



Older Individuals who are Blind
Technical Assistance Center

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Lesson 8: Make the Most of Your Vision with Magnification Devices

Introduction

In Lesson 7, we learned about some strategies and devices that can help maximize low vision. This lesson builds on those strategies by introducing you to magnification devices. With the help of these low vision aids, individuals may be able to read the list of ingredients on a food package; independently access bills and other mail; work a crossword puzzle; or read restaurant menus, both booklet and behind the counter. This lesson will describe various near, distant, and electronic optical magnification devices that can make these tasks possible for many people with functional vision.

Lesson Goals

- Compare different types and styles of near magnification, distance magnification, and electronic magnification devices
- Consider the advantages and disadvantages of each type of device
- Gain a realistic idea of how magnification devices can help

Near Vision Optical Devices

Near vision optical devices are used for close tasks like reading, writing, sewing, or putting a hook on a fishing line. The most common near vision optical devices have a lens and include stand magnifiers, handheld magnifiers, magnifying reading glasses, clip-on magnifiers, and telemicroscopic glasses. Below are descriptions of each of these devices, with a brief discussion of their advantages and disadvantages.

Handheld Magnifiers

Handheld magnifiers are portable and helpful for spot-reading things like labels on items, tags in stores, insurance cards, credit cards, restaurant menus, and other brief identification tasks. Handheld magnifiers are easy to use, come in different sizes and shapes, are available in various magnification strengths, and commonly have built-in lights. Some can fit in a pocket, purse, or small backpack and fairly inexpensive. One

disadvantage is that handheld magnifiers must be held at both the right distance from the item being viewed and the right distance from the eye to work effectively. Because of this disadvantage, handheld magnifiers are not suited to lengthy reading tasks. Finding and keeping the right focal distance for long periods can be frustrating, and holding a magnifier can quickly tire one's arm. Also, any slight movement of the user's arm or hand will cause movement, making it difficult to keep one's place on the page because the field in view is small.

Stand Magnifiers

Stand magnifiers are a better option than handheld magnifiers for long-term reading. Stand magnifiers are similar to handheld versions, but they have a stand or extension on the bottom that allows the magnifier to rest directly on the page or other item being viewed. The stand holds the magnifier at the correct distance from the object being viewed to keep the focus, eliminating the need to hold the magnifier steady to maintain a clear image manually. When placed on a text page, stand magnifiers are automatically positioned for its focal distance. Most come with built-in lights that illuminate the area being viewed. Some individuals might use them for extensive reading, but this is not common because the field of view is not large. When using a stand magnifier, it's a good idea to use a reading stand to prop up the material at an ergonomic angle to see the text more easily and avoid bending over the magnifier, causing neck strain. Another advantage of a stand magnifier is that fatigue of one's arm or hand is usually not as significant as a handheld magnifier. This type of magnifier is fairly inexpensive compared to others. A disadvantage of stand magnifiers is the small viewing window, which often slows reading speed. Stand magnifiers are also a bit less portable than handheld magnifiers due to the stand's larger size.

Lamp-Magnifier Combinations

Lamps with magnifiers attached come in various styles and magnification powers and are found in catalogs of products for visually impaired people. They can also often be found in craft stores. These lamp-magnifiers can be used at a distance of 10 to 14 inches, making them great for hand or

machine sewing, knitting, or crocheting, threading a fishing pole and attaching hooks, and other tasks that require both hands. In general, they do not provide as much magnification power as several of the other devices described in this lesson. These magnifiers can be attached to a pole to stand on the floor, while others are designed to stand on a desk or tabletop. Another style of this type of magnifier is attached to a lanyard or cord to be worn around the user's neck.

Magnifying Reading Glasses

Magnifying reading glasses provide a wide field of view, allowing you to read a line of text more easily. Because they are portable and leave your hands free, you can use them almost anywhere. You can do handwork with lower-powered glasses, read a computer screen, or read sheet music at the piano quite easily. With higher-power lenses, reading materials must be held closer to your eyes and kept very steady, which can become tiring. It is important to use the right amount of lighting when using magnifying reading glasses to help print look clearer.

Loupes

Magnifiers called loupes clip on to your regular prescription glasses, increasing the magnification to assist in reading print or music or to do handwork. Loupes are convenient. Flip them up when you don't need them, then bring them down in front of your glasses when you do. The field of view through the loupe can be somewhat small, which may be a disadvantage when reading for any length of time. Again, it is important to add enough lighting when using a loupe.

Telemicroscope Glasses

Telemicroscope glasses are designed for near vision tasks and can be used hands-free at a comfortable working distance. They provide a clear image for reading text or music, using a computer, doing crafts, playing cards or board games. Unfortunately, there are several disadvantages. These devices are small telescopes that feel heavy on your nose and do not look like glasses, which some find aesthetically unappealing. The field of view is very narrow and may cause images to appear dark. They are also quite expensive. Also, as with any magnification added to glasses,

arm, and hand fatigue when holding an item you are looking at will cause the magnified image to wiggle if your hands or arms shake.

Distance Vision Optical Devices

Distance vision devices are often used for identifying print, symbols, or objects at a distance or for short-term viewing, such as reading a street sign, the number on the front of a bus or train, an aisle number in the grocery store, or bird watching. Other distance vision devices help watch television, look for someone in a crowd, attend sports or theater activities, or view scenery. Like near vision optical devices, distance vision optical devices can be handheld, clipped on, or put in a frame to leave the hands free.

Monocular

A monocular is a small, handheld telescope that can help with short-range and distance tasks. Use the monocular by holding it steady in front of one of your eyes, usually, the eye with which you see best. A monocular is typically used for short periods to read things like signs, house numbers, or menu boards. Monoculars are available in a wide range of magnification powers and are small enough to carry in a pocket or hang on a cord around your neck.

Practice is needed to use a monocular for scanning the environment to locate your target. Slight hand movements or tremors can affect an image's focus and clarity, and your depth perception and balance can be distorted when looking through a monocular. These devices should be used while standing still; it is not recommended to walk while using a monocular. Bright lights can cause glare, which can also make it difficult to use a monocular.

Spectacle-Mounted Telescopes

Spectacle-mounted telescopes are permanently attached to a pair of eyeglasses, leaving both hands free. They provide a clear view for watching sports or viewing television or movies for extended periods without arm fatigue. Like telemicroscope glasses, they have a small viewing field and do not look like normal glasses. Like monoculars, these

glasses are not safe to use when walking.

Bioptic Telescopes

Bioptic telescopes are a type of distance optical device mounted in the upper part of eyeglass lenses. The wearer looks through the bottom half of the glasses at objects in the distance and looks through the telescope in the top of the glasses to see a magnified image. Many states allow some people with low vision to drive using bioptic telescopes. Note that specific bioptic driving rules and requirements vary from state to state.

Electronic Magnification Devices

One of the disadvantages of the near vision optical devices mentioned earlier is a small viewing area. Most people want a device that is powerful enough to read print while also showing the entire page. Unfortunately, as magnification increases, the viewing area gets smaller, so basic magnifiers can't provide both a large viewing area and a wide range of magnification. Additionally, electronic magnification can help increase contrast. For instance, if black print is on a red background, this image can be manipulated to show the image as white text on a black background or black text on a white background.

Electronic magnifiers can provide a wide range of magnification levels with an increased viewing area. Different types of electronic magnifiers have different capabilities. All electronic magnifiers use a combination of camera and screen to increase functional vision.

The desktop version displays a magnified image on a monitor the size of a computer screen, allowing some people to read books and magazines, view photographs, read handwritten letters, and fill out forms and other handwriting tasks. Other electronic magnifiers are handheld and easily carried in a purse or bag to help with tasks outside the home. These portable systems can allow people to read restaurant menus, labels, coupons at the grocery store, the program at a concert, or forms at the doctor's office. Both desktop and portable electronic magnification systems can help in the workplace or at a weekly volunteer activity. Most electronic magnifiers offer adjustable levels of magnification, color, and contrast. Some models even allow for low magnification levels to help those with a

limited field of vision or for those who need increased contrast but not magnification. The less magnification used, the more text can be fit on the screen. Each device has advantages and disadvantages, depending on the user's vision and lifestyle.

CCTV

The desktop version of an electronic video magnifier called a closed-circuit television (CCTV) has a camera pointing at a table where a document can be laid. The camera captures the image and displays the enlarged image on a monitor. Not only can a CCTV enlarge anything placed under the camera, but it can also improve the contrast and brighten the monitor's image. It can be changed to black letters on a white or light-colored background or white or light-colored letters on a dark background. Some CCTVs have a variety of color options to increase contrast and reduce eye fatigue. Most electronic magnifiers focus automatically and can even capture an image to be stored. Some devices include a feature called optical character recognition, which can recognize and read the text aloud. A CCTV can make it possible for someone to read a prescription label, read a book or magazine article, sort the mail, pay bills, fill out forms, write a letter, identify items, or pursue crafts and hobbies.

Some individuals may find handwriting tasks are much easier to accomplish when using a CCTV, although practice may be needed to master this skill. Unfortunately, desktop CCTV units are too big to be carried, limiting how and where they can be used. Another disadvantage is that they cost much more than any of the optical devices discussed so far.

Portable Video Magnifiers

A portable video magnifier looks a little like a smartphone with a screen on top and a camera on the opposite side. Some apps can transform a regular smartphone into one of these devices. (Note that portable video magnifiers are made for the specific purpose of enlarging text and may have better quality than the app equivalent.) Screen sizes can range from about 3.5 to 12 inches. Like the desktop versions, the level of magnification and color contrast is adjustable, and some portable video magnifiers can take a picture and show the image after the device is moved away from the

viewed image. These devices can be used anywhere for almost any task. They provide a range of magnification powers and excellent contrast and brightness. Their advantages over lens magnifiers include manipulating the contrast, a wider field of view, and the ability to read with both eyes. Compared to a desktop video magnifier, these devices are more portable, less conspicuous, and can be used to see items, not at eye level. For instance, to see a lower level shelf at the grocery store, the device can be lowered, and a picture taken. The device can then be brought back to eye level for viewing. The disadvantages include expense, difficulty completing handwriting tasks, and, on some models, the image can have faded edges. The small screen size limits the field of view, but many portable video magnifiers can be connected to a TV or large monitor at home when used for a longer-term reading task to expand the visual field.

There are even some electronic video magnifiers that can be worn over the eyes. These options are still gaining momentum in the market and may change more frequently as new technology emerges. Currently, several examples of these devices include eSight Eyewear, IrisVision, and NuEyes. Although these devices are wearable, it is usually not recommended that you move around while wearing them as they can change your sense of space and be a fall hazard. These options are highly marketed; however, many of the same tasks can be completed with lower-cost devices.

Before you purchase any of these electronic magnification systems, it's recommended that you have a low vision exam and discuss your needs and options with a specialist. If possible, find a government or nonprofit blindness or vision rehabilitation agency where you can get hands-on experience with different video magnification devices. It may help bring examples of the types of items you wish to view with a video magnifier. Make sure to ask about specific features; not all devices have all the features described in this lesson. There is a wide variety of models and brands of video magnifiers. If the specific setup you desire is not available in one product line, keep shopping. Another vendor may offer a combination of features that works better. Finally, programs that provide video magnifiers as part of their service may only offer a limited number of options.

Operating video magnification devices is not difficult, but it does take a little time to learn. Getting familiar with several models lets you make an informed choice. Some low vision clinics, private and government agencies, and online resources have loaner programs or resale options for refurbished electronic magnification devices at reduced prices.

Summary

Different tasks may require different devices because each situation has different requirements. Most low vision aids are specifically made for either a near or distance task. For example, near vision devices are designed for reading books, mail, or recipes. Each of these near reading tasks varies by length, print size, and possibly print or background color. Although all near reading tasks might be accomplished with the same magnifier, the user may find that the size of a device is not practical for taking to the kitchen to read recipes or that a smaller device is tiresome to hold for the longer activity of reading a book. Distance devices might be used for watching television or attending theater productions or sporting events. Another form of magnification is electronic video magnifiers, which use a camera to project text or an image on a screen. The large desktop models allow you to read a book, see pictures, write a check, or address an envelope under the camera. Smaller versions make it easy to read a menu, a concert program, or the hymnal at your place of worship. Because they are task-specific, you may need to use several optical devices throughout your day based on your vision and lifestyle. Professional training, which is often available through government or nonprofit blindness agencies, is recommended to use many of these devices efficiently.

This lesson has described several low vision optical devices that can be used to enhance the remaining vision. It is important to note that not everyone can successfully use magnification to access print due to the amount of remaining vision or secondary physical challenges that can interfere with some low vision devices' successful use. Because there are various options, it is important to evaluate and experiment extensively with the devices to determine what will work well for the tasks you need to accomplish. It helps maximize vision with optical devices, but some tasks

can be done more quickly by using other senses and the other tools in the toolbox.

Suggested Activities

Try these activities to further your understanding of magnification devices:

- Contact your nearest government or nonprofit vision rehabilitation agency and request assessment and training in the use of optical devices.
- Identify five near vision tasks that you would like to use an optical device to accomplish.
- Identify five distance vision tasks that you would like to use an optical device to accomplish.
- Think of 3 ways you could incorporate the skills you used in previous lessons along with an optical device to maximize effectiveness.

Resources

Find various low vision aids such as magnifiers, monoculars, and electronic magnifiers at the following links. Please note that the below list is not comprehensive.

- Enhanced Vision
- eSight Eyewear
- Humanware
- Independent Living Aids
- IrisVision
- LS&S Products
- MaxiAids
- NuEyes
- Vispero