



CVRP



West Virginia University
The Institute

Children's Vision Rehabilitation Project

Instructions For Training With Optical Devices

TYPES OF DEVICES

SPECTACLES

Definition:

Glasses are the most often prescribed low vision device and are the device of choice in most situations. They are simply reading glasses with higher powers than normal. These higher powers provide a shorter focal distance, resulting in relative distance magnification.

Instructions for Spectacles:

The most important area is reading distance. Depending on the prescription, the student's vision will be blurry at previously preferred "normal" working distance. The best way to teach adaptation to short focal lengths is to have the student touch his/her nose with the reading material and back away until it comes into focus. The second issue is distortion. It occurs when moving the eyes from side to side. The higher power lens, the more pronounced this problem might be. A constant and clearer image is possible if the head is kept still and the paper is moved from side to side. This is a difficult adjustment to make and will require patience of the instructor and student.

HAND MAGNIFIERS

Definition:

Hand magnifiers consist of a convex lens surrounded by a plastic or metal carrier attached to a handle. Some hand magnifiers have a light attachment. The optical principles of hand magnifiers are based on the same rules a spectacles, but introduce another concept. Because the lens is not worn on the face, there is now an eye-to-magnifier distance as well as a magnifier-to-print distance.

Instructions for Hand Magnifiers:

The most important point is to keep the distance from the hand magnifier to the printed page constant. To find this distance, start with the lens on the page and slowly pull back until the optimal focus is reached. Hand magnifiers should be used with distance glasses. To increase field of view, bring the magnifier closer to your eye as well as the reading material. ***The distance from print to lens must always***

be kept constant to maintain focus.

STAND MAGNIFIERS

Definition:

Stand magnifiers are similar to hand magnifiers except they have legs or some other support attached. This allows the magnifier to stand freely on the page. Stand magnifiers allow the magnifier-to-print distance to remain constant. This eliminates the need for controlling focal length; many students prefer this over hand magnifiers. Disadvantages of stand magnifiers include reduced illumination of the material being viewed and that the device is not as portable as a handheld magnifier.

Instructions for Stand Magnifiers:

This magnifier is good for students who are young, have tremors or arm control issues (i.e. students with cerebral palsy) because of the fixed magnifier to print distance. The eye-to-lens distance causes some difficulty. Students tend to pull stand magnifiers close to their eyes as if viewing through a telescope. This will improve the field minimally, but blur the image. The distance will vary with each student but students should not view at a close distance. If a student persists in holding the stand magnifier close to eye, teachers should suggest a high power spectacle instead. It would achieve the same purpose, and keep the hands free.

NOTES

TRAINING WITH DISTANCE OPTICAL DEVICES

UNIT I: HOLDING THE UNIT

Objectives:

11. He will hold the device correctly.

Suggested Activities:

- 1a. Demonstrate the correct way to hold the device. Have him practice first with his arm supported and later unsupported.
- 2b. Instruct him to hold the device as closely as possible to his eye with the other eye closed. If he has trouble with keeping the opposite eye closed allow him to cover his eye with his hand.

Evaluations:

- 1a. Observation by instructor.

UNIT II: FOCUSING THE DEVICE

Objective:

1. He will focus the device.

Suggested Activities:

- 1a. First focus the device for him and allow him to look through the device to see a clear image.
- 1b. Put the device out of focus. Instruct him how to focus the device. Have him attempt to focus it.
- 1c. Check the device for a clear image after he has attempted to focus it.

Evaluations:

- 1a. Check for focus of a clear image.

UNIT III: SPOTTING WITH THE DEVICE INDOORS

Objective:

1. Using a distance device she will spot a target indoors.

Suggested Activities:

- 1a. Introduce a simple target of good contrast. Have her spot the instructor first with the naked eye.
- 1b. Have her then use device to spot the instructor and move to the target the instructor is holding.
- 1c. Back away slowly from her. Have her to try to keep the device in focus.
- 1d. Have her locate the target without first spotting the instructor.
- 1e. Introduce more complicated targets at varying distances and have her spot them.
- 1f. Change targets to make sure she is spotting accurately.

Evaluations:

- 1a. Observation by instructor
- 1b. She follows the target.

Objective:

2. Using a distance device she will spot objects indoors

Suggest Activities:

- 2a. After she has learned how to spot targets, pick out objects in the room for him to spot. Have her find the objects first with her naked eye and then the device.
- 2b. Name a familiar object in a room. Have her spot it and name its location.
- 2c. Have her look down a hall and name the objects she spots with the device.

Evaluations:

- 2a. Observation by instructor

TRAINING WITH DISTANCE OPTICAL DEVICES

UNIT IV: TRACKING WITH THE DEVICE INDOORS

Objectives:

1. He will use the device to track an object indoors.

Suggested Activities:

- 1a. Use two targets five feet apart. Have him locate the first target with the naked eye and then the device. Have him locate the second target with the naked eye and then the device.
- 1b. Hold one target in front of the other. Have him locate the target with the device. Move slowly left to right and have him follow the target with the device.
- 1c. Place a strip of masking tape from one target to another. Have him track from one target to the other following the masking tape.
- 1d. Have him use device to follow a borderline.
- 1e. Have him use device to familiarize himself with a room. Have him use a combination of tracking and spotting.

Evaluations:

- 1a. Observation by instructor.

NOTES

UNIT V: SPOTTING WITH THE DEVICE OUTDOORS

Objectives:

- 1a. Using a distance device she will spot objects outdoors.

Suggested Activities:

- 1a. Begin in a large open area. Select a target. Have her spot it.
- 1b. Begin with familiar shapes; i.e., street signs, traffic signs. Have her spot these familiar shapes in the outdoors environment.
- 1c. Have her use device to spot objects in environment. Have her name the objects he spots.

Evaluations:

- 1a. Observation by instructor.

NOTES

TRAINING WITH NEAR OPTICAL DEVICES

UNIT I: INSTRUCTIONS ON HOW TO USE A MAGNIFIER:

Hand Magnifier:

1. Place the lens on the page
2. Raise slowly until the image is increases to its maximum size without distortion.
3. Held this way close to its focal length a lens provides maximum magnification and working distance, but a smaller field of view than a spectacle.
4. Used closer to the print, the lens provides less magnification, very little distortion, and a larger field. By moving the head closer to the lens, the student obtains a larger field without sacrificing maximum magnification.

Fixed-Focus Stand Magnifier:

1. Position reading material either flat on the table or on an inclined surface (use a reading stand or improvise with a clipboard propped up on books.)
2. Adjust the light to shine on the material at an angle to avoid reflections from the lens surface.
3. Place the stand on the reading material and push it along the page but do not lift it.
4. The best way for the instructor to learn the use and limitations of stand magnifiers is to use the devices and vary the viewing distance.

UNIT II: ACTIVITIES FOR USING A MAGNIFIER

Preschool / Elementary School Students:

1. Observe interesting objects: rocks, shells, fossils, feathers, money, fingerprints, leaves, flowers, etc.
2. Identify stamps and find the country of origin in an atlas or on a globe.
3. Use a game board approach to move forward when cut-out pictures pasted on individual cards are identified.
4. Find hidden pictures. Use this game as an opportunity to teach systematic left-to-right scanning by placing a clear piece of acetate over the page with a grid or scanning plan mapped out at first.
5. Read recipes off boxes during a cooking lesson.
6. Read and play board games which require reading fine print.
7. Read toy assembly instructions.
8. Place magnifier on mirror to observe eyes and open discussion on eye condition.

Middle / High School Students:

1. Scan computer printouts for specific information.
2. Read newspaper classified sections, sports pages, and stock reports to search for specific information.
3. Locate information about food ingredients on grocery store labels.
4. Read bus and train schedules to plan routes to and from school and work.
5. Make an address book by looking up names and addresses of friends in the telephone book.
6. Make a chart to compare reading speed using a magnifier with different size print.
7. Read instruction manuals for computers or new appliances.
8. Use a magnifier to locate geographic areas, mentioned in current news broadcasts, in an atlas.

LOW VISION GLOSSARY

Accommodation- the ability of the eye to maintain a clear focus as objects are moved closer to it by changing the shape of the lens.

Angular Magnification- increasing the apparent size of an objects through the use of various lens system, such as binoculars.

Binocular Vision- vision that uses both eyes to form a fused image in the brain and results in three-dimensional vision.

Concave Lens- a minus; spreads out light rays and is used to correct for myopia.

Convergence- the movement of both eyes toward each other when an object approaches, to maintain fusion of separate images.

Convex Lens- a plus lens; bends light rays inward and is used to correct for hyperopia.

Diopter- the unit of measure for the refractive power of a lens.

Eccentric Viewing- the use of a part of the retina that is not specialized for sharp vision when the fovea is damaged or non-functioning.

Fixation- coordinated eye movements to enable an image to focus on the fovea.

Focal Distance- focal distance is the distance at which converging light has come to a point of focus behind a plus lens.

Focus- poing where light rays that originate at some object point are brought to a sharp image by a lens.

Fovea- the center of the macula where the cones are concentrated

and clearest vision occurs.

Glare- an annoying sensation produced by too much light in the visual field that can cause both discomfort and reduction in visual acuity.

Magnification- This refers to the enlargement in the size of an image. Magnification is measured in dioptic power or in terms of X.

Motion Parallax- telescopes and other magnifiers have reduced fields of view. As an image is viewed through the small visual aperture, objects pass through the small field very quickly. This apparent motion is much faster than normal. If the telescope itself is moved, the apparent motion is also much faster. This apparent motion is known as motion parallax.

Refraction- is the bending of light rays by a lens. Convex (plus) lenses causes light rays to converge. Concave (minus) lenses cause light rays to diverge.

Scotoma- a blindspot in the visual field.

Scanning-refers to the technique of looking across a particular area by sweeping a magnifier or telescope slowly in a horizontal fashion to take in the complete field of view. It requires moving the lens, so motion parallax may interfere.

Spotting- is the technique of finding and viewing a stationary object in the field of view. Neither the eye nor the lens are moved.

Tracking- is the technique of viewing a moving object. The object and the magnifier are both in motion, keeping them aligned can be tricky. Motion parallax and smearing of the view are common problems, as is losing the view of the object altogether.