation (LVR) is a specialized service provided by eye care providers in conjunction with other health care professionals who address the functional limitations caused by ocular pathology. The goal of LVR is to maximize visual function by augmenting remaining vision through the use of compensatory techniques and low vision devices. The low vision examination includes a thorough functional history along with an evaluation of the patient's visual performance at distance, intermediate, and near. Additionally, visual field extent, binocular vision function, and ocular health should be assessed. Inquiring about the effects of illumination on one's visual performance can aid in solving issues with poor contrast, glare, and light sensitivity. A variety of tints, lighting options, contrast enhancers, electronic devices, and environmental modifications may be prescribed depending on the patient's visual needs and illumination preferences.

Indispensable components of the low vision exam include preferred retinal loci (PRL) localization and eccentric viewing (EV) training. For patients with normal vision, fixating on an object in order to see requires placing the object of interest in the line of sight by directing it onto the macula. In contrast, patients with central vision loss secondary to ocular pathology will typically have non-foveal alternative areas of viable retina that can be employed. These areas or islands of functional vision are known as PRL. EV training during LVR teaches patients how to use PRL to obtain maximal visual function. This is crucial for a successful rehabilitative outcome.

It is important that careful assessment is made when determining which low vision devices are appropriate for each patient. There are conventional optical devices that may help to meet many of the patient's visual needs and to accomplish his/her rehabilitative goals. Additionally, there are many new digital technologies that can assist with visual impairment, such as the OrCam. The OrCam is a portable artificial vision device that attaches to a person's eyeglasses. With the point of a finger or push of a button, the device's camera scans information, including text, money, products, and faces, and then transmits information to an earpiece.[6] While the device has many advantages, one disadvantage (not exclusive to the OrCam but also possible with other technological devices) is the potential to inhibit a patient from maximizing their visual function. Occasionally, a patient may become enthralled with the newest technology. If this occurs, there can be resistance to conventional LVR techniques, leading to underutilization of remaining vision. Through EV training, patients can use conventional optical devices and technology to augment their residual vision in their PRL without relying completely on technology. When technology is used in conjunction with the application of LVR, there is a greater chance of self-sufficiency and independence with ADLs.

The patient discussed in this paper experienced vision loss secondary to bilateral NAIONs. With LVR, this particular patient was able efficiently to use his PRL with both conventional optics and technology. Consequently, the patient was able to carry out an array of ADLs that he was previously unable to perform prior to admission to the Eastern Blind Rehabilitation Center (EBRC).

## Case Report

### History

A 71-year-old male presented to the EBRC at the West Haven Veterans Affairs Hospital for a 6-week-long inpatient LVR program to address his ADLs. His established ocular history was remarkable for bilateral NAIONs. The patient recalled a sudden vision loss OS and at that time had a complete work-up, which led to the diagnosis of NAION. In 2016, he underwent cataract extraction, initially OD and then a couple of months later OS. Shortly after his second procedure, he noticed a sudden vision loss OD, leading to another NAION diagnosis.

At his initial low vision evaluation, the patient complained of significant blurry vision at distance and near OS>OD with visual field loss, which prohibited him from safely ambulating in familiar and unfamiliar environments. His ADLs and his quality of life were greatly affected. Prior to his vision loss, he was an avid reader and computer user. The patient enjoyed reading newspapers, magazines, and books. After vision loss, he noted that he was no longer able to read, to work, or to manage his finances. He reported difficulty performing simple tasks, such as seeing his food, pouring milk, or seeing food labels while grocery shopping. Clipping his fingernails or changing the batteries on his hearing aids were challenging activities as well. In addition, he reported that he was very light sensitive and bothered by glare.

Prior to his arrival at the EBRC, the patient had received a variety of devices to assist with his vision loss from the Washington, DC VA Medical Center. His previous optical and non-optical devices consisted of bifocal sunglasses, +3.00 diopter (D) over-the-counter reading glasses, a Smartlux video magnifier, a 22" ClearView Plus HD closed-circuit television (CCTV), and the OrCam.

### Examination Findings

During initial entrance acuity testing, it was determined by careful observation that the patient was in primary gaze and had not habituated to a PRL. His uncorrected visual acuity (VA) in primary gaze was OD 2/700 and OS 1/700. The patient was then introduced to the concept of locating his PRL. The patient's PRL was determined by systematically going through each clock hour and evaluating his acuity at the point along that meridian where the patient felt they saw best. After finding the patient's subjective PRL, it was determined that the uncorrected visual acuity was OD 10/100 with EV 1:00 and OS 8/700 with EV 4:00 in moderate illumination. His subjective trial frame refraction of OD +0.75-1.00x100 and OS +3.00-2.00x180 further improved his visual acuity to OD 10/80+1 with EV 1:00 and OS 5/600 with EV 4:00.

A Humphrey Visual Field (HVF) 24-2 Sita Standard was performed on his dominant right eye to qualify and to quantify the remaining islands of vision. The HVF OD revealed dense diffuse visual field defects with a small, remaining visible island of higher decibels inferior nasal (Figure 1). This HVF was used as an objective confirmation of the patient's PRL and established that this PRL was most optimal to use for visual functioning. Once the subjective PRL was confirmed with an objective test, a low vision therapist trained the

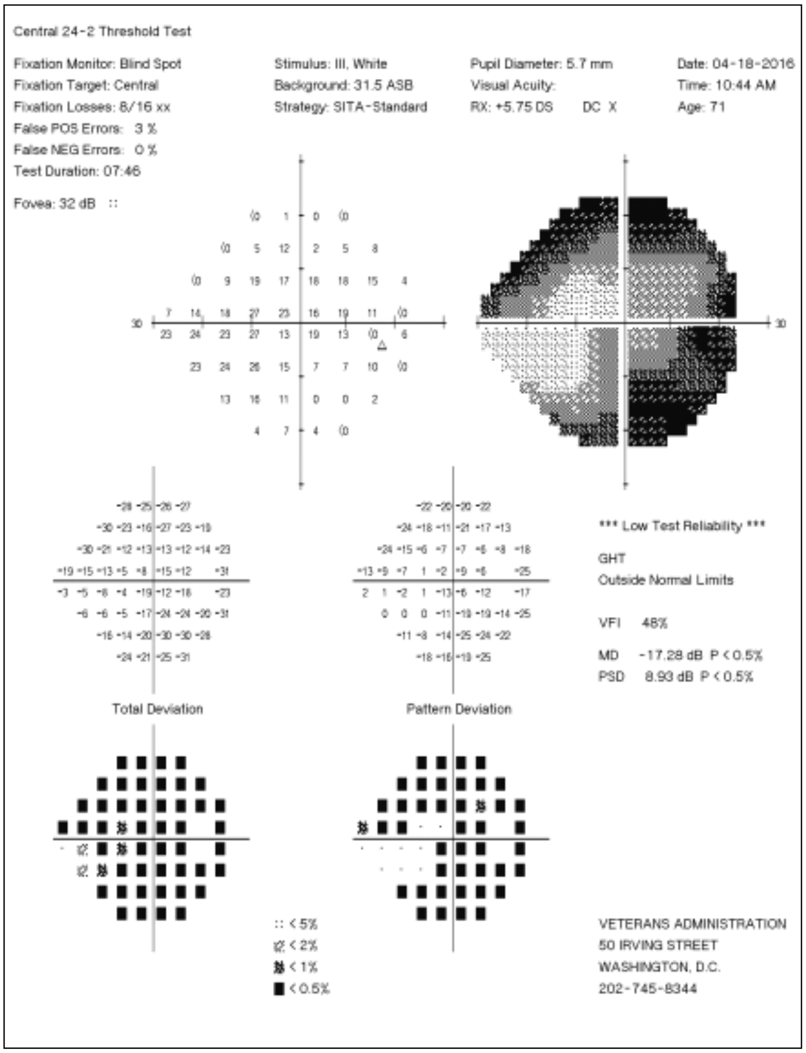


***Figure 1:*** *HVF 24-2 Sita Standard OD*

patient to stabilize the PRL. The patient was given targets of appropriate visual demand with which to practice outside of the scheduled training sessions.

The patient's contrast sensitivity was noted to be greatly reduced. On the Pelli Robson contrast sensitivity chart, he was able to distinguish 6/16 triplets OD and 1/16 triplets OS, corresponding to a severe and a profound loss, respectively. Tinted lenses (amber, orange, yellow, plum, grey) were shown to the patient. With an 80% transmission yellow-tinted lens, the patient's contrast sensitivity improved to 8 OD and remained at 1 out of 16 triplets OS. The patient was prescribed full-time and reading glasses with this tint, which provided the best-corrected visual acuity and improved his contrast sensitivity. Additionally, a 40% transmission grey tint was chosen for his sunglasses to alleviate his symptoms of photosensitivity and glare.

The near add for volume reading tasks was found to be 20D based on the distance acuity and taking into account an acuity reserve. This high plus-powered lens was prescribed in a 5x Clear Image lens. This lens allowed the patient to meet his visual acuity goal of 1M (20/50) required for reading a newspaper and furthermore provided a 3-point acuity threshold (20/20) on the Rosenbaum near acuity chart. Occlusion of OS (the non-dominant eye) was recommended given the large acuity disparity and different PRL between the two eyes. A trial with OS occlusion during reading demonstrated improved fluency, speed, and accuracy. An intermediate prescription of +2.50 for a working distance of 16-18 inches was determined for use on his computer and CCTV.

For near spotting tasks such as reading medication bottles and grocery store food labels, non-illuminated and illuminated handheld magnifiers (HHM) were assessed. The patient achieved 3-point print (20/20, 0.4M) on the Rosenbaum near acuity chart with a non-illuminated 7X Eschenbach pocket hand-held magnifier and an illuminated 7X Optelec Power Magnifier. Throughout the examination, the patient was reminded to use his PRL during all tasks and handling of low vision devices. For tasks that required the patient to be hands-free, such as changing his hearing aid batteries or home repair, a 5D OptiVISOR with a 10D loupe and Quasar light was prescribed. Additionally, a Luxo Magnifying lamp was introduced to the patient for the task of clipping his fingernails.

For television watching, the patient was shown a variety of spectacle-mounted telescopes. He reported that at home he had a 48" wall-mounted television and viewed it from approximately 12-13 feet away. With a spectacle-mounted 1.7X wide-angle telescope mounted in the bioptic position over OD and OS occluded, the patient was able comfortably to watch television and spot 10/30 (20/60) optotypes. A summary of the prescribed devices can be seen in Table 1.

During his stay at the EBRC, an ocular health examination was performed. Entrance testing was normal. His intraocular pressure measured 11 mmHg OD and 10 mmHg OS at 9:45am by Goldmann Applanation Tonometry. Anterior segment findings were unremarkable OU. Both eyes exhibited posterior chamber intraocular lenses that were clear and centered. Dilated fundus examination revealed diffusely pale optic nerves with peripapillary atrophy OU. His maculae were noted to have small focal drusen with mild RPE mottling OU. All of his findings were stable, and the patient was educated to follow up with eye care providers upon his return home from the EBRC.

## Discussion

According to the Veterans Affairs Low Vision Intervention Trial II (LOVIT II), veterans report both an increased ability to perform ADLs and a better quality of life after LVR.7 The study demonstrated improvements in visual ability, such as reading, visual information processing, visual motor skills, and overall functioning.[7] Through LVR, patients are taught many skills and use multiple aids as a means to augment their

**Table 1: Final prescribed low vision devices, tasks accomplished, and visual acuity achieved**

| Low Vision Device | Tasks Accomplished |
|---|---|
|  Reading glasses with 5X Clear Image (CI) OD and occluded lens OS | Allowed for prolonged reading using his PRL in the better seeing eye<br><br>Task demand VA achieved: 1M (20/20) continuous text and 3 point (20/20) print |
|  7X Eschenbach Pocket Magnifier<br> 7X Optelec PowerMag Handheld Magnifier | Near spotting tasks, such as reading food labels and medication bottles; the PowerMag added illumination which provided better contrast<br><br>Task demand VA achieved: 3 point (20/20) print |
|  +2.50 Intermediate Glasses | Provided best-corrected intermediate visual acuity at patient's preferred working distance for comfortable viewing on computer and CCTV |
|  5D OptiVISOR® with Quasar™ Light and 10D Loupe | Allowed patient to change batteries on his hearing aids, cutting fingernails; increased contrast with QuasarTM Light |
|  1.7X WATS spectacle-mounted TS | Read ticker and recognize faces on TV<br><br>Task demand VA achieved: 10/30 (20/60) |
|  ClearView Plus HD 22″ | Prolonged near work at a more comfortable working distance with enhanced contrast |
|  OrCam | Identified text, people, and products, which allowed for volume auditory reading and provided portability. |

remaining vision. In cases where central vision has been lost, training low vision patients to learn how to use a PRL is essential for a successful outcome. Depending on the severity and type of vision loss, a variety of low vision devices may be prescribed contingent upon the patient's ocular pathology and visual needs. These devices include tinted and non-tinted corrective lenses, prismatic glasses, non-illuminated and illuminated handheld magnifiers, stand magnifiers, hands-free devices, monocular telescopes, spectacle-mounted telescopes, task lamps, non-optical devices, and electronic devices such as CCTVs, optical character reader (OCR) devices, and other technologies.

The low vision examination begins with a detailed case history and establishment of the patient's visual needs, interests, and goals. Other important considerations of which to be aware are the patient's potential mobility hazards, illumination preferences, and contrast issues within his/her environment. First and foremost, a meticulous trial frame refraction must be performed, and if a PRL is determined, then the subjective refraction should be assessed using this PRL. This ensures optimal visual clarity and optimal performance with all recommended low vision devices. In the case of the patient discussed in this paper, his ocular pathology was bilateral NAION. His visual impairment was due to poor central visual acuity compounded by a loss of peripheral vision. A refraction using a PRL gives better results than a refraction without using a PRL, optimizing the patient's vision; this was essential for the successful outcome of his LVR.

In cases where central vision is affected by pathology, LVR focuses on training a non-foveal PRL to view objects of interest. Being able to access and effectively sustain a PRL is critical when a patient requires the finest detail in order to accomplish a visual task, such as reading. The location, size, and quality of the PRL are important factors to assess when choosing a PRL, as these factors will have a significant impact on visual performance.[1] The optical devices and low vision aids prescribed are trained and used with the residual vision available at the PRL. In this particular case report, the patient was found to have one very functional PRL at 1:00. Of note, the patient's initial visual acuity recordings were arduous secondary to his lack of experience with EV prior to LVR. At the patient's last visit, his final visual acuity after several classes of EV training with correction was recorded as 10/60 with EV 1:00 OD and 10/350 with EV: 7:00 OS, which was a significant improvement from his pre-LVR assessments, where he was 2/700 OD and 1/700 OS.

Reading is one of the major ADLs affected with central visual acuity loss. Many visually impaired patients report reading the newspaper as a goal that they would like to achieve and consequently seek help for this ADL. The text of most newspapers requires an acuity of 1M or 8 point (20/50).[1] Although the goal for reading is 1M, the visually impaired are plagued with poor contrast and what is known as the crowding effect inherent to using a non-foveal PRL.8 The crowding effect is a phenomenon that affects non-foveal PRLs and reduces patients' ability to identify a single optotype when surrounded by other optotypes.[8] Thus, to assure that fluency of 1M text is met easily, an acuity reserve of 3 lines is required to compensate for crowding and contrast issues.1 Acuity reserve is defined as the difference between critical acuity (smallest print allowing maximum reading speed) and threshold acuity (smallest print viewable).[6] In this case, for long-term reading, the patient was prescribed a 5X Clear Image lens, which is equivalent to 20D over OD, with OS occluded. The Clear Image lens was the preferred lens of choice given that it is a true achromatic doublet microscopic lens that affords a larger field of view (FOV) with fewer aberrations often noted with high plus aspheric lenses.[9] The 5X Clear Image is made of two lens components that are equivalent to 20D. With training, the patient used his PRL with the 5X Clear Image lens to spot 3-point print and read 1M (newspaper) continuous text fluently. Occlusion of his non-dominant eye was recommended. For most low vision patients, binocular vision is challenging due to the large difference in visual acuity between the eyes, different PRL locations in each eye, and the close working distance required by high plus lenses.[1]

Short-term near spotting tasks, such as reading price tags and food labels, are usually accomplished with HHMs. As with reading, an acuity reserve is needed for near spotting tasks. However, the reserve for short-term spotting is one line better than critical print size/acuity to assure that the patient can comfortably meet their near spotting goal, despite contrast, lighting, and crowding effects.[1] For this particular patient, a non-illuminated 7X Eschenbach pocket hand-held magnifier and an illuminated 7X HHM were prescribed to meet his spotting goals. The patient was able to hold the HHM at his spectacle plane and trombone the reading material to the appropriate focal distance. The benefit of the non-illuminated HHM is that it is smaller and more portable, whereas the benefit of the illuminated HHM is increased light, thereby providing better contrast.

Intermediate goals are typically influenced by the working distance required to use one's hands comfortably. Providing the required task demand acuity at an extended working distance can be challenging. To meet the patient's intermediate needs of computer and CCTV use, he was prescribed a +2.50 single vision intermediate pair of spectacles for his preferred working distance of 16-18 inches. These intermediate glasses, in conjunction with variable magnification options on the CCTV and text enhancing magnification software on the computer, allowed the task acuity to be met at a comfortable working distance. For other intermediate tasks, such as changing the batteries on his hearing aids, he was prescribed a 5D OptiVISOR with Quasar light and 10D loupe. This head-borne magnifier provided the patient with the required acuity and working distance to meet his intermediate tasks.

For long-term distance viewing and seated tasks, such as watching television, the patient was prescribed a spectacle-mounted telescope. A spectacle-mounted telescope is typically the preferred device choice over a handheld TS for prolonged distance viewing tasks. Spectacle-mounted telescopes are hands-free devices that are easy to use. For the patient, a 1.7X wide-angle telescope in the bioptic position over the better-seeing eye was prescribed, and the contralateral eye was occluded. As previously mentioned, occlusion prevents diplopia and prevents image interference from the non-dominant eye.[6] Monocular occlusion combined with the telescope allowed the patient comfortably to use his EV in his better-seeing eye without diplopia and asthenopia for both distance spotting and prolonged distance viewing tasks.

Enhancing contrast sensitivity and reducing glare are important factors to address in LVR. In many cases, patients with ocular pathology experience glare. Glare can cause a reduction in visual performance by degrading visual acuity and decreasing contrast sensitivity. To tackle glare, light, and contrast sensitivity issues, LVR employs the following strategies: tints, lens coatings, optimal task lighting, environmental modifications, electronic devices, and the use of non-optical aids such as typoscopes.[1,10] The patient in this case was classified to have significant contrast sensitivity reduction OD and severe contrast sensitivity reduction OS based on his Pelli Robson contrast sensitivity measurements.[11] He was prescribed a blue blocker tint, 80% transmission yellow for both his full-time and reading glasses. Additionally, he was prescribed a neutral density tint, 40% transmission grey, for his outdoor sunglasses. There was a subjective improvement in contrast and comfort, which was confirmed objectively by an improvement measured on the Pelli Robson chart in his better-seeing eye OD. Task lighting was provided, and specific environmental adaptations were also recommended. These included using a variation of colored backgrounds to provide better contrast between the task object and its surroundings, as well as using tape to enhance and to delineate the edge of each individual step of his home staircase.

The patient discussed in this paper received an OrCam prior to his arrival at the EBRC. He depended solely on the OrCam to read aloud to him and did not use his functional vision. While there are many benefits of the OrCam, which transmits text-to-audio to the patient with a point of a finger or push of a button and has the ability to identify familiar faces and previously stored products, it did not address all of his ADLs. Moreover, once the patient completed his LVR, he not only relied less on the OrCam, but when using the device, he was much more efficient, taking full advantage of its benefits, including the point and scan feature, which he was now able to use following LVR as he was able to localize text more proficiently.

With continuing advancement in technology, there are many existing devices that can increase the quality of life of low vision patients. However, when technology is used in conjunction with LVR, a patient's visual potential is maximized, and he/she can achieve his/her ADLs more easily. Prior to LVR, the patient in this case report had difficulty completing his ADLs even with his current low vision devices and the OrCam. After a full course of LVR, which included low vision, orientation and mobility training, manual skills, and living skills, the patient became visually functional and independent. Through rehabilitation and utilization of his PRL with conventional optical devices and low vision aids, he was able to accomplish visual tasks that he was not previously able to do, such as seeing his food, reading medication labels, and changing the batteries on his hearing aids. The skills and techniques acquired through LVR helped this patient to remain visually functional without complete technological dependency. This case example shows that when rehabilitation, conventional optics, and technology are used together, the patient will be more likely to achieve optimal performance, to preserve a good quality of life, and to remain self-sufficient and independent.

## Conclusion

Patients living with visual impairment have more tools today than ever before. With the new trends in the thriving market of digital technologies, patients have more options when choosing devices to meet their visual needs and goals. While these devices are beneficial, some of them do not require patients to use their remaining vision. New technologies may interfere and prohibit individuals from maximizing their visual function if proper low vision training and techniques are not incorporated into the patient's rehabilitation.

LVR is a specialized program that provides patients with invaluable visual enhancing skills and techniques that ultimately improve their overall visual function. With the use of residual vision, there are many ADLs that patients can continue to perform, allowing them to remain independent without solely relying on technology. The patient discussed in this case accomplished many more ADLs after a full LVR program. His greatest asset after LVR was his knowledge of and ability to use his PRL.

The incorporation of his new skills, in conjunction with conventional optical devices and new technology, provided the best visual outcome. Using all of the tools available, such as compensatory strategies, environmental modifications, PRL utilization, conventional optical devices, and technology, allows visually impaired patients to maximize their quality of life and to maintain their independence despite their vision loss.

## References


1. Lovie-Kitchen J. Low Vision. Optometry: Science Techniques and Clinical Management. Edinburgh: Butterworth Heinemann Elsevier, 2009:475-96.
2. Omar R, Rahman MHA, Knight VF, Mustaphal M, Mohammed Z. Mental health state and quality of life questionnaire in low vision assessment: A case report. BMC Research Notes 2014;7:667. Last Accessed Mar 12, 2017. http://bit.ly/2M22G0g.
3. Kempen GI, Ballemans J, Ranchor AV, van Rens GH, Zijlstra GA. The impact of low vision on activities of daily living, symptoms of depression, feelings of anxiety and social support in community-living older adults seeking vision

rehabilitation services. Qual Life Res 2012;21(8):104-11.

4. Windsor L, Windsor R. Understanding stroke of the optic nerve: Anterior ischemic optic neuropathy. Vision Enhancement 2002 Spring;7(2):24.
5. Felson DT, Anderson JJ, Hannan MT, Milton RC. Impaired vision and hip fracture. The Framingham study. J Am Geriatr Soc 1989;37(6):495-500.
6. Waisbourd M, Ahmed O, Siam L, Moster MR. The impact of a novel artificial vision device (OrCam) on the quality of life of patients with end-stage glaucoma. Invest Ophthalmol Vis Sci 2015;56(7):519.
7. Stelmack JA, Tang XC, Wei Y, Wilcox DT, et al. Outcomes of the veterans affairs low vision intervention trial II (LOVIT II): A randomized clinical trial. JAMA Ophthalmol 2017;135(2):96-104.
8. Leat SJ, Li W, Epp K. Crowding in central and eccentric vision: The effects of contour interaction and attention. Invest Ophthalmol Vis Sci 1999;40(2): 504-12.
9. Edmund Optics Inc. Edmund Optics Worldwide. Last Accessed March 28, 2017. http://bit.ly/2vkIRYx.
10. Khanna A, Ichhpujani P. Low Vision Aids in Glaucoma. J Curr Glaucoma Prac 2004;6(1):20-4.
11. Whittaker SG, Lovie-Kitchin JE. The Assessment of Contrast Sensitivity and Contrast Reserve for Reading Rehabilitation. In: Low Vision: Research and New Developments in Rehabilitation. Kooijman AC, Looijestijn PL, et al., eds. Amsterdam: IOS Press, 1994:88-92.

*Correspondence regarding this article should be emailed to Jonathan R. Hamilton, OD, at jonathan.hamilton@va.gov.* 

Pham L, Zerilli-Zavgorodni T, Nancy Shenouda-Awad N, Hamilton JR. The essential role of low vision rehabilitation in the presence of modern day technology. Optom Vis Perf 2018;6(4):155-61.

***The online version of this article contains digital enhancements.***