The purpose of low vision rehabilitation is to maximize the way a person uses his or her remaining vision. The effort typically requires multiple visits and a multidisciplinary approach. At the initial evaluation, the low vision specialist (LVS) seeks to determine the patient’s current level of vision and to develop a treatment plan based on his or her goals. The examination’s priorities differ from those for a typical eye examination. To the LVS, the cause of the visual impairment is secondary; the resulting functional issues are the primary concern. The LVS acts as a gatekeeper, referring the patient for other services as needed. This article discusses how the diagnosis of glaucoma may affect a patient’s functional vision, the components of the functional vision evaluation, and strategies for helping to improve the patient’s independence and quality of life.

THE DISEASE

The symptoms of glaucoma that affect visual function include visual field defects (central and peripheral), decreased dark adaptation, reduced contrast sensitivity function, and glare. Patients often complain of overall dim vision; difficulty seeing steps, curbs, or changes in terrain; problems seeing in low light or under extreme changes in lighting; bumping into objects; difficulty seeing faces and signs at a distance; and problems with reading.

Asking screening questions during routine visits can identify good candidates for vision rehabilitation. If a patient’s vision interferes with his or her ability to perform the activities of daily living, a referral to an LVS is recommended. People’s ability to read mail or the newspaper can serve as a barometer for their functional difficulties.

THE PATIENT

With referrals for vision rehabilitation, a summary of the case is extremely helpful to the LVS. Information regarding visual acuities and other diagnoses, copies of recent visual fields, and the dates of the patient’s last visit, past surgeries, and/or pending treatments provide the LVS with a general picture of the patient and allow the specialist to predict functional problems.

THE PERSON

During the initial low vision evaluation, the LVS explores patients’ social history in detail. How active or functional are they? Can they accomplish their activities of daily living? What is the status of their overall health and cognitive level? Do they still drive? Do they live alone, or do they have support from family and/or friends? Do these individuals have physical impairments such as tremors, paralysis, or weakness that might impede their use of certain low vision devices? What are their specific goals? The answers to these questions will help identify specific problems and prioritize each patient’s goals. One study found the two main priorities for patients with glaucoma are (1) reading and seeing detail and (2) outdoor mobility.

THE FUNCTIONAL EVALUATION

The initial evaluation serves as an information-gathering session for both the doctor and the patient. The evaluation typically includes distance visual acuities performed with a high-contrast chart for the visually impaired, a low vision refraction using a trial frame, near visual acuity (single letter and text), Amsler grid testing, contrast sensitivity function, binocularity, motilities, and functional visual fields. Additional tests are performed as needed based on the specific case.

During testing, the LVS observes how patients use their vision. Eccentric viewing (EV) training can help individuals with central field defects utilize other areas of viable retina in order to see more detail. EV training helps them find the preferred retinal locus (ie, eye position that uses remaining vision more efficiently). Improving EV skills may help to increase patients’ success with low vision devices, and it is often the first step in the rehabilitative process. Once an individual’s level of vision is determined, he or she is introduced to different device options.
DEVICE OPTIONS

The key phrase is different tools for different tasks. Patients must learn that one device likely will not meet all of their visual needs and that each option has advantages and disadvantages. Some basic rules regarding magnification can be helpful here. First, as power increases, the field of view and depth of focus decrease, and image movement increases. Higher magnification makes it more challenging for patients to use a given device, and they will require more training to gain proficiency. Glaucoma patients with severely restricted fields tend to have more difficulty using higher levels of magnification, because their peripheral vision is already reduced. An early referral for vision rehabilitation when patients’ visual impairment is mild tends to facilitate their adaptation to devices, because they can use lower levels of magnification.

READING

As noted earlier, the ability to read is the most common priority of low vision patients in general and of those with glaucoma in particular. It is important to be specific about the goal, including print size, in order to prescribe the proper device. The LVS can then determine the level of magnification needed and the potential devices to evaluate.

Options for Long-Term Reading

Long-term reading refers to books, magazines, newspapers, and the like. Full-field microscopes are basically strong reading glasses. Patients are usually receptive to this modality, because glasses are familiar to them. Their reading speeds are typically faster than with handheld or stand magnifiers, their hands are free to hold the reading material, and the glasses are portable. Task lighting is needed to provide adequate illumination for comfort. The disadvantages of full-field microscopes become more apparent as their power increases: working distance decreases, and lighting becomes more critical. Higher magnification limits patients’ chances for binocular vision due to the significant demands for convergence found with extremely close working distances. Also, patients may need to adopt the typewriter style of reading (ie, moving text in front of their eyes instead of scanning across text) due to the reduced field of view and depth of focus found with higher-powered microscopes.

Stand magnifiers are another option for reading. Because these devices are designed to rest on the page, they provide a consistent lens-to-text distance and a more stable image than handheld magnifiers. Most glaucoma patients prefer illuminated designs due to their need for bright lighting. Reading material can be held farther away than with a microscope of comparable power, and the room’s illumination is not critical. The chief disadvantage...
is the need to hold the magnifier and move it across the text. Also, stand magnifiers are bulkier and thus not as portable as full-field microscopes.

Options for Short-Term Reading

Short-term reading refers to price tags, menus, phone books, and other such items. Handheld magnifiers are designed for positioning at or near the focal point of the magnifying lens. They are smaller and, therefore, more portable than stand magnifiers. Given the variance of lighting conditions (eg, restaurants vs grocery stores), illuminated designs provide greater flexibility, because ambient lighting is not an issue. Handheld magnifiers are not a good option for people with fine motor difficulties, because it is difficult for them to stabilize the device to obtain a clear image.

Electronic Magnification

CCTVs are available for short- and long-term reading tasks, and they come in a range of sizes (Figures 1 and 2). Again, based on the patient’s goals, specific features may make one CCTV more appropriate than another. The advantages of CCTVs over conventional magnification include a larger field of view (due to screen size), more comfortable working distance, adjustable magnification, variable contrast modes to enhance contrast and reduce glare, and no peripheral distortion, because the image is projected electronically (no spherical or chromatic aberrations). The main disadvantage is cost ($300 to $5,000, depending on features).

MOBILITY

Poor visual acuity, poor contrast sensitivity, and/or a reduced visual field can affect patients’ ambulation.

RESOURCES FOR THE VISUALLY IMPAIRED

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Figure 3. Simulated view through a reversed telescope. A patient with severely constricted fields can see a red car and a silver car. When looking through the telescope, the same patient can see more sky and an additional two cars to the right of the silver vehicle.

Figure 4. An example of a bioptic telescope.

Providing best correction is a basic necessity and can enhance these individuals’ mobility. Filters can augment contrast and reduce glare. Optical devices that can assist patients with severely constricted visual fields include sectoral prisms, high minus lenses, and reverse telescopes. Sectoral prisms are most beneficial to patients with homonymous field defects that respect the horizontal or vertical midline. High minus lenses and reverse telescopes (Figure 3) employ minification to fit more information into a small visual field. When holding the objective lens toward the eye, the image is minified by the amount of magnification (a 2X telescope will minify two times). The patient’s
visual acuity must be taken into account, because it decreases by the power of the telescope (a patient with 20/30 acuity will see 20/60 through a 2X reverse telescope).

Orientation and mobility training can be a valuable means of enabling patients to travel independently. Certified orientation and mobility specialists help to integrate the optical devices into daily travel and also provide cane training to those who would benefit from it. A properly used cane will alert the traveler to changes in ground-level surfaces. Because the individual does not need to look down to see where he or she is walking, the person can use his or her vision for looking toward a destination, finding landmarks, scanning the route ahead, and watching out for cars and other pedestrians.

SEEING DISTANT DETAIL

Reading signs, seeing faces, and taking notes in meetings or class may require intermittent magnification. Handheld telescopes are good for short-term spotting tasks at distance. These devices are typically smaller than binoculars and very portable. Patients with poor dexterity or tremors in their hands are not good candidates for handheld telescopes due to their difficulty in stabilizing the device. A bioptic telescope may be a better option for these individuals (Figure 4). The bioptic system consists of a small telescope mounted superiorly into the spectacle correction. Tilting the chin downward brings the telescope into the visual axis, thus providing hands-free distance magnification. The bioptic is not a good option for patients with head tremor. For individuals with severe field loss, localizing the target can be very challenging with bioptics or handheld telescopes.

Full-diameter spectacle telescopes can aid sustained distance viewing such as watching television, sporting events, or theatrical productions. Full-diameter telescopes are larger than bioptic telescopes. The former are mounted centrally into a spectacle frame, thereby providing a larger field of view and a more comfortable position for the head compared with the bioptic system. Because peripheral vision and depth perception are compromised, patients need to remove the device to ambulate.

ADDITIONAL STRATEGIES

Simple ideas for improving patients’ function at home (Figure 5) include:

- marking appliances’ dials with a permanent marker, raised paint, or tactile cues
- employing a typoscope or line guide to keep their place while reading
- using a check-writing template or making lines bolder on checks
- using signature guides
- writing with a felt-tipped rather than a ballpoint pen
- using a goose-neck lamp for better lighting
- choosing items with large print to make it easier to perform the activities of daily living

CONCLUSION

Although the devices and strategies discussed herein can help to increase low vision patients’ independence and quality of life, the use of these options is ultimately the individual’s decision. Motivation and a willingness to adapt to devices or modify habits are keys to successful rehabilitation. Some patients feel low vision devices are obtrusive and are concerned about what others think. These challenges must be addressed in order to improve patients’ chances of success. People may not be willing to undertake vision rehabilitation at the time of their initial referral, but it is important they realize that help will be available when they are ready.

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