Column Technology and Internet

Technologies for People with Low Vision — Part 2

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This is the second article in the series regarding technologies for people with low vision. In the previous article, the author described strategies to facilitate the most frequently reported goal for low vision rehabilitation, reading. Here the author explores strategies for accomplishing activities of daily living which include technologies that are commonplace, free, or costly.

Activities of daily living

Lighting in the home

As people age they need more light to see details of objects, however, they are also more sensitive to glare. For example, a 60-year old receives only one third the amount of light entering the eye as a 20-year old, and can tolerate much less glare. These normal age-related changes coupled with an ocular disease causing low vision can make it tricky to find the right balance between too much light and just the right amount. Additionally, many older homes have outdated light fixtures that use standard incandescent light bulbs — which produce only 10% light while the remainder of the power they consume is discharged as heat.

When addressing the lighting needs of an older client, keep in mind that what you may feel is adequate may not be so for the client. Increasing illumination inside the home needs to be coupled with thoughtful shielding of light sources to prevent glare. Lighting within each room in the home should meet the needs associated with the activities performed in that room. Lighting should include a combination of natural (window), ambient (general, typically overhead), and task lighting.

Good overall ambient lighting helps people safely identify obstacles or changes in surfaces around the home. Bathrooms and kitchens are rooms where falls can occur from slick, slippery surfaces, so bright, even, and



Figure 1. Bright orange adhesive labels were cut into thin strips and placed on the microwave keypad to increase *visibility of the numbers*

shadow-free illumination is essential in these areas.

In general, close-up work should be done with task lighting—that is, a light source such as a desk lamp directed to a specific area where a task is performed. Bringing the light source closer to the task increases the brightness and contrast of the object and is preferable to increasing the wattage of the bulb, which can produce heat. Light emitting diodes (LED) are more efficient and safer than traditional incandescent, fluorescent, or halogen bulbs (Illuminating Engineering Society of North America, 2009).

Home-management

People with low vision frequently complain of difficulty seeing control

panels/displays to set appliance dials, like those on a microwave, oven, or washing machine. Simple, low-budget modifications can be made to control panels to increase their visibility using bright-colored fabric paint or adhesive stationary labels. Adhesive Velcro® can also be used for tactile marking. On old-style analogue controls, adhesive tactile markings can be placed on select settings, for example on the medium heat and bake settings for operation of the oven, or the starting position for operation of a washing machine.

Writing

Writing is a frequently overlooked goal in low vision rehabilitation. Aside from writing for personal creative expression and for social communication, writing



Figure 2. A signature guide enables a person with low vision to sign his name in the appropriate location

and recording information is a survival skill needed for many activities of daily living, like writing a check or filling out a form during a medical appointment. Writing is also an important memorization strategy, for example, as when taking notes during an appointment with a physician or jotting down a message.

While it is assumed that technologies and strategies for reading may be appropriate for writing, an activity analysis reveals their differences. Reading typically occurs at a distance of about 40 cm, yet writing typically occurs at an arm's length. Writing is done with the dominant hand, while reading materials may best be seen when held up to the better-seeing eye, regardless of whether or not it is the dominant eye. Writing is typically larger than the font size which is considered "standard print". The writer fixates on and follows the tip of the pen, guiding and directing its movement across a line. Writing is slower than reading and therefore tracking eye movements are also slower and require sustained fixation to facilitate eve-hand coordination. Patients with central scotomas have difficulty guiding the direction of the pen leading to handwriting that drifts up or down a line with poor spacing between letters and words. In patients with constricted visual fields, inaccurate anticipation of the edges of the page can lead to writing which goes outside of its margins.

Writing guides are simple plastic stencils with openings that guide the writer's pen placement in the appropriate space. Writing guides are made commercially for full-size pages, envelopes, and checkbooks; however the resourceful occupational therapist can fashion simple writing guides from sturdy cardboard.

Community mobility

Glare

important consideration for An participation in outdoor activities as well as traveling as a passenger is glare. Like sunglasses, glare filters help to protect the eyes from harmful light rays. Yet in addition to eve protection, glare filters also cut out certain colors from the color spectrum, which may provide further relief from discomfort caused by glare. Glare filters come in a wide variety of designs and colors. For people with low vision who wear corrective glasses, glare filters that fit over glasses may be preferred over a separate pair of sunglasses. Fit-over styles allow the user to keep his or her distance glasses on while donning or doffing the fit-over glare filters as needed. Fit-over filters come in a wide array of colors. While the choice of color is entirely subjective, warm colors (yellow, orange, gold, amber, copper, and brown) appear to enhance the foreground in people who have central vision loss from macular degeneration. For people with peripheral

vision loss, light colors such as gray or pale yellow may be preferred.

Some lenses are polarized, meaning they help to reduce horizontal glare, for example, from cars, streets, and buildings. People with low vision should be instructed in the correct method for using glare filters. When going outside, the user should don the filters over the corrective lenses before stepping outdoors. When entering buildings, the user should only remove the filters once inside. No single filter can protect a person from all sources of glare. Glare filters can also be used indoors and users should be encouraged to try various colors and shades to determine their level of visual comfort in specific environments. Glare filters are commercially available with prices starting around \$10.



Figure 3. Glare filters come in a variety of shapes and colors

Cane travel and guide dogs

A white cane for some people is a symbol of independence, while others with low vision may perceive it as a symbol of weakness or vulnerability. While it is not within the scope of an occupational therapist to train a person to use a white cane, it is certainly within our scope of practice to support and educate clients about the benefits of using a cane and refer them to professionals who can provide appropriate training, namely orientation and mobility specialists. These professionals are trained to provide instruction in safe travel techniques using cane skills and other orientation technologies such as GPS systems. In the United States, the National Federation of the Blind provides United States residents free canes through its Free White Cane Program (https://nfb. org/free-cane-program). Folding canes are commercially available from \$12.

Guide dogs can be wonderful companions to people with low vision but require a high degree of initial and continued training and care. Guide dogs assist the person with low vision, (called the "handler") with travel, but are dependent on the handler for instructions. Contrary to popular belief, guide dogs cannot independently direct the handler to a specified location or interpret street signs. They simply follow the handler's commands. Therefore, the handler needs prior skills in orientation and mobility. It is crucial that the guide dog is carefully matched to the person with low vision, and equally important that the handler understand the responsibilities associated with owning. caring for, and maintaining the skills of the guide dog (Wikipedia, 2018). There are many organizations that raise and train dogs to be companions to people with low vision and blindness. Some of them provide the dog free of charge, while others charge a fee.

Driving

In the United States, one of the most difficult topics to address in clients with low vision is driving cessation. Few cities offer convenient methods of public transportation, and giving up one's car keys can be a major blow to an individual's sense of self worth, pride and level of independence.

Visual acuity refers to sharpness of vision and is measured by documenting a person's ability to see characters on an eye chart from a particular distance. The top number refers to the distance, measured in feet or meters, and the bottom number is the size of the character, measured in a unit called an M-size. In the general population, the minimum visual acuity required for



Figure 4. Customized bioptic telescope, right eye. Photo credit: Alex Bowers, www.nei.nih.gov

reading street signs is 20/40 (in feet) or 6/12 (in meters) (Steinkuller, 2010). The visual field requirements vary from state to state (in the USA), and is usually only specified for commercial, long-haul drivers Some states allow a driver with low vision to use a specially-designed telescope, called a bioptic telescope. These devices are fitted slightly above the user's direct line of sight, in such a way that the driver has to tip his or her chin down in order to line up the telescope for viewing. The telescope is meant to be used for a brief period, also called "spotting". When the driver tips his chin down, the telescope is aligned with the driver's pupil and the driver views through the telescope to gather information about upcoming road signs, road conditions, etc. The bioptic can be customized or pre-fabricated, but in all instances the telescope is limited

in power to 4x. Auto-focus telescopes should be avoided and manual focus telescopes should be focused at infinity. The driver using the bioptic needs to learn skills to locate, align, and view distant objects quickly and efficiently before using the bioptic telescope on the road. In the United States, a monocular bioptic telescope system can cost \$800-\$2500 and is prescribed by a low vision optometrist or ophthalmologist (VisionAware, 2018).

For those wishing to use public transportation, a monocular telescope can help with identification of bus and train numbers, train and bus platforms, and stations, etc. Monocular telescopes come in a range of powers from two to six times magnification (2x to 6x). The sequential skills for successfully using a monocular telescope include locating the visual target with the naked eye, holding up the monocular to the better eye, lining up the visual target with the monocular on the visual target, and following the target while moving.

Summary

Low vision rehabilitation is a growing and relevant area of intervention for occupational therapy practitioners. The two part articles presented were intended to provide occupational therapists with insights into the potential needs of people with low vision, as well as to highlight areas for intervention. Just as no two people with low vision have the same eyesight, there are no simple solutions which meet the needs of everyone with low vision. Continued education and training in this area is a lifelong, but worthwhile endeavour!

References

- Illuminating Engineering Society of North America. (2009). *Lighting Your way to Better Vision*. New York: Lighting Your way to Better Vision.
- Steinkuller, P. G. (2010). Legal Vision Requirements for Drivers in the United States. *American* Association Journal of Ethics, 938-940.
- VisionAware. (2018, May 31). Driving with Low Vision. Retrieved from American Foundation for the Blind Web site: http://www.visionaware. org/info/everyday-living/ transportation/driving/125
- Wikipedia. (2018, May 16). *Guide dog.* Retrieved from Wikipedia: The free encyclopedia web site: https:// en.wikipedia.org/wiki/Guide_dog

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