A course in low vision practice

Part 6 – advantages and disadvantages of aids

Having looked at the optics of common low vision aids, **Barbara Ryan** and **Tom Margrain** compare the advantages and disadvantages of various optical aids (Module C3139)

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Association of Optometrists Ireland

A COURSE IN LOW VISION PRACTICE

In this series of 12 articles, Barbara Ryan and Tom Margrain from the School of Optometry and Vision Sciences, Cardiff University outline some of the basic theory required for low vision practice. These articles are based on modules which were developed to train the optometrists and dispensing opticians who provide The Welsh Low Vision Service which has been developed and is funded by the Welsh Assembly Government

A LARGE RANGE of low vision aids is available and it is important to weigh up their various advantages and disadvantages for each person and task.

Hand magnifiers

Most people with vision impairment are prescribed a hand magnifier of some kind at some stage as they are useful for short 'survival' tasks and are often prescribed for use out and about. There are hundreds of designs available, two of which are shown (Figure 1).

Advantages

◆ Socially acceptable. Lots of people have one and so most people feel comfortable using them

◆ Very handy. They are the most portable and convenient of all the aids. They can usually go in a pocket or handbag and are great for short 'spot' or 'survival' near tasks (Figure 2)

◆ Flexible. As long as the magnifier to task distance stays constant you can vary the magnifier to eye distance without affecting the magnification. So you can use them for tasks for which you don't want to get your face too close to the object, eg, looking at the dials on a cooker, or you can bring it right up to your eye for maximum field-of-view eg, when reading instructions

◆ Cheap. In the main, less than half the price of most other aids though the larger aspheric/illuminated versions obviously cost more

◆ Available in a large range of powers although over +20.00DS rarely used because of the short working distance

◆ Available in illuminated versions. Lots of hand magnifiers with illumination systems are now available which is very useful for when the person is out and about and illumination is unpredictable. Touch grip versions are available to allow the light to be switched on with minimal pressure (Figure 3) where grip is an issue. LED light sources (with much greater energy efficiency) are increasingly replacing the older filament lamps.

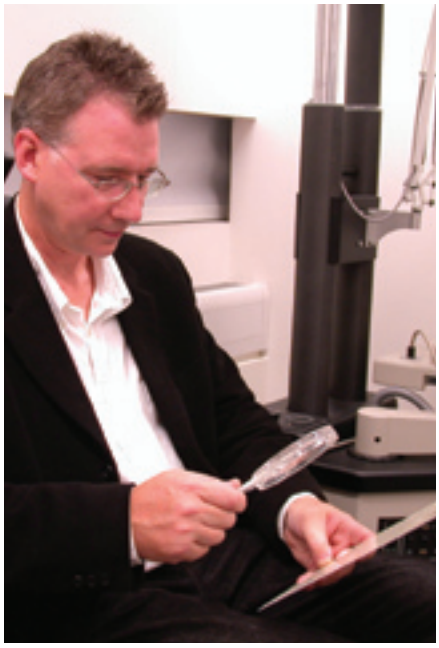

FIGURE 2. Key advantage of hand magnifiers is their ease of use

FIGURE 1. Examples of hand magnifiers

Disadvantages

◆ Good physical dexterity is required. People with hand tremors or grip problems may find them impossible to use and the effort needed to maintain focus means the length of time they can be used at any one session is limited

◆ Reduced effective magnification. Patients often hold them closer to the page than the focal length of the lens which reduces the magnification.

Stand magnifiers

Stand magnifiers are used by most people for sustained reading tasks such as reading a magazine or letter (Figure 4).

Advantages

◆ Constant accurate working distance. Particularly useful for sustained tasks or where tremor or physical difficulties need to be considered. Particularly useful at higher powers because the depth of focus becomes small and necessitates the keeping on an accurate working distance

◆ Internally illuminated. The most commonly prescribed stand magnifiers are internally illuminated because the stand can obstruct light from getting to the object (Figure 5). That means that there is no need for a separate light source

FIGURE 3. Illuminated magnifiers can have touch grip control

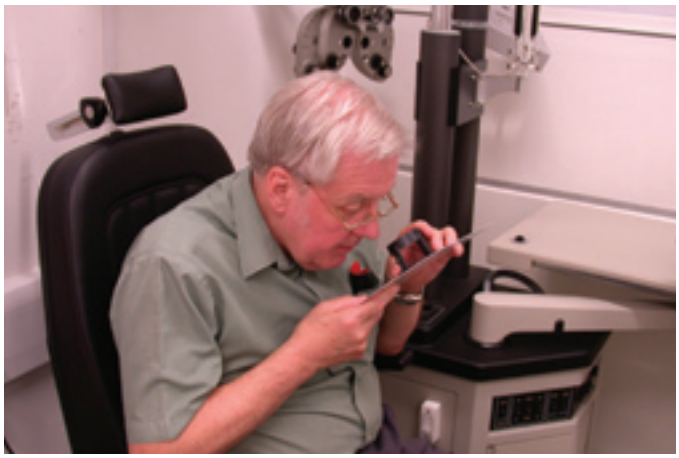

FIGURE 4. Stand magnifiers are useful for sustained reading tasks

◆ Hands-free. Some lower powered stand magnifiers allow tools (such as a pen) to be used (Figure 6).

Disadvantages
◆ Spectacle prescription. The person is usually requires a pair of reading spectacles to neutralise the divergent rays
◆ Bulky. Many of the stand magnifiers available, especially internally illuminated models, are too bulky to easily carry around.

Spectacle mounted plus lens magnifiers

Advantages
◆ Cosmetically and psychologically acceptable. Particularly at lower magnifications with a longer working distance patients find wearing a spectacle device a more comfortable option
◆ Maximum field of view. This is provided by having the lens as close to the eye as possible. This is particularly useful in scanning tasks such as reading
◆ Both hands-free. This makes reading techniques much easier and allows tasks such as sewing to be pursued (Figure 7)
◆ Correction of ametropia. Some of the forms allow for the correction of ametropia as well as providing magnification
◆ Binocularity may be maintained. This may enhance acuity and total field of view up to about +10.00DS
◆ Allows for bifocal correction.

Disadvantages
◆ Expense. High-powered lenses can be expensive. For a lot of people they need to be tailor-made to take account of facial features, centration and ametropia
◆ Short working distance. Many people dislike holding tasks close to their face. In addition it can be difficult getting enough light onto the task and maintaining the working distance for higher magnifications (Figure 8)
◆ Mobility. If binocular, the system cannot be used for walking about. Care must be taken with bifocal forms especially on stairs and steps.

CCTVs

Advantages
◆ High magnification. Up to X70 possible
◆ Contrast reversal and enhancement. The only type of LVA to provide contrast enhancement eg, from 70 per cent to 100 per cent. Also has reverse polarity and some have colour options and ability to use margins or masks to give an in-built typoscope effect
◆ Allows better posture (Figure 9)
◆ Zoom facility. Variation of image size independent of focus allows greater flexibility of use
◆ Socially acceptable. Especially in school and work environments
◆ Binocularity
◆ Depth of field. In the main, it has a reasonable depth of field so it can be used for non-flat tasks such as peeling carrots.

Disadvantages
◆ Expense. Though it varies greatly, all types are generally outside the reaches of most people to purchase privately. Cheaper devices are limited in their use for example, fixed magnification
◆ Difficult to use. Moving the object on an X-Y table, focusing and adjusting magnification all at the same time is not easy. Most people need practice and some will never master their use
◆ Poor portability. Portable versions are available but are usually very expensive. Desktop versions are hard to transport. TV readers are the most portable.

FIGURE 5. Internally illuminated stand magnifiers are commonly prescribed

Flat-field magnifiers

Advantages
◆ Normal viewing distance possible
◆ Binocular viewing possible
◆ Light gathering
◆ Constant accurate focus. No need to hold or focus – which is particularly useful for sustained tasks or where tremor or physical difficulties need to be considered and in cases were comprehension is poor
◆ No aberrations
◆ Can be used with spectacle mounted LVAs to give greater magnification.

Disadvantages
◆ Can only be used on a firm, flat surface
◆ Only up to about X3
◆ Even low powers are heavy and smaller versions have a reduced field of view
◆ Can get scratched easily as resting on reading material.

FIGURE 6. Using a pen with hands-free system

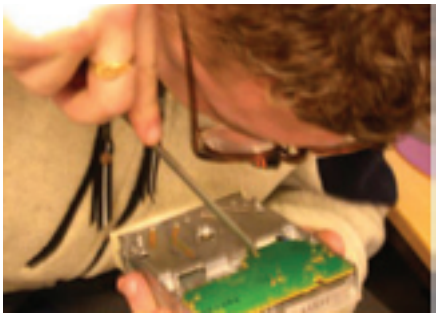

FIGURE 7. Hands-free spectacle magnifier

INSTRUCTION WITH LVAs

General instruction with all low vision aids

All low vision patients, however simple the device prescribed, require instruction in their use. In general, the more complex the device the more instruction that is required. Some people may benefit from training sessions which will allow them to make the most of their low vision aid in daily life. Many rehabilitation workers will provide this training and will visit people in their own home or take them out and about with their distance aid. It is important to check that the patient understands:

◆ What tasks the device is designed and prescribed to be used for
◆ The correct working distance, both from the magnifier or screen to the task and the magnifier to the eye
◆ How to change the batteries, use the transformer or controls
◆ How to change the bulb and where to get replacement bulbs
◆ How to use the device with other aids such as clip boards or reading stands
◆ Which spectacles they should use with each aid
◆ Any other techniques such as how to change line (outlined in the 'Using sight and other senses' module).

General instruction with telescopes

Finding, focusing and following objects when you have a visual impairment and are using a distance low vision aid is extremely difficult. Everyone prescribed a distance low vision aid should be shown:

◆ Spotting – if a person wants to look at a stationary object they first locate it with their naked eye, and keeping their gaze on the object bring the eye-piece up to the eye they want to use, the other hand covering the other eye, while adjusting the focus. With binoculars it is similar. This can be practiced by asking the person to focus on different objects in a room or scene
◆ Focusing – get the patient to refocus for different distances
◆ Scanning – if a person wants to find another object while looking through the telescope (eg, looking from a timetable to a clock in a train station) they can be taught to scan in systematic swoops across the area the object is thought to be located in. This can be practiced by getting them to find and focus on different objects in a room
◆ Tracking – by far the most difficult thing to do with a distance low vision aid is follow moving objects. The small field of view and need to adjust focus makes this a skill few master. Practice at tracking by following you around a room is a start.

FIGURE 9. Better posture with CCTV

FIGURE 8. Many people dislike a short working distance. Clipboards are to be encouraged

Further Reading

Dickinson C. *Low Vision Principals and Practice*. Oxford. Butterworth-Heinemann 1998.
Nawakowski R. *Primary Low Vision Care*. East Norwalk, CT: Appleton and Lang, 1994.
Product Catalogue. Eshenbach.
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Cole RG and Rosenthal BP. *Remediation and Management of Low Vision*, St Louis, Mosby 1996.

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MULTIPLE-CHOICE QUESTIONS

1 Which of the following is not an advantage of a hand magnifier?
A Portability
B Excellent for higher magnification tasks (>20X)
C Cost effective
D Psychologically acceptable

2 Which of the following points is true regarding the use of a hand magnifier?
A Must be used with reading spectacles
B Must be used with distance spectacles
C Generally gives lower magnification than might be expected for the equivalent lens power because people hold them closer than the focal distance to the page
D Illuminated versions only useful for patients with good grip

3 Which of the following points is true regarding the use of a stand magnifier?
A Best used with distance spectacles
B The higher the magnification, the better the field of view
C Best used with reading correction
D Impossible to use in conjunction with a pen or tool

4 Which of the following points is true regarding the use of a spectacle magnifier?
A May be adapted to incorporate refractive error correction
B Possible to maintain binocularity up to +20.00D
C Only available in single-vision form
D High-power lenses provide limiting field of view

5 Which of the following points is true regarding the use of a CCTV?
A Should not be considered for elderly patients
B Refractive correction is irrelevant for their use
C Typoscopic aid may be incorporated
D Only good for viewing flat objects

6 Which of the following is true regarding the use of a flat-field magnifier?
A Only for monocular viewing
B Only suitable for children
C May be combined with spectacle magnifiers or accommodation to increase magnification
D Useful for uneven surfaces

The deadline for responses is Thursday, March 16

Module C3 139 To take part in this module go to www.opticianonline.net and click on the Continuing Education section. Successful participation in each module of this series counts as one credit towards the GOC CET scheme administered by Vantage and one towards the Association of Optometrists Ireland's scheme.