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ELDER CARE

A Resource for Interprofessional Providers

Low Vision Aids

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The National Eye Institute reported that in 2014 more than 4 million adults in the US had blindness or low vision, and the majority were over age 65. By 2030, that number is expected to increase to over 7 million (Table 1). As noted in a prior edition of Elder Care, age-related macular degeneration (AMD) is the most frequent cause of irreversible blindness among older adults in the US. It affects 30% of people over 75, with 1 in 14 having serious visual impairment.

Table 1. Eye Disease Prevalence and Projections

Number of Adults >40 Years in US	2014 Estimates* (in millions)	2030 Projections (in millions)
Age-Related AMD	2.1	3.7
Glaucoma	2.7	4.3
Diabetic Retinopathy	7.7	11.3
Cataract	24	38.7

Source: National Eye Institute https://nei.nih.gov/eyedata/

Low vision in older adults is associated with significant declines in health, functional status, and quality of life. It is also linked to an increased risk of falls, cognitive decline, delirium, and depression. It is thus important that clinicians address vision problems in older adults. This Elder Care reviews several commonly used devices for individuals with visual impairment that cannot be successfully managed with medical or surgical therapies (Table 2).

Hand-Held Magnifiers

A hand-held magnifier is the most basic vision aid. Typical devices have a 3" round or 2"x4" rectangular lens, and magnify objects up to 5x, though some go up to 20x (Figure 1). Many have illumination to facilitate use in low-light. Hand-held magnifiers are used to assist with reading and viewing pictures. Their advantages are low cost ($10-40) and portability. There are even smartphone apps that serve as magnifiers. Their main disadvantage is that they require use of the hands, and often work poorly when patients have tremor.

Also, their narrow field of view requires movement of the device across text during reading, thus reducing reading speed.

Figure 1.
Hand-Held Magnifier
Source: Administration of Community Living, US Department of Health and Human Services
https://abledata.acl.gov/indexing-terms/magnification?page=32

Stand Magnifiers

Stand magnifiers are magnifying lenses mounted on a stand that typically sits on a desk top. As with hand-held magnifiers, they can be illuminated. Their main advantage over hand-held magnifiers is that they are hands-free and often can be used by people with tremor. They do, however, still require good hand-eye coordination. Some sit over text on four legs and have large view areas; others are mounted on fixed or goose-neck stands. Cost varies from around $15 for simple models to as high as $200 for more sophisticated models (Figure 2).

High-Powered Spectacles

High-powered spectacles are inexpensive eyeglasses with high-magnification lenses. They do not require the use of hands. Their disadvantage is the need to hold objects close to the eyes, which interferes with illumination for reading. They are relatively inexpensive; prices start at about $20.

Figure 2. Stand Magnifier

Source: NASA Scientific and Technical Information: Improving Vision. www.sti.nasa.gov/tto/spinoff2003/hm_7.html

TIPS FOR RECOMMENDING LOW-VISION AIDS

- Recommend low-cost magnifiers or high-powered spectacles if they are adequate visual aids.
- Avoid hand-held devices for patients who have tremor.
- Consider spectacle-mounted magnifiers when patients need both near and distant vision aid.
- Check to see if your state commission for the blind will pay for patient's vision aids.

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Spectacle-Mounted Magnifiers

Spectacle-mounted magnifiers are small protruding lenses that are mounted on eyeglass frames (Figure 3). The magnifiers can be "microscopes" for close-up vision or "telescopes" for more distant vision, and patients may switch between the two. In microscope mode, patients must hold objects much closer to the eye than normal, which some people find difficult and can interfere with adequate illumination of reading material. Telescope mode is designed for distant viewing activities like watching television, painting, reading music, and looking at a computer monitor. Field of vision is narrow with both modes.

There are low-cost over-the counter devices that cost as little as $5-10. More sophisticated spectacle-mounted magnifiers require a prescription by an eye-care professional. They are also somewhat expensive, with prices in the range of $250-300 or more. Many patients need instruction on correct use of these devices.

Figure 3.
Spectacle-Mounted Magnifier

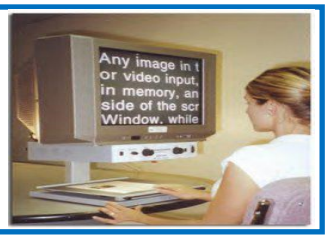
Source: US Department of Veterans Affairs. Optometry. Low Vision. Rehabilitations. http://www.va.gov/OPTOMETRY/Low_Vision_Rehabilitation.asp

Electronic Magnification Units

Commonly called closed circuit television (CCTV), these devices use video cameras to view objects and project a magnified image of the object on a computer monitor (Figure 4). The camera can be hand held and scanned across text, or it can be mounted in a device similar to the document readers/cameras that are used in lecture halls, enabling an entire page to be viewed at once. High levels of magnification (up to 60x) can be achieved, and the size of print can be increased or decreased with a zoom control. Advantages include faster reading speed as well as a greater working distance compared to other aids. This makes it easy to use for activities such as writing or drawing. Lower-cost units with a hand-held scanner start at about $250, while more expensive units can cost as much as $3000.

Figure 4.
Electronic Magnification Unit

Source: Administration of Community Living, US Department of Health and Human Services https://abledata.acl.gov/indexing-terms/magnification?page=32



Insurance Coverage

Most medical insurance plans do not cover for low-vision aids. In many states, the commission for the blind provides devices at no cost to appropriate patients.

Table 2. Advantages and Disadvantages of Various Low Vision Aids

Device	Advantages	Disadvantages
Hand-held magnifiers	Inexpensive; can be illuminated	Must hold at precise focal length from reading material; slow reading; difficult with tremor
Stand magnifiers	Inexpensive; can be illuminated; No hands necessary	Must set device at precise focal length from reading material; not easily portable
High-powered spectacles	Inexpensive; no hands necessary	Objects must be close to eye, which interferes with illumination
Spectacle-mounted magnifiers	Have both "microscope" and "telescope" lenses, so can be used for both near and far vision; no hands necessary	Expensive; objects must be held close to the eyes in microscope mode; narrow field of vision; training required
Electronic magnification units (closed-circuit TV)	Permit high-resolution images at a customized high-magnification level; both portable and desktop models	Expensive

References and Resources

Devices to Help Low Vision. American Macular Degeneration Foundation. https://www.macular.org/low-vision-resources
Rosenbery EA, Sperazza LA. The Visually Impaired Patient. *Am Fam Physician*. 2008; 77:1431-8. http://www.aafp.org/afp/20080515/1431.html
Virgili G, Acosta R. Reading aids for adults with low vision. *Cochrane Database Syst Rev*. Cochrane Database Syst Rev. 2013; 10: CD003303.
What You Should Know About Low Vision. Patient education brochure from the National Eye Institute. https://nei.nih.gov/lowvision/content/know

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